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A proactive and diligent approach to Institutional Developments for sustainable vessel operation

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Summary

Purpose of the research: This PhD thesis focuses primarily on assessing the impact of implementing the newly established policy of sustainability on the shipping sector and on creating a circuit with existing practices, integrating aspects from various shipping domains, that will ensure the effectiveness and continued implementation of this newly established policy in perpetuity. Alongside the gradual expansion of sustainable practices, other exogenous factors equally influence and cause upheavals in normal shipping practices. Those factors are i) technological development, ii) digitalisation iii) the expansion of Covid-19. Therefore, in parallel with evaluating the impact of sustainability, the effect of the above-mentioned exogenous factors on the expansion and implementation of sustainable shipping policies will be assessed. Furthermore, any possible correlation between recent legislative changes in maritime law with sustainable maritime policies will be examined and the possible future effects and changes that the expansion of the new policies may bring will be explored. Finally, there will be an evaluation of the maritime control bodies, their evolution, and their impact on sustainable shipping in terms of the expansion of its policies, but mainly in terms of their possible contribution to the continuation of implementing this newly established policy in perpetuity.

Methodology: The doctoral dissertation is based on the research and study of legislation and relevant court decisions (legal doctrine) to draw conclusions and to make hypotheses, while integrating aspects of shipping management and maritime economics, to achieve a holistic and interdisciplinary approach. At the same time, a hybrid legal research model (based on American models of legal research) was implemented with: i)the investigation of an original central idea (combination of sustainability, with proactiveness and the duty of diligence), ii) the extraction of conclusions and original research ideas from each individual point of assessment, iii) the examination of the main institutions and laws which are affected or depended by sustainable policies, to achieve best implementation and the continuation of sustainable practice in perpetuity.

Findings: As a result of the research, it appears that many existing newly established legislation and proactive measures have significant shortcomings, as they (i) act

primarily in response to a phenomenon, (ii) have poor supervision by the competent authorities and, as a result, hinder the effective implementation of sustainable practices. It is therefore proposed that sustainability should operate in continuous correlation with the principles of due diligence and proactiveness, with the assistance of effective supervisory bodies. It is also concluded that achieving sustainability requires the application of the methodology of effective management systems and the enforcement of legislation, having installed preventive applications and supervisory bodies, combined with new legislation, practices, and technologies. As far as the international and national legal framework is concerned, despite the adoption of a more market-oriented attitude, a stance of proactiveness or implementation of practices directly assisting the development of sustainable maritime policy has not yet been adopted. Finally, with regard to the supervisory and control bodies of shipping, it is foreseen that P&I Clubs and port state control (PSC) will develop into key stakeholders, through which the implementation and maintenance of sustainable shipping policies can be achieved in perpetuity.

Research Originality: Initially, the study of the newly established policy of sustainability and its ancillary practices is considered be original, given the exceptionally current legislation and practices that are gradually being implemented in order to expand and effectively implement the newly created policy. Also, an innovation is the coupling of legal concepts, such as the duty of diligence with concepts that are usually found in maritime management, such as that of proactiveness, which is also a requirement of the modern institutional framework in order to examine their possible impact on the sustainability of the shipping industry, through the creation of a circuit that will ensure the effective and continuous implementation of sustainable policies in perpetuity and with the assistance of the present supervisory bodies. Finally, the examination of the current developments in international and English maritime law to determine a possible correlation with sustainable policies, in combination with the examination of the above-mentioned external factors, enables a more in-depth evaluation to the research. Lastly, the thesis relies on an integrated research methodology, to provide a holistic and interdisciplinary approach to the research topics.

Keywords: Sustainable Shipping, Due Diligence, Proactiveness, International Maritime Institutional Framework & Policy, International Maritime Law, Maritime Controlling Bodies.

Περίληψη

Σκοπός της έρευνας: Η παρούσα διδακτορική διατριβή εστιάζει στην αξιολόγηση της επίδρασης της εφαρμογής της νεοσύστατης πολιτικής της βιωσιμότητας στην ναυτιλιακή αγορά και στην δημιουργία ενός κυκλώματος με υπάρχουσες πρακτικές, από όλους τους τομείς του ναυτιλιακού κλάδου, όπου θα εξασφαλίζεται η αποτελεσματικότητα και η συνέχιση της εφαρμογής της νεοσύστατης αυτής πολιτικής στο διηνεκές. Όμως, παράλληλα με την σταδιακή επέκταση των βιώσιμων πρακτικών, υπάρχουν και άλλοι εξωγενείς παράγοντες που εξίσου επηρεάζουν και προκαλούν ανακατατάξεις στην συνήθη ναυτιλιακή πρακτική. Οι κυριότεροι παράγοντες είναι η i) τεχνολογική εξέλιξη, ii) η ψηφιοποίηση και iii) η επέκταση του Covid-19. Συνεπώς, παράλληλα με την αξιολόγηση της επίδρασης της πολιτικής της βιωσιμότητας, θα αξιολογηθεί και η επίδραση των αναφερομένων εξωγενών παραγόντων στην επέκταση και εφαρμογή των βιώσιμων ναυτιλιακών πολιτικών. Στη συνέχεια, θα εξεταστεί και η ύπαρξη τυχόν συσχέτισης των πρόσφατων νομοθετικών αλλαγών στο ναυτικό δίκαιο με τις βιώσιμες ναυτιλιακές πολιτικές και θα διερευνηθούν οι πιθανές μελλοντικές επιπτώσεις και αλλαγές που ενδέχεται να επιφέρει η επέκταση των νέων πολιτικών. Τέλος, θα γίνει αξιολόγηση των οργάνων ελέγχου της ναυτιλιακής αγοράς, της εξέλιξης τους και της επίδρασης τους στην βιώσιμη ναυτιλία όσον αφορά την επέκταση των πολιτικών αυτής, αλλά κατά κύριο λόγο όσο αφορά την πιθανή συνεισφορά τους στην συνέχιση της εφαρμογής της νεοσύστατης αυτής πολιτικής στο διηνεκές.

Μεθοδολογία: Η διδακτορική διατριβή βασίζεται στην έρευνα και μελέτη της νομοθεσίας και των σχετικών δικαστικών αποφάσεων (legal doctrine) για την εξαγωγή συμπερασμάτων και για την πραγματοποίηση υποθέσεων, ενσωματώνοντας παράλληλα πτυχές της ναυτιλιακής διοίκησης και της ναυτιλιακής οικονομίας, για να επιτευχθεί μια ολιστική και διεπιστημονική προσέγγιση. Παράλληλα εφαρμόστηκε ένα υβριδικό πρότυπο έρευνας (βασισμένο σε αμερικάνικα μοντέλα νομικής έρευνας) με: i) την διερεύνηση μιας πρωτότυπης κεντρικής ιδέας (συνδυασμός βιωσιμότητας, καθήκοντος επιμέλειας με πρακτικές πρόληψης), ii) την εξαγωγή επιμέρους συμπερασμάτων και καινοτομιών από τα υπό εξέταση θέματα, κατά κύριο λόγο νομοθεσίες ή δικαστικές αποφάσεις, iii) την εξέταση των βασικών οργάνων και

νομθεσιών στις οποίες επιδρά ή από τις οποίες εξαρτάται, με σκοπό την επίτευξη της βέλτιστης εφαρμογής και της συνέχισης της βιώσιμης πρακτικής στο διηνεκές.

Ευρήματα: Σαν αποτέλεσμα της έρευνας, προκύπτει ότι πολλές υπάρχουσες νεοσυσταθείσες νομοθεσίες και μέτρα πρόληψης παρουσιάζουν σημαντικές ελλείψεις, καθώς i) δρουν κατά κύριο λόγο σε αντίδραση ενός φαινομένου, ii) έχουν ελλιπή εποπτεία από τις αρμόδιες αρχές και ως αποτέλεσμα δυσχεραίνουν την αποτελεσματική εφαρμογή των βιώσιμων πρακτικών. Συνεπώς, προτείνεται η βιωσιμότητα να λειτουργεί σε συνεχή συσχέτιση με τις αρχές της δέουσας επιμέλειας και της πρόληψης, με την συνδρομή αποτελεσματικών εποπτικών οργάνων. Συμπεραίνεται επίσης ότι για την επίτευξη βιωσιμότητας, απαιτείται η εφαρμογή της μεθοδολογίας αποτελεσματικών συστημάτων διαχείρισης και η επιβολή νομοθεσιών, έχοντας εγκαταστήσει προληπτικές εφαρμογές και εποπτικά όργανα, σε συνδυασμό με νέες νομοθεσίες, πρακτικές και τεχνολογίες. Όσον αφορά το διεθνές και εθνικό νομικό πλαίσιο, παρά την υιοθέτηση μιας στάσης περισσότερο προσανατολισμένης στις ανάγκες της αγοράς, δεν έχει υιοθετηθεί ακόμα μιά στάση πρόληψης ή εφαρμογής πρακτικών που να επικουρούν άμεσα την ανάπτυξη της βιώσιμης ναυτιλιακής πολιτικής. Τέλος, αναφορικά με τα εποπτικά-ελεγκτικά όργανα της ναυτιλίας προβλέπεται ότι οι αλληλασφαλιστικές ενώσεις και οι λιμενικοί έλεγχοι θα εξελιχθούν σε βασικούς αρωγούς, μέσω των οποίων θα μπορέσει να επιτευχθεί η εφαρμογή και η διατήρηση των βιώσιμων ναυτιλιακών πολιτικών εις το διηνεκές.

Πρωτοτυπία Έρευνας: Αρχικά η μελέτη της νεοσυσταθείσας πολιτικής της βιωσιμότητας και των παρεπόμενων πρακτικών αυτής, κρίνεται ως ιδιαίτερα πρωτότυπη, δεδομένων και των ιδιαίτερα επίκαιρων νομοθεσιών και πρακτικών που μπαίνουν σταδιακά σε εφαρμογή με σκοπό την επέκταση και την αποτελεσματική εφαρμογή της νεοσυσταθείσας πολιτικής. Επίσης, καινοτομία αποτελεί και η σύζευξη νομικών εννοιών, όπως αυτή του καθήκοντος επιμέλειας με έννοιες που συνήθως απαντώνται σε ζητήματα ναυτιλιακής διοίκησης, όπως αυτή της πρόληψης, η οποία αποτελεί και ζητούμενο του σύγχρονου θεσμικού πλαισίου με σκοπό την εξέταση της πιθανής επίδρασης τους στην βιωσιμότητα του ναυτιλιακού κλάδου, μέσω της δημιουργίας ενός κυκλώματος που θα εξασφαλίζει την αποτελεσματική και συνεχή εφαρμογής των βιώσιμων πολιτικών στο διηνεκές και με την συνδρομή των παρόντων εποπτικών οργάνων. Επίσης, εξετάζονται και οι τρέχουσες εξελίξεις του διεθνούς και του Αγγλικού ναυτιλιακού δικαίου ώστε να διαπιστωθεί πιθανή συσχέτιση με τις

βιώσιμες πολιτικές, σε συνδυασμό και με την εξέταση εξωγενών παραγόντων, ώστε να επιτραπεί μία πιο εις βάθος αξιολόγηση των αποτελεσμάτων της έρευνας. Τέλος, η διατριβή βασίζεται σε μια συνδυαστική ερευνητική μεθοδολογία, για να παρέχει μια ολιστική και διεπιστημονική προσέγγιση των ερευνητικών θεμάτων.

Λέξεις κλειδιά: Βιώσιμη Ναυτιλία, Δέουσα Επιμέλεια, Πρόληψη, Διεθνές Ναυτιλιακό Θεσμικό Πλαίσιο & Πολιτική, Διεθές Ναυτικό Δίκαιο, Ναυτιλιακά Εποπτικά Όργανα.

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Introduction

a. The concept of Sustainability

Over the last few years, the maritime industry has been at the crossroads of evolution, starting from the enormous technological expansion, the rapid development of digitalisation, and the adoption of new systems that increase maritime safety. At the same time, it is established that the maritime sector redefined its objectives and is moving toward sustainable shipping. However, sustainable shipping cannot be easily defined and relies on many factors[1].

But, to assess sustainable shipping, we must first define the concept and the roots of the newly emerged concept of sustainability. The first notion and the initial definition of sustainability was given in 1987, where the United Nations Brundtland Commission concluded that each generation should meet its own present needs without compromising the resources and the ability of future generations to meet their own needs[2]. The same Commission concluded that the future has become threatened, because of the reckless overuse of our natural resources and new approaches to environmental policies and development should be taken[3]. The Commission also concluded that to achieve sustainable urban development, the resource base should be conserved and enhanced, the technology should be reoriented to manage and ultimately eliminate any kind of risks and that environmental and economic decisions should be merged[4].

Finally, various other aspects and issues were assessed, such as the importance of the balance of life between land and ocean, the need for incentives to adopt environmental fuel options and the need of an environmentally neutral method of

[1] Psaraftis, H. N., Amboy, P., & Psaraftis. (2019). *Sustainable shipping*. Berlin: Springer International Publishing.

[2] United Nations Brundtland Commission. (1987). Report of the World Commission on Environment and Development: Our Common Future. Available at: http://www.un-documents.net/our-common-future.pdf. Last assessed: 28-12-2022.

[3] Ibid.

[4] UNCTAD. (1985). Handbook of International Trade and Development Statistics 1985 Supplement. Available at United Nations Digital Library: https://digitallibrary.un.org/record/100012?ln=en. Last assessed: 28-12-2022.

transportation to effectively support the continuing urban development while preserving the environment from all aspects and risks of pollution[5].

Another momentum for the expansion of the concept of sustainable practices was the United Nations Conference on Environment and Development (UNCED), also known as the 'Earth Summit', held in Rio de Janeiro, Brazil, in 1992[6]. During the conference it was highlighted the interconnection between social, economic, and environmental factors and that successful policies and practices in one sector require incentives and actions to the other sectors to be sustainable over time[7]. During the conference, a broad agenda of actions and incentives was developed to guide international cooperation in the twenty-first century[8]. The so-called "Earth Summit" recognized that the integration and balance of economic, social and environmental concerns is paramount for achieving sustainable life on the planet and that such an integrated approach is viable, if a new perception is adopted[9].

Over the next decades, the "sustainability debate"[10] continued while many academics tried to clarify and promote the roles that the governments, which are responsible for developing standards and regulating, and the corporations, which invest and operate while utilizing natural resources and products, should each uphold to achieve sustainability[11]. Many researchers also suggested that a company's operations management should be developed in conjunction to the management of natural and

[5] United Nations Brundtland Commission. (1987). Report of the World Commission on Environment and Development: Our Common Future. Parts 7,8,9,10. Available at: http://www.un-documents.net/our-common-future.pdf. Last assessed: 28-12-2022.

[6] United Nations Conference on Environment and Development, Rio de Janeiro, Brazil. (1992). *Environment and sustainable development – "The Earth Summit"*. Available at: https://www.un.org/en/conferences/environment/rio1992#:~:text=A%20new%20blueprint%20for%20international,from%203%2D14%20June%201992, last assessed: 28-12-2022.

[7] Johnson, S. P. (2001). The earth summit: The United Nations conference on environment and development (UNCED). *The Earth Summit*, 1-540. Permalink: http://digital.casalini.it/9789041177261.

[8] United Nations sustainable Development. (1992). *Agenda 21*. Available at: https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf, last assessed: 28-12-2022.

[9] Grubb, M., Koch, M., Thomson, K., Sullivan, F., & Munson, A. (2019). *The'Earth Summit'Agreements: A Guide and Assessment: An Analysis of the Rio'92 UN Conference on Environment and Development* (Vol. 9). Routledge.

[10] Wilkinson, A., Hill, M., & Gollan, P. (2001). The sustainability debate. *International Journal of Operations & Production Management*, **21**(12), 1492-1502. DOI: https://doi.org/10.1108/01443570110410865.

[11] Scoones, I. (2007). Sustainability. *Development in practice*, **17**(4-5), 589-596. DOI: https://doi.org/10.1080/09614520701469609.

human resources, adding the aspects of education[12], training and awareness of sustainable practices and the development of corporate and social responsibility[13].

The United Nations in 2015, after monitoring the international actions and incentives since 1987 and the academic discussion towards the adoption of effective sustainable practices[14], adopted seventeen Sustainable Development Goals (SDGs) in an effort to reignite and effectively guide the international community towards specified goals to achieve the initial aim of sustainability, namely the harmonious continuity of life on the planet[15].

The SDGs are by all aspects integrated and to achieve balance and further development of the concept and aims of sustainability, the international communities must prioritise those that are still behind[16]. This new approach of sustainability is evidently affected by the notion that sustainable development can only be achieved by the balance of social, economic and environmental sustainability[17].

The SDGs included many goals that were directly or indirectly connected with the shipping industry, such as clean waters, life below water, sustainable development of industry, innovation and infrastructure, affordable and clean energy[18]. To this end, the concept of sustainable shipping[19] was adopted by the international maritime community, in an effort to effectively participate to the international effort to meet the SDGs set by the United Nations in 2015[20].

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[12] Thiele, L. P. (2016). *Sustainability*. John Wiley & Sons.

[13] Portney, K. E. (2015). *Sustainability*. MIT Press.

[14] Robert, K. W., Parris, T. M., & Leiserowitz, A. A. (2005). What is sustainable development? Goals, indicators, values, and practice. *Environment: science and policy for sustainable development*, **47**(3), 8-21. DOI: https://doi.org/10.1080/00139157.2005.10524444.

[15] United Nations. (2015) *The SDGS in action*. Available at: https://www.undp.org/sustainable-developmentgoals#:~:text=What%20are%20the%20Sustainable%20Development,people%20enjoy%20peace%20and%20prosperity, last assessed: 28-12-2022.

[16] Hák, T., Janoušková, S., & Moldan, B. (2016). Sustainable Development Goals: A need for relevant indicators. *Ecological indicators*, **60**, 565-573. DOI: https://doi.org/10.1016/j.ecolind.2015.08.003.

[17] Stafford-Smith, M., Griggs, D., Gaffney, O., Ullah, F., Reyers, B., Kanie, N., ... & O'Connell, D. (2017). Integration: the key to implementing the Sustainable Development Goals. *Sustainability science*, **12**, 911-919. DOI: https://doi.org/10.1007/s11625-016-0383-3.

[18] Robert, K. W., Parris, T. M., & Leiserowitz, A. A. (2005). What is sustainable development? Goals, indicators, values, and practice. *Environment: science and policy for sustainable development*, **47**(3), 8-21. DOI: https://doi.org/10.1080/00139157.2005.10524444.

[19] Psaraftis, H. N., Amboy, P., & Psaraftis. (2019). *Sustainable shipping*. Berlin: Springer International Publishing.

[20] United Nations. (2015) *The SDGS in action*. SDG 6,7,9,11,13,14. Available at: https://www.undp.org/sustainable-developmentgoals#:~:text=What%20are%20the%20Sustainable%20Development,people%20enjoy%20peace%20and%20prosperity, last assessed: 28-12-2022.

b. The concept of Maritime Sustainability

The concept of sustainable shipping is a new and holistic management approach of the shipping industry, which sets many new goals and restructures the purpose of the industry. Due to the economy of scale, the maritime sector was elected because of its low cost and high quantity transportation benefits. At the same time, its environmental footprint was lower than the other transport methods. Therefore, the maritime sector aims to dominate the transportation market while being environmentally neutral. This new concept contrasts with the older shipping scope, namely low-cost transportation. Undoubtedly, being environmentally neutral imposed expenses on the market, which must invest heavily in new technologies and processes, to substantially decrease the pollutive emissions up to elimination[21].

Presently, maritime sustainability is concentrated in some aspects to achieve its goals, namely i) the enhancement of maritime safety, ii) the protection of the environment, iii) the elimination of harmful emissions and iv) corporate and social responsibility[22].

c. Research Aims

The first aim of the thesis is to evaluate the current state of the market and assess how this newly introduced concept of sustainability might be effectively implemented. To this end, the analysis will be conducted on the principal maritime regulatory framework to evaluate its current impact on the market and relevant environmental legislation. Furthermore, the international maritime framework and the established control systems will be included in the analysis to evidence of their impact on the adoption of applicable policies and the enforcement processes' status. Finally, assessing all the competent stakeholders will enable us to notify the gaps in the present regulatory system that might obstruct or delay the adoption and the efficient application of sustainability. While the assessment is principally relied upon maritime international institutions, managerial and economic aspects of shipping are integrated to the analysis,

[21] Boviatsis, M., & Vlachos, G. (2022). Correlation of the Concepts of Proactiveness and Due Diligence to Achieve Sustainability in the Maritime Sector. *Journal of Shipping and Ocean Engineering*, **12**, 33-42. DOI: 10.17265/2159-5879/2022.02.001.

[22] EMSA, (2022). Mission Statements. Available at: About - Mission Statements - EMSA - European Maritime Safety Agency (europa.eu), last assessed: 30-8-2022.

as per the concept of sustainability, to effectively ascertain a holistic approach to the thesis.

By assessing similar previous policies, it has been proved that the establishment of a new approach should be combined with the adoption of systems that will enhance the status and the development of the new policy and the imposition of alteration to the present system, to become more aligned with the new policy. Thus, this thesis's second and foremost aim is to propose creating a system by combining already established principles while adopting new policies, to achieve efficiency and continuity after sustainability installation. The initiation of a new concept, although many times it starts with the best prospects, the lack of strategic development may lead to abatement, which may cause the abolishment of this new concept in the long term. To this end, adopting a system that will prospectively enhance performance and establish continuity is of paramount importance. Various methods and processes will be explored to develop such a system, and other concepts will be utilised and adapted to the current needs.

The third aim of this thesis is also to assess the impact of external factors, such as the rapid technological advancements, digitalisation, and the present spread of Covid-19, to explore their significance to the establishment of sustainability and to evaluate the performance and the capacity of the current maritime regulatory framework to change and evolve. Specifically, the adoption and the consequences of many new technologies will be assessed, such as the utilisation of LNG as a fuel and the development of unmanned vessel technology, to evidence their significance to sustainable shipping. Additionally, the Covid-19 pandemic has been utilised as a test to evaluate the practical impacts of the pandemic on the maritime regulatory framework and to evidence the gaps in the maritime industry to counter such occurrences. Finally, one of the main aspects that need to be enhanced to achieve sustainable shipping is safety. Covid-19 challenged most maritime safety-related processes. Thus, it is extensively utilised to evaluate the majority of those processes.

The fourth aim of this thesis is to evaluate the impact of many recent regulatory amendments and the adoption of new legislation on shipping practice and to explore the evolution of the present legal framework. Adopting new regulations or modifications to existing rules aims to affect market practices in a specific direction. Thus, the impact of newly established or amended regulations will be assessed, and the connection with sustainable shipping will be addressed.

Finally, the fifth aim is to assess the development and impact of the shipping market's controlling bodies and determine their evolution and influence on sustainable shipping. Adopting new maritime legislation is without consequence if this regulation is not materialised in shipping reality. In most cases, those regulations create mounting expenses for the industry, which tries to avoid or partially implement the imposed changes. To this end, controlling bodies have been developed, that enforce the adoption and utilisation of those changes. The principal stakeholder of this sector is port state control, an emerging process that has dominated the market and continues to expand rapidly. To evaluate the impact of the "controlling market", port state control, classification societies, P&I Clubs and vessel registration will be assessed, their current balance of power will be evaluated, and their impact on sustainable shipping will be regarded.

d. Novelty of the Thesis

The original contribution of this thesis is summarised below in six points, connected with the chapters and the methodology of thesis:

1. Evaluation of the newly established concept of sustainability and the current status of the maritime regulatory framework for effectively incorporating sustainability in shipping practice.
2. Creation of an interdisciplinary system that will achieve efficiency and continuity to sustainability after its adoption, correlating already established principles and systems with new policies and integrating regulatory, managerial, and economic approaches from shipping industry.
3. Analysis of external factors, such as the rapid technological advancements, digitalisation, and the present spread of Covid-19, to evaluate their impact on sustainability and assess the performance of the present regulatory framework and its capacity to change.
4. Exploration of the newly adopted and amended legislation and assessing the correlation to sustainable shipping.
5. Evaluation of the current status and the future trends of the maritime controlling bodies and how their balance of power will affect the enforcement of sustainable shipping.

6. Development of an integrated research methodology, which will combine materials and methods for different shipping domains, namely maritime economics, shipping management and maritime regulations, to achieve an interdisciplinary and holistic approach of a research topic.

e. Materials & Methods

The present thesis was conducted with the support of specific electronic sources and free internet material. However, some limitations have been established for the practical focus of the research. Initially, besides the reports found electronically to the IMO and other relevant sources, specific subscription platforms were utilised for analysis: i) ilaw, ii) BIMCO, and iii) University of Essex e-library. The utilisation of those platforms considerably enhanced the legal aspect of the research. It provided helpful insight from shipping practice, which was incorporated into the thesis and supported the stated argumentation.

Concerning the methodology utilised, the legal doctrine was implemented. Legal doctrine is qualitative exploratory research based on international and national legislation and the most prominent judicial decisions to evaluate an issue, assess its impact, and explore its further utilisation.

Thus, the primary regulatory framework and environmental legislation were assessed, and the outcomes were utilised to locate gaps in the legislation, propose amendments to the existing rules, or suggest the creation of new norms or systems to counter an issue, innovate legislation or a system and procure for the effective adoption of a new policy. At the same time, the thesis integrated aspects of shipping management and maritime economics, to achieve a holistic and interdisciplinary approach to the research and conclusions.

In addition, a hybrid legal research model (based on American models of legal research) was implemented with: i) the investigation of an original central idea (combination of sustainability, the duty of diligence with prevention practices), ii) the extraction of individual conclusions and innovations from (iii) the examination of the main institutions and laws on which it affects or on which it depends, intending to achieve best implementation and the continuation of sustainable practice in perpetuity.

f. Research Layout

The analysis of the thesis is distinguished into five chapters:

The first chapter involves the analysis of the concept of international organisations, focusing on the specified organisation for shipping, namely the International Maritime Organisation (IMO) and its practices towards a proactive environmental protection. The research continues with the most fundamental conventions of IMO, namely MARPOL, SOLAS, STCW, and ILO's MLC are assessed supportively. The analysis focuses on each convention's past, present and future trends, to assess if they respond proactively towards environmental issues. Their impact on the shipping industry is also evidenced by assessing maritime accidents and occurrences, such as Covid-19.

The second chapter involves all the relevant environmental legislation and established maritime codes and systems from the perspective of proactiveness, with the integration of the concept of due diligence. Specifically, UNCLOS, CLC, FUND Convention, HNS, and LLMC Conventions were assessed from the international legal framework, in addition to the evaluation of OPA 1990, the principal national environmental legislation of the US. Additionally, the initiation and the impact of ISM and ISPS Codes are explored, which led to the adoption of systems to enhance maritime safety. Finally, an evaluation between ISM and other newly emerged systems, such as TMSA, is initiated, including other maritime "tools" and guidelines, such as ISGOTT.

In the third chapter the most prominent legislations, aiming to minimise and ultimately eliminate the environmental footprint of shipping, are assessed. Specifically, analysis of i) the ballast water management, ii) the ship recycling process, iii) the utilisation of LNG as a fuel, iv) the installation of new low sulfur cap and monitoring systems, and v) the new measures to eliminate air pollutants and vi) the development of unmanned vessels is executed, and valuable outcomes upon the adoption of a system-pattern are proposed. Finally, a "system" is proposed to achieve efficiency and continuity in the incorporation and development of the concept of maritime sustainability, with the integration of the concepts of proactiveness and due diligence.

In the fourth chapter, the present legal amendments are assessed, and an evaluation of their impact on sustainability is executed. Specifically, the current amendments to charter party clauses are evaluated along with the revisions in aspects of maritime law, such as collisions, salvage, and general average. Then, the present

changes in marine insurance are assessed, focusing on the amendments introduced with the adoption of MIA 2015. Finally, an evaluation of maritime arbitration's impact is addressed, focusing on its status in conjunction with court processes.

The fifth and final chapter focuses on the maritime control systems and the competent stakeholders. Thus, the analysis involves the recent developments in vessel registration, the status of classification societies, the evolution of P&I Clubs, and the adoption, development, and current status of port state controls. In addition, to this chapter, there is also a part evaluating the current developments of Covid-19 pandemic, including information from all chapters. Finally, this analysis aims to provide a systematic evaluation of the Covid-19 pandemic, which was utilised in various parts of the thesis to demonstrate the efficiency and the impact of each legislation and system upon countering, minimising, or handling extenuating occurrences.

Research Layout: Overall

Made by author.

Chapter 1

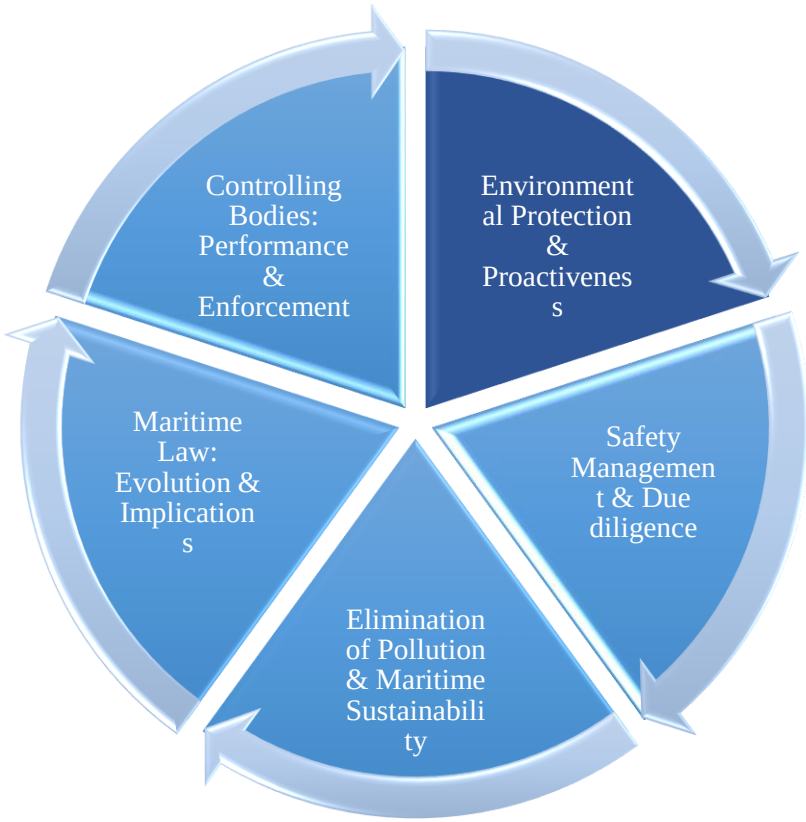
Maritime Organisations & Fundamental Conventions: Assessing the four pillars of shipping.

The first chapter focuses towards the evaluation of the principal environmental protection conventions. Initially, the International Maritime Organisation (IMO) is evaluated to assess its methods and processes upon creating environmental legislation. The research continues with the most fundamental conventions of IMO, namely MARPOL, SOLAS, STCW, and ILO's MLC, to evidence the impact of those legislation to shipping practice.

Specifically, the analysis focuses on each convention's past, present and future trends, to assess if they respond proactively towards environmental issues. Their impact on the shipping industry is also evidenced by assessing maritime accidents and occurrences, such as Covid-19.

Research Layout

Chapter 1: Evaluation of Principal Environmental Protection Legislation



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1.1 The Concept of Maritime Organisations

1.1.1 The Creation of International Organisations

The emergence and development of international organisations derive from the existence of international society, that is, the society of states. From the 17th century and the emergence of the modern states, the creation of organisations was based on the need for communication and cooperation between the newly emerged entities[23].

The next stage, especially after the First World War, is the creation of international organisations. Currently, there is permanent communication between states within a legal framework in such a structured way that they retain a unique legal personality. At the same time, a series of socio-economic and political causes led to the spread of the new institution. The transformation of society and the changes in the form of the modern state as well as the two industrial revolutions, the spread of colonialism with all the consequences on the cost of raw materials, and the creation of new markets, national differences, and technical progress that contributed to economic development and brought about changes in the foundations of society changed the form of international relations. They made it necessary for cooperation at the international level[24].

Another critical element in the current formation of international cooperation is presented with the intervention of state-owned bodies– private companies and organisations with financial autonomy – and international organisations that participate in other international organisations. Of course, these various forms of cooperation do not necessarily promote international relations in most areas. Still, there is an important development in the limitation of state competence in the actions to maintain world peace. On the contrary, the nation-state's existence removes the approach based on universal unity. Still, it enables individuals to make decisions, and therefore the international organisation will be created not only for the will of governments but also for the co-acceptance of societies[25].

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[23] White, N. D. (2020). The law of international organisations. In *The law of international organisations (third edition)*. Manchester University Press.

[24] United Nations. (2022). Model United Nations. Available at: UN Family of Organisations | United Nations, last assessed: 30-8-2022.

[25] Burnham, P. (1994). The organisational view of the state. *Politics*, **14**(1), 1-7. DOI: https://doi.org/10.1111/j.1467-9256.1994.tb00001.

Today, international organisations are instruments of political and legal power. Member States are linked by permanent legal ties to a legal person with their own will to pursue common objectives. The creation of an international organisation is based on a "founding treaty", which defines the goals, structure, relations with third parties, and how to participate in the organisation. But there are also cases where the international organisation is created without a treaty. The Organisation for the Development of Industry (UNIDO)[26] and the Conference on Trade and Development (UNCTAD)[27], for example, are the result of resolutions of the UN General Assembly of 1961[28].

Most of the time, however, international organisations are created by states. Exceptions are organisations formed by other international organisations, e.g. the International Maritime Satellite Organisation (INMARSAT) resulted from a conference of the International Maritime Organisation (IMO) in 1976[29].

However, it is not excluded that the representatives of States may establish an agency at an international conference, without the need for an international treaty, provided that the internal organs of the States ratify the decision. Another example is the Organisation of the Petroleum Exporting Countries (OPEC)[30].

Another element of the international organisation is the "multilateral". The institution presupposes the participation of more than two states, although there are no restrictions or ceilings. Relations between states are bilateral. From a legal perspective, the differences between multilateral and bilateral treaties lie in the entry into force, the formulation of reservations, the revision, and the validity expiry[31].

The element of “permanence” also characterises modern international organisations. In the absence of permanence, the consent of the member states would be necessary for every decision taken by the agency. The distinction between

[26] UNIDO, (2022). Progress by Innovation. Available at: UNIDO | United Nations Industrial Development Organisation, last assessed: 27-8-2022.
[27] UNCTAD, (2022). Prosperity for all. Available at: Topics | UNCTAD, last assessed: 27-8-2022.
[28] United Nations General Assembly, (2022). United Nations General Assembly Resolutions. Available at: 1961 United Nations General Assembly Resolutions (worldlii.org), last assessed: 27-8-2022.
[29] IMO, (2022). New World Maritime Theme highlights environmental legacy. Available at: International Maritime Organisation (imo.org), last assessed: 28-8-2022.
[30] Saboori, B., Al-Mulali, U., Bin Baba, M., & Mohammed, A. H. (2016). Oil-induced environmental Kuznets curve in organisation of petroleum exporting countries (OPEC). *International Journal of Green Energy*, **13**(4), 408-416. DOI: https://doi.org/10.1080/15435075.2014.961468.
[31] ILO, (2022). The ILO and the multilateral system. Available at: The ILO and the multilateral system, last assessed: 2022.

international organisations and conferences, which meet on an ad hoc or opportunistic basis and are not permanent, is therefore evident. Nevertheless, international organisations are governed by international law, and within this framework, their aims and actions must not escape international legality[32].

The will to pursue a particular "purpose" is also one of the reasons for the existence of the international organisation. However, it may be that the objectives of the Agency, as defined in the founding Treaty, differ from those pursued in practice and therefore do not correspond to the intentions of the Member States. The object of an organisation will, therefore, also change. A typical case is the Customs Union of Belgium, the Netherlands, and Luxembourg (BENELUX). The establishment agreement concerned a customs union. Its gradual enlargement utilizing protocols provides for coordinating economic, financial, social, agricultural, and monetary policies[33].

Apart from the common objectives of international cooperation, international organisations must not escape the 'international legality' framework. In particular, international organisations are governed exclusively by international law, which means that with the development of international relations, most of them are subjects of international law and operate for various purposes, manifesting a separate will from that of the participating states (until 1920 only states were considered bearers of rights and obligations directly by international law)[34].

An international organisation has its instruments exclusively to conduct its work, which is not subject to the powers of the domestic law of the Member States. This distinguishes the international organisation from other forms of associations. In the federation of states, there are no relations of constitutional law between the

[32] Sobrino Heredia, J. M. (2021). The Loss of Institutionality in International Organisations, and their Decline in the Contemporary International Society. *Paix & Sec. Int'l*, **9**, 1. DOI: http://dx.doi.org/10.25267/Paix_secur_int.2021.i9.02.

[33] Jones, E. (2005). The Benelux countries: identity and self-interest. *The Member States of the European Union,* Oxford University Press*, Oxford*, 164-184.

[34] Duxbury, A. (2011). *The participation of states in international organisations: the role of human rights and democracy* (Vol. 71). Cambridge University Press.

members, whose independence and sovereignty are limited as defined by the union's agreement[35].

Unique bodies enable the international organisation to express a 'special will'. The organisation's will does not have to be identical to the collective will of the member states. Therefore, an international organisation can act independently of the Member States that make it up, i.e. by a majority. This is of great importance since the question of the 'legal personality' of international organisations is being considered. In particular, all international organisations, such as the Organisation for Economic Cooperation and Development (OECD), do not apply the majority principle, where decisions are taken unanimously[36].

According to the founding treaties, an explicit provision states that international organisations have legal personality. But what happens when the treaty does not provide for or mention, without specifying the extent of the international character? The occasion was given when the Swede Bernadotte, the UN mediator for Palestine, and the Frenchman Serot, an observer of the United Nations, were murdered by members of the Irgun organisation (1948)[37]. The question was whether the international organisation was entitled to raise compensation against Israel, which was not yet a member of the UN.

According to the opinion of the International Court of Justice, it was decided that an international organisation would not be able to meet its obligations and the requirements of the Member States if it had been deprived of its legal personality. In this way, the theory of implied powers was established, according to which the organisation, besides the powers deriving from its statutes or international treaties, also has all those powers deemed necessary for the performance of its tasks[38].

[35] Alvarez, J. E. (2016). International organisations and the rule of law. *New Zealand Journal of Public and International Law*, **14**(1), 3-46. Available at: https://search.informit.org/doi/10.3316/informit.416948442070338.
[36] OECD, (2022). Aid for Trade 2022: Empowering connected, sustainable trade. Available at: Home page - OECD, last assessed: 30-8-2022.
[37] Agreement, P. (2015). United nations. *United Nations Treaty Collect*, 1-27.
[38] Gareis, S. B. (2012). *The united nations*. Bloomsbury Publishing.

Another important question concerns the activities of international organisations in accordance with the applicable law and, consequently, the consequences of their international personality[39]:

a) The conclusion of international treaties (the treaty-making power). This right derives not only from the existence of legal personality (which is not sufficient) but also from the rules contained in their founding treaty (Articles 57 and 63 of the Charter, which lay down agreements on the guardianship of territories and relations with specialised UN bodies). In addition, the United Nations may enter treaties not explicitly displayed in the Charter[40].

b) Immunities and privileges (privileges and immunities). For an international organisation to function effectively, freedom and security are required for its assets, administrative services, personnel, and representatives to exercise its duties.

c) Capacity to espouse international claims. For example, the International Court of Justice, in its judgment on the 'Reparation case'[41], stipulated that the United Nations (because of the existence of legal personality) can bring actions for damages against member states and non-members of the organisation.

d) International responsibility. The question of international responsibility arises in those cases where the organisation's bodies violate the rules of international law (e.g. problems occur with the UN peacekeeping forces in Bosnia and Herzegovina and previously in Cyprus, Congo, and Palestine). In addition, it extends to the organisation's activities that harm third states or individuals or when it violates its founding treaty (e.g. many lawsuits have been brought in the past against the EC Commission for the rules of the Common Agricultural Policy).

International organisations are also distinguished based on the geographical area and the objectives they pursue. The fundamental distinction concerns

[39] Wernli, D., Harbarth, S., Levrat, N., & Pittet, D. (2022). A 'whole of United Nations approach'to tackle antimicrobial resistance? A mapping of the mandate and activities of international organisations. *BMJ global health*, **7**(5), e008181. DOI: http://dx.doi.org/10.1136/bmjgh-2021-008181.
[40] Sharp, W. R. (1947). The specialized agencies and the United Nations: Progress report I. *International Organisation*, **1**(3), 460-474.
[41] *FW Woolworth Co. v. Contemporary Arts, Inc.*, 344 U.S. 228, 73 S. Ct. 222, 97 L. Ed. 276 (1952).

intergovernmental organisations in which only states are members, and therefore not private individuals, and supranational organisations constitute a new category of international organisations. Finally, a separate section includes the so-called international companies. Intergovernmental organisations may be classified into four categories[42]:

a) Global Organisations with General Purposes

This section includes the League of Nations and the United Nations. The participation of most countries, action at the world level, and the diversity of functions are their characteristics[43].

b) Global Organisations with Special Purposes

Here there is a differentiation in subject matter, e.g. economic, technical, social, military, and cultural. Typical examples of this section are the International Labour Organisation (ILO), the World Health Organisation (WHO), the International Monetary Fund (IMF), the Educational, Scientific and Cultural Organisation of the United Nations (UNESCO), etc[44].

c) Regional Organisations with General Purposes

As their name suggests, these organisations are widely active at a regional level, without the need for all the states on the periphery to participate, e.g. the Organisation of American States (OAS), the Arab Union (LAS), the Western European Union (WEU), the Council of Europe, the Organisation of African Unity (OAU), etc.

There is also the agreement between the UN and the USA (1947) that determines the location of the headquarters of the organisation (New York), while a similar arrangement is made by the UN with Switzerland and Austria, according to which the organisation has established its services and bodies on their territory. Finally,

[42] Eilstrup-Sangiovanni, M. (2020). Death of international organisations. The organisational ecology of intergovernmental organisations, 1815–2015. *The Review of International Organisations*, ***15***(2), 339-370. DOI: https://doi.org/10.1007/s11558-018-9340-5.

[43] Swanson, R. A. (2005). The challenge of research in organisations. *Research in organisations: Foundations and methods of inquiry*, 11-26.

[44] Sinclaire, J. K., & Vogus, C. E. (2011). Adoption of social networking sites: an exploratory adaptive structuration perspective for global organisations. *Information Technology and Management*, **12**(4), 293-314. DOI: https://doi.org/10.1007/s10799-011-0086-5.

the Vienna Conventions on state representation in relations with international organisations of a global nature (1975) and diplomatic relations (1964) are essential[45].

d) Regional Organisations with Special Purposes

International organisations in this category have a limited scope for action, particularly at an economic or military level.

The Latin American Free Trade Association (LAFTA), the North Atlantic Symphony Organisation (NATO), the Warsaw Pact Organisation, and the Council for Mutual Economic Assistance (COMECON) are typical examples of this category[46].

In the category of Supranational Organisations, we can classify the European Community (now the European Union). The term supranational refers to the founding treaty of the European Coal and Steel Community (ending in 2002, now the European Atomic Energy Community), intending to define the executive power of its members. The EU's enhanced powers, i.e. the direct exercise and decision-making of legislative and administrative content without prior state intervention, the judicial decisions on individuals and businesses, and its financial autonomy, give it unique characteristics and distinguish it from intergovernmental organisations[47].

Private International Companies are established either by treaties or by decisions of international organisations and do not imply state participation. Their object may be cultural and charitable, but it is not excluded that they may also have business activities for profit. They are governed by their domestic law and have significant autonomy concerning international organisations. Typical examples of this category are the International Red Cross (IRC), the International Chamber of Commerce (ICC), the European Society for the Financing of Railway Equipment (EUROFIMA), and the European Society for the Chemical Treatment of irradiated Fuels (EUROCHEMIC)[48].

[45] Keohane, R. O. (2017). International institutions: Two approaches. In *International Organisation* (pp. 171-188). Routledge.
[46] Christiano, T. (2012). Of international institutions. *The Routledge companion to philosophy of law*, 380.
[47] Duffield, J. (2007). What are international institutions?. *International Studies Review*, **9**(1), 1-22. DOI: https://doi.org/10.1111/j.1468-2486.2007.00643.x.
[48] Christiano, T. (2012). Of international institutions. *The Routledge companion to philosophy of law*, 380.

1.1.2 The League of Nations and the UN Constitution

At the end of the First World War, the League of Nations (League)[49] was founded in Paris under the peace treaties (1919-1920). Its objectives were to ensure peace and security among member states and promote international cooperation at the political, economic, and cultural level17. Unfortunately, US President Wilson, who was one of the supporters of the idea and contributed to the formulation of the draft statute of the League, was unable to achieve his country's participation after the refusal of the Senate[50].

The composition, organisation, and operation of the League were determined by its convoy, which emphasized the ecumenical character and wide range of objectives of the organisation (concerning Concert Européen). However, along the way, the question of the legal nature of the League was raised. The organisation was subject to international law and therefore had international legal capacity. Still, it did not constitute a superstate because it lacked direct power over the Member States nor a central authority like the confederal states. Moreover, on the one hand, under the principle of unanimity, which applied to all states' decisions and, on the other hand, by the title denoting its name, it was rightly called a 'union of States' united by a loose band pursuing common objectives[51].

The organisation included the original members, i.e. those who had signed the peace treaties and those mentioned in the Annex to the Charter[52] without having signed the treaties, and the elected members (according to Article 1, any self-governing State, colony, or acquisition could become a member), who had applied to become members (for some States the organisation required additional conditions, e.g. for Albania it called for an explicit declaration on the protection of minorities, on Hungary a declaration on the restoration of the dynasty and Ethiopia guarantees on slavery and the arms trade). Membership was terminated by voluntary resignation on the grounds of compulsory exclusion and automatically (Articles 1, 16, and 26 of the Covenant)[53].

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[49] Henig, R. (2019). *The Peace that Never was: A History of the League of Nations*. Haus Publishing.
[50] Goodrich, L. M. (1947). From league of nations to United Nations. *International Organisation*, **1**(1), 3-21. DOI: https://doi.org/10.1017/S002081830000655X.
[51] Duroselle, J. B. (1984). Le «concert européen». *Relations internationales*, 271-285.
[52] United Nations, (2022). Charter of the United Nations. Available at: Chapter I: Article 1 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[53] Gareis, S. B. (2012). *The united nations*. Bloomsbury Publishing.

The three central bodies of the League (the Assembly, the Council, and the Secretariat) did not have the power to impose their decisions on a Member State, i.e. their effectiveness depended solely on the will of the Member States to comply with them. The permanent Court of International Justice, provided for by the Covenant (Article 14), was an autonomous body[54].

All state representatives participated in the Assembly and had one vote. The assembly regularly met each year or on a unique basis at the request of the Council or a majority of its members. Its concerned responsibilities issues of acceptance of new members, the election of non-permanent members of the Council, the budget of the organisation, revision of international treaties, etc. The Council consisted of a limited number of members in permanent and non-permanent seats. The total number ranged from 8 to 15 members. It usually met every four years, and decisions were taken unanimously, which meant that any Member State retained its veto right[55].

The responsibilities of the Council[56], other than those exercised together with the Assembly (co-responsibilities), were the appointment of the Secretary-General, the control of the exercise of the mandate by the forces-designate, the protection of minorities, the implementation of the mutual guarantee of the territorial integrity and political independence of the Member States, the examination of the threat to international peace, etc. The General Secretariat was a permanent body, where the Secretary-General was appointed as head by the Council, assisted in the performance of his work by the various directorates and officials of the institution, who were international officers and enjoyed the performance of their duties the privileges and diplomatic immunities of states. Arbitration, the reduction of armaments, the mandatory settlement of international disputes, and the allocation of an international army to the League, if necessary. The League of Nations could not be identified with the type of Federation of States for several additional reasons, mainly because of the question of territorial extent. Indeed, while the League had a propensity for universality, the Federation of States had common racial and linguistic elements (e.g., Germany, the

[54] Ibid.
[55] Schachter, O. (1964). The quasi-judicial role of the Security Council and the General Assembly. *American Journal of International Law*, **58**(4), 960-965. DOI: doi:10.2307/2196038.
[56] Housden, M. (2014). *The League of Nations and the Organisation of Peace*. Routledge.

USA) or elements of traditions and interests (e.g., Switzerland) and had defined geographical boundaries[57].

The League failed to secure peace since it did not prevent humanity's path to World War II. This is because most of the pact provisions were not applied in the general failure to improve economic and political relations between states and ensure effective defence against aggressive actions. Germany, in particular, withdrew relatively quickly with Hitler's rise to power. Moreover, Japan pursued an expansionist policy with the attack on Manchuria (China 1931), the intervention of Italy (1935) in Ethiopia, as well as the invasion of the former Soviet Union on Finland (1939), shook the credibility of the organisation. At the same time, the League did not react to Germany's annexation of Austria (1938) and the enslavement of Czechoslovakia (1939). Even more so, he maintained a passive attitude throughout the conflict between Germany and Poland, which eventually came to an armed rupture (1939) and triggered the Second World War[58].

Also, the League's reluctance to settle internal disputes in Spain during the Spanish Civil War (1936-1939) reveals that, unfortunately, violence and war are the regulating factors of the "balance of power" system. Finally, the mistrust in the relations between Britain and France as victorious powers did not allow them to understand that the previous actions endangered international peace, believing they were acts of particular national interests[59].

However, the institution's failure is also due to some other causes. First, the non-participation of many powerful forces, e.g. the USA officially refused to become a member of the organisation by projecting its policy. It is even claimed that American public opinion saw immediate risks of the League interfering in their internal affairs (migrations, customs duties)[60]. In turn, Japan, after the intervention in China, withdrew from the organisation in 1933, while Germany also left the organisation in 1933, Italy in 1937 and Hungary, Spain and the Soviet Union in 1939. The undoubted result of all these events was a heavy blow to the newly established organisation because, in the

[57] Öberg, M. D. (2005). The legal effects of resolutions of the UN Security Council and General Assembly in the jurisprudence of the ICJ. *European Journal of International Law*, **16**(5), 879-906. DOI: https://doi.org/10.1093/ejil/chi151.
[58] Henig, R. (2019). *The Peace that Never was: A History of the League of Nations*. Haus Publishing.
[59] Pedersen, S. (2015). *The guardians: the League of Nations and the crisis of empire*. OUP Oxford.
[60] Ibid.

event of international crises, the absence of significant powers confirmed its inability to impose sanctions[61].

In addition, one of the organisation's primary purposes, resolving international disputes with the operation of arbitral, judicial, and political bodies, rarely came to fruition. Furthermore, the introduction of the principle of unanimity for decision-making by the Council and the Assembly gave the right to the member states, regardless of their size or validity, to exercise a veto, thus obstructing the adoption of decisions and causing solid contradictions between the member states that would judge the fate of the organisation. Finally, the lack of popular support which some states have strengthened (e.g. the idea of a single German ethnic group, the preservation of the American regime of political freedom, the neutrality of Switzerland, and the common origin and common political traditions of the British Commonwealth) has created in public opinion a feeling of deep distrust of international law and the institution of the League[62].

While it has not been able to fulfil its work in the political field, the League has had substantial results in particular areas. Permanent communication between states and the achievement of cooperation by establishing committees in parallel and using the methods of voting and representation have contributed to the solution of many administrative and financial problems. Furthermore, it was the first world political organisation with its statute and its bodies, as well as a framework for negotiations and research to serve the common interests of states. In other words, the League appeared in the history of international relations as the first well-constituted body and Bulgarian refugees[63].

At the same time, the organisation, in the first years of its operation, attempted to settle international disputes mainly among small and medium-sized states, which found a satisfactory solution (e.g., the conflict between Poland and Lithuania on the occasion of the claim of the city of Vilnius in the year 1920)[64].

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[61] Housden, M. (2014). *The League of Nations and the Organisation of Peace*. Routledge.
[62] Ellis, C. H. (2003). *The origin, structure & working of the League of nations*. The Lawbook Exchange, Ltd.
[63] Jackson, S., & O'Malley, A. (Eds.). (2018). *The institution of international order: From the League of Nations to the United Nations*. Routledge.
[64] Ibid.

In this way, and under pressure from the great powers, the organisation achieved its goal of preventing the recourse to war for at least some years. Finally, establishing the system of mandates for the protection and strengthening of developing countries condemned the old system of colonialism and led to the complete emancipation of peoples[65].

The failure of the League did not mean the collapse of international society but rather the coordination of efforts for a more improved version of a peacekeeping organisation. The first positive elements for establishing such an international organisation after the end of the Second World War were shown in the Moscow Declaration (1943), in which the USA, China, the Soviet Union, and Great Britain participated. This was followed by a meeting of the representatives of the four states on the initiative of the United States at the conference in Dumbarton Oaks (1944) with a view to the creation of the United Nations Organisation. Finally, the proposals were amended and supplemented at the Yalta Conference (1945)[66].

Two months later, at the St. Francis Conference with the participation of 51 States, they concluded with the signing of the Charter of the United Nations, which entered into force in October of the same year. Historically, the United Nations is a continuation and improved version of the League of Nations. However, the initiators of this effort have expressed the view, for purely psychological reasons, that they have made a new beginning for world peace[67].

1.1.3 Structure and Sub-Instruments

The United Nations aims to maintain peace and security at an international level, promote international relations between States based on the principle of equal rights and the self-determination of peoples, to cooperate internationally in the resolution of international economics[68].

[65] Anghie, A. (2001). Colonialism and the birth of international institutions: Sovereignty, economy, and the mandate system of the League of Nations. *NYUJ Int'l L. & Pol.*, **34**, 513.
[66] Matz, N. (2005). Civilization and the Mandate System under the League of Nations as Origin of Trusteeship. *Max Planck Yearbook of United Nations Law Online*, **9**(1), 47-95. DOI: https://doi.org/10.1163/187574105X00039.
[67] Ziring, L., Riggs, R. E., & Plano, J. C. (2005). *The United Nations: International organisation and world politics*. Cengage Learning.
[68] Gareis, S. B. (2012). *The united nations*. Bloomsbury Publishing.

The UN operates based on the sovereign equality of the Member States and stresses the non-interference in internal affairs which fall within their exclusive competence. It was also deemed necessary for the organisation to be a kind of international centre, a forum with absolute power and enforcement of its decisions. This was necessary to mitigate the differences between the major powers because even the organisation's existence was threatened during the Cold War (1946-1961)[69].

The organisation's original members, including Greece, were 51 who participated in the St. Francis conference and had signed the United Nations Declaration. Article 4 provides for the accession of a State as long as it meets certain conditions. In particular, to be peaceful to accept the obligations arising from the statutes, and to fulfil them[70].

It was argued that the entry of a new state into the organisation does not automatically mean recognition under international law, e.g., the State of Israel, which the Arab states as members of the UN do not recognize. Practical reasons have led to the acceptance of the valid view at the time of the League, where admission meant recognition. However, while the issue of admission to the agency is regulated in the statutes, there is no provision for the withdrawal of a member state. Article 5 defines the suspension of the rights and obligations of a State, and Article 6 refers to the exclusion of a State when this violates the principles of the Charter. Indonesia was the only state to withdraw from the organisation in protest against the non-admission of the People's Republic of China but later rejoined as a member of the UN[71].

According to Article 7 of the Charter, six central bodies are established[72]: the General Assembly, the Security Council, the General Secretariat, the Economic and Social Council, the Guardianship Council, and the International Court of Justice. But secondary organs were also created by the principal organs' phases to assist in their work. Some auxiliary bodies are now international organisations with administrative

[69] Housden, M. (2014). *The League of Nations and the Organisation of Peace*. Routledge.
[70] Ziring, L., Riggs, R. E., & Plano, J. C. (2005). *The United Nations: International organisation and world politics*. Cengage Learning.
[71] United Nations, (2022). Membership. Available at: Chapter II: Article 5 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[72] United Nations, (2022). Chapter III — Organs. Available at: Chapter III: Article 7 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.

and financial autonomy. Examples include the United Nations Committee on Palestinian Refugees (UNRWA) and the United Nations Child Protection Fund (UNICEF)[73].

1.1.3.1 The General Assembly

The General Assembly is the body attended by all UN member states. Each representative shall have one vote. Decisions of particular importance, e.g. proposals on security and peace issues, questions of admission of a new Member State, budgetary matters, the election of non-permanent members of the Security Council, and expulsion of members, require a two-thirds majority. In contrast, a simple majority is sufficient for the rest of the issues (Article 18)[74]. It meets in ordinary sessions once a year but also in extraordinary sessions when circumstances require it (Article 20)[75]. In addition, establishing committees and special working groups aim to organize its functions better.

There are seven (7) committees. In particular, the first concerns disarmament issues relating to international security, while the second is the Committee on Economic and Monetary Affairs and Industrial Policy. The third committee deals with social, humanitarian, and cultural affairs. The fourth has responsibilities related to colonial matters, while the fifth has administrative content on the one hand and is also responsible for the budget. The sixth is the Legal Committee, and the seventh is the Special Political Committee on Racial Discrimination Issues[76].

There is also a general committee consisting of the chairperson of the General Assembly. He does not come from an industrially developed country, and 21 vice presidents and the chairpersons of the seven committees. There are also permanent and

[73] Trauttmansdorff, F. (2001). The organs of the United Nations. In *The United Nations* (pp. 25-56). Brill Nijhoff. DOI: https://doi.org/10.1163/9789047403005_007.
[74] United Nations, (2022). Chapter IV — The General Assembly. Available at: Chapter IV: Article 18 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[75] United Nations, (2022). Chapter IV — The General Assembly. Available at: Chapter IV: Article 20 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[76] Alger, C. F. (1966). Interaction in a committee of the United Nations General Assembly. *Midwest Journal of Political Science*, **10**(4), 411-447. DOI: https://doi.org/10.2307/2108921.

auxiliary committees that facilitate the work of the Assembly, mainly on issues of disarmament, human rights, colonialism and space[77].

The General Assembly is the meeting place for negotiations and the exchange of views. Its responsibilities include the submission of studies and proposals (Article 13), the development and codification of international law, the promotion of international cooperation at the political level, the supervision of other UN bodies (Articles 15, 24), and the election of the members of the other central bodies (Articles 23, 61, 86), the possibility of making recommendations to the Member States and the Security Council (Articles 10, 11), responsibilities of a financial nature (Article 17) and those relating to the guardianship system[78].

The existence of the great powers changed the balance in the voting system as well. Since the organisation is based on sovereign equality, the Charter has rightly abandoned the principle of unanimity in the decisions of the General Assembly (which was applied in exceptional circumstances under the league's treaty regime),[79] which are now taken either by a two-thirds majority of those present or by a simple majority[80].

At the Dumbarton Oaks Conference, it was proposed that the General Assembly should be a single consultative body with general powers without decisive power. Consequently, the Charter strengthened the Security Council since it could make mandatory decisions for the Member States[81]. However, with the pressure exerted by the developing states to extend the powers of the Convention and in combination with the Council's inability to take decisions because of the permanent disagreement of its members and the subsequent Korean War, the powers of the Assembly (the Acheson decision) has been extended, with the result that it has become the most important body of the UN[82].

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[77] Bleicher, S. A. (1969). The legal significance of re-citation of general assembly resolutions. *American Journal of International Law*, **63**(3), 444-478. DOI: https://doi.org/10.2307/2198866.

[78] United Nations, (2022). Chapter IV — The General Assembly. Available at Chapter IV: Article 9 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.

[79] Alker, H. R. (1964). Dimensions of conflict in the general assembly. *American Political Science Review*, **58**(3), 642-657. DOI: https://doi.org/10.2307/1953139.

[80] Keohane, R. O. (1969). Institutionalization in the United Nations general assembly. *International Organisation*, **23**(4), 859-896. DOI: https://doi.org/10.1017/S0020818300025698.

[81] Keohane, R. O. (1965). Political influence in the General Assembly. *Int'l Conciliation*, **36**, 1.

[82] Bleicher, S. A. (1969). The legal significance of re-citation of general assembly resolutions. *American Journal of International Law*, **63**(3), 444-478. DOI: https://doi.org/10.2307/2198866.

1.1.3.2 The Security Council

The Security Council has five permanent members – China, France, Russia, Great Britain, and the USA – and ten non-permanent members elected by the General Assembly for two years (Article 23)[83].

There is an inequality between permanent and non-permanent members expressed in the exercise of veto (right of veto) by the Great Powers in making important decisions. The qualified majority required shall be nine votes and the votes in favour of the council's permanent members. However, according to Article 31, a State member of the UN but not of the Security Council may participate in the meetings without a vote if the matter under discussion is in its interests[84].

The Security Council is a permanent body, unlike the General Assembly, which meets periodically. Under exceptional circumstances, provision is also made for the council to operate continuously, e.g. the Cuban crisis (Article 28)[85]. The Council's responsibilities are mainly political but have general administrative content. He is primarily interested in maintaining peace and resolving international disputes. When he sees a threat to peace or some act of aggression, he proposes the measures to be taken. It can also decide on using coercive measures of a military nature (unlike in the period of the League, the pact stipulated the shared competence of the Assembly and the Council for any matters affecting international peace)[86].

1.1.3.3 The Secretariat

The Charter refers to the Secretariat as the main body of the organisation but also as an executive body of the other central bodies and is not composed of representatives of the States. It has its permanent staff headed by the Secretary-General, who is considered the highest official of the Agency (Article 97). He participates in all the conferences of the other central bodies, except the International Court of Justice

[83] United Nations, (2022). Chapter V — The Security Council. Available at Chapter V: Article 23 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[84] Luck, E. C. (2006). *UN Security Council: practice and promise*. Routledge.
[85] United Nations, (2022). Chapter V — The Security Council. Available at Chapter V: Article 28 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[86] Malone, D., & Malone, R. D. M. (Eds.). (2004). *The UN Security Council: from the Cold War to the 21st century*. Lynne Rienner Publishers.

(Article 98), and submits to the General Assembly the Annual Report on the activities of the Organisation and the prospects for the future[87].

An essential element is the mutual recognition and approval of the Secretary by the developed states and states of the Third World[88]. The members of the Secretariat are selected based on efficiency and geographical distribution (Article 101)[89]. Over time, the functions of the Secretariat have been expanded to the extent that it was deemed necessary to establish a significant number of committees and special offices that assist it in its work.

As a result, the Secretary-General took political initiatives, without extensive powers, to contribute to alleviating differences as an international mediator. The Political role of the Secretary is also underlined by his right to focus the attention of the Security Council on any matter that would threaten international peace and security (Article 99)[90].

1.1.3.4 The Economic and Social Council

The primary purpose of the Economic and Social Council is to cooperate at the socio-economic level with specialized organisations and various working groups, known as the United Nations Family. It consists of 65 members serving for three years and coming 18 from Africa, 13 from Asia, 13 from Latin America, 13 from Western Europe, and 8 from Eastern Europe. Each member has the right to cast one vote by a relative majority (Article 67)[91].

Its responsibilities include the discussion and examination of international economic and social issues, the initiative to convene international conferences and

[87] United Nations, (2022). Chapter XV — The Secretariat. Available at Chapter XV: Article 97 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[88] Myint-U, T., & Scott, A. (2007). The UN secretariat. *New York: International Peace Academy*.
[89] United Nations, (2022). Chapter XV — The Secretariat. Available at Chapter XV: Article 101 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[90] Gordenker, L. (2013). *The UN Secretary-General and Secretariat*. Routledge.
[91] Rosenthal, G. (2005). The economic and social council of the United Nations. *An Issues Paper. New York: Friedrich-Ebert-Foundation (Occasional Paper No. 15)*.

conferences for the signing of international conventions, the negotiation of agreements with specialized organisations, and the promotion of respect for human rights[92].

The Economic and Social Council is made up of numerous committees and subcommittees. The operational committees are 6: The Statistics, the Population Committee, the Social Development Committee, the Human Rights Committee (which has remarkable work to do – e.g. a draft Declaration on Human Rights – and which includes the subcommittees of Information and Press, Racial Discrimination and Protection of Minorities), the Committee dealing with issues concerning Women and, finally, the Drugs Committee[93].

The regional economic committees are 5: Africa, Asia-Pacific Commission, Europe, Latin America and the Caribbean, and West Asia. There are also six standing committees and specialized working groups on crime control, development, taxation, and the transport of dangerous goods. Despite the extent of its powers, the Economic and Social Council finds itself in a difficult position to take the initiative for three main reasons: it lacks real power, its composition is minimal (54 members), and, most importantly, the parallel emergence of other organisations with similar content, e.g. UNCTAD, UNIDO, UNICEF[94].

1.1.3.5 The Trusteeship Council

The Guardianship Council was created to be the main instrument of action in the guardianship system established by the UN as the successor to the League's mandate system. In other words, the primary responsibility of the Council is the gradual development of the regions and peoples under guardianship towards self-government and independence. The original intention was to play an essential role in the guardianship issues of some areas, but in practice, the same did not happen[95].

According to the Charter, the overall number of members of the Council is distributed among the States that administer areas under guardianship, the permanent

[92] United Nations, (2022). Chapter X — The Economic and Social Council. Available at Chapter X: Article 61 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
[93] Simma, B. (Ed.). (1995). *The charter of the United Nations*. Oxford, UK: oup.
[94] Citaristi, I. (2022). United Nations Economic and Social Council—ECOSOC. In *The Europa Directory of International Organisations 2022* (pp. 123-124). Routledge.
[95] United Nations, (2022). Chapter XIII — The Trusteeship Council. Available at Chapter XIII: Article 86 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.

members of the Security Council, and certain other states that do not administer such areas for equality. In practice, this is an exchange rate that is not maintained. There would therefore be a problem with the composition of the Council. The General Assembly supervises the Funeral Council. At the same time, in cases where an area under guardianship is designated as a "strategic area", it falls under the competence of the Security Council. The Council's objectives have been implemented for 11 regions that had been placed under guardianship, and either united with neighbouring states or became independent[96].

These are New Guinea under the administration of Australia (which became Papua New Guinea in 1975), the two states of Africa, Rwanda, and Burundi, under the administration of Belgium (they were divided into two states in 1961), French Cameroon and French Togoland, British Cameroon and British Togoland, Western Samoa under the administration of New Zealand, Somalia under the administration of Italy and Tanganyika (which was united with Zanzibar and became Tanzania in 1961). The Pacific Islands of Mariana, Carolines, Marshall, and Bikini (a complex of 2,100 islands) are the only area still under guardianship because they have been considered strategic zones and are run by the US[97].

1.1.3.6 The International Court of Justice

The international Court of Justice is based in The Hague and is the principal judicial body of the UN. Since the Conferences in The Hague (1899, 1907), attempts have been made to create a permanent judicial body without bearing fruit. After the First World War, the Permanent Court of International Justice (I.D.R.D.) was established, an independent body with great activity. However, it ceased functioning in 1944, parallel with the League of Nations' dissolution[98].

After the end of the Second World War, the International Court of Justice was established, consisting of 15 judges elected in separate votes by the General Assembly and the Council of Security, without considering their nationality. The election of judges is based on their substantive and formal qualifications. However, the necessary

[96] Blum, Y. Z. (1969). The Composition of the Trusteeship Council. *American Journal of International Law*, **63**(4), 747-768. DOI: https://doi.org/10.2307/2199483.
[97] Meron, T. (1960). The question of the composition of the Trusteeship Council. *Brit. YB Int'l L.*, **36**, 250.
[98] International Court of Justice, (2022). History of the Court. Available at: The Court | International Court of Justice (icj-cij.org), last assessed: 28-8-2022.

attention should also be paid to the geographical position of the Member States, the specific elements of culture, and the basic legal systems. Their term of office lasts 9 years and can be renewed every 3 years by 1/3[99].

Although the participation of UN member states in the Statute of the International Court of Justice is binding, its jurisdiction to resolve international disputes or to give its opinion is optional. In other words, the consent of the states concerned is required[100]. However, according to Article 36 para. 2 of the Statute, Member States may declare that they recognize as mandatory the jurisdiction of the court in matters relating to the interpretation of a treaty, in cases of International Law, in the existence of an event which is likely to constitute a violation of an international obligation and the nature or extent of the remedy due to non-compliance with the international obligation[101].

Only States have the right to be present as parties to the proceedings. This means that international organisations and individuals cannot go to court. Judicial powers include (Article 38) the application of international conventions, international custom, general principles of law, judicial decisions, and the theories of the most competent publicists of the various nations. At the same time, opinions are given at the request of the institution concerned[102].

1.2 The International Maritime Organisation (IMO) and the Fundamental International Maritime Conventions

1.2.1 The Establishment of IMO

The first attempts to establish an international organisation dealing exclusively with maritime affairs were made at the conferences of Washington (1889) and St. Petersburg (1912) without success. Before The Second World War, international

[99] Akande, D. (1997). The International Court of Justice and the Security Council: Is There Room for Judicial Control of Decisions of the Political Organs of the United Nations?. *International & Comparative Law Quarterly*, **46**(2), 309-343. DOI: 10.1017/S0020589300060450.

[100] Thirlway, H. (2016). *The International Court of Justice*. Oxford University Press.

[101] Powell, E. J., & Mitchell, S. M. (2007). The International Court of Justice and the world's three legal systems. *Journal of Politics*, **69**(2), 397-415. DOI: https://doi.org/10.1111/j.1468-2508.2007.00539.x.

[102] Posner, Eric A., The Decline of the International Court of Justice (December 2004). U Chicago Law & Economics, Olin Working Paper No. 233; U of Chicago, Public Law Working Paper No. 81, Available at SSRN: https://ssrn.com/abstract=629341 or http://dx.doi.org/10.2139/ssrn.629341

maritime affairs were the subject of a certain number of international associations which were non-intergovernmental[103].

However, during the war, there was a need to establish an Authority to coordinate the maritime affairs of the Allied fleet. Initially, it took the form of the Combined Shipping Adjustment Board and later (1944) of the United Maritime Authority (UMA). Then it was deemed necessary, after continuous consultations within the UN framework, to establish an association with the primary purpose of coordinating all actions to solve the problems of world merchant shipping[104].

At the first session (1946) of the UN Economic and Social Council (ECOSOC), the ad hoc Committee on Transport and Communications was established to submit proposals to the UN Council for the creation of new specialized organisations or the unification of existing ones. With joint Maritime Consultative Council initiatives, which succeeded UMA, a draft convention was prepared to establish a permanent intergovernmental maritime body (1947)[105].

At the same time, it was accepted that the seafaring profession was one of the most demanding, and the very nature of shipping required cooperation at the international level instead of an independent policy being pursued by the various states, especially in matters of improving maritime safety. At the United Nations Maritime Conference in Geneva (1948), with the participation of all the member states of the UMCC, the convention establishing IMCO (Intergovernmental Maritime Consultative Organisation) was discussed and approved[106].

During the ten years, i.e. until ratified the Convention by 21 states (1958), various obstacles arose on the way to establishing the organisation. The organisation had advisory responsibilities on technical issues of shipping, the promotion of international trade, the adoption of general regulations in the field of safety and

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[103] IMO, (2022). New World Maritime Theme highlights environmental legacy. Available at: International Maritime Organisation (imo.org), last assessed: 28-8-2022.

[104] Stemmer, J. E. O. (1987). A new economic order for postwar shipping and the liner conference system. The International Maritime Conference, 1948. *Maritime policy and management*, **14**(1), 5-26. DOI: https://doi.org/10.1080/03088838700000002.

[105] Blanco-Bazán, A. (2004). IMO–Historical highlights in the life of a UN Agency. *Journal of the History of International Law/Revue d'histoire du droit international*, **6**(2), 259-283. DOI: https://doi.org/10.1163/1571805042782118.

[106] Silverstein, H. B. (2019). *Superships and Nationstates: The Transnational Politics of the Intergovernmental Maritime Consultative Organisation*. Routledge.

prevention of marine pollution, the avoidance of discrimination and restrictions, and the preparation of international conventions and the exchange of proposals (Article 3). Its advice, opinions, and decisions were non-binding for its member states[107].

Next was a reaction from traditional maritime states to establishing IMCO as the central body for managing maritime affairs. This view was based on its title containing the term 'consultative'. At the same time, it was expressly stated in the convention that the agency refrains from investigating matters 'which appear to be capable of settlement through the normal process of international shipping business' (Article 4)[108].

The main reactions, however, concerned introducing political decisions in a purely technocratic area, although today, the political element is more than substantial in the maritime sector. The problem was exacerbated because the technical issues were inextricably linked to the commercial process. Shipping companies often considered that the intervention of an international organisation, albeit with advisory powers, in conditions of free competition and the financing of the shipbuilding industry would not contribute to eliminating measures restricting international trade. As a result, the process of recognizing the organisation was delayed for a decade[109].

On 23 May 1982, the organisation changed its name from IMCO to IMO (International Maritime Organisation)[110], and its impact was upgraded since its decisions have since been binding on member states. A necessary condition for the convention's entry into force was the collection of 21 signatures, which required the additional participation of the 7 largest states whose fleets exceeded one mil. Gross tonnage (GRT) each. The initial discussions in Geneva brought together the US, the UK, France and the Netherlands. Another group of states consisting of Greece, Norway, Panama, Japan, Italy and the Soviet Union signed the convention in 1957[111]. As soon

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[107] Srivastava, C. P. (1976). The Inter-Governmental Maritime Consultative Organisation. *The Journal of Navigation*, **29**(4), 307-316. DOI: 10.1017/S0373463300039266.

[108] Archer, J. N. (1979). Implementation and enforcement of IMCO (Intergovernmental Maritime Consultative Organisation) regulations. *Mar. Eng. Rev.;(United Kingdom)*.

[109] Goddu, L. W. (1972). IMCO and the Marine Industry. *Marine Technology and SNAME News*, **9**(03), 273-280. DOI: https://doi.org/10.5957/mt1.1972.9.3.273.

[110] Blanco-Bazán, A. (2004). IMO–Historical highlights in the life of a UN Agency. *Journal of the History of International Law/Revue d'histoire du droit international*, **6**(2), 259-283. DOI: https://doi.org/10.1163/1571805042782118.

[111] Vinar, B. (1960). Effect of the Genuine Link Principle of the 1958 Geneva Convention on the National Character of a Ship. *NYUL Rev.*, ***35***, 1049.

as the convention entered into force, Denmark, Sweden, Finland, Liberia, and Germany became members of the organisation. This meant the participation in the IMO of all the major maritime states[112].

On the other hand, almost all the future member states of the Agency were already convinced that its integration into the field of trade was futile. Moreover, the stark difference between the shipping interests of traditionally maritime countries (ship-owning) and developing countries with a ship-using industry was a ubiquitous source of controversy[113].

However, the gradual development and influence of 'Third World' countries on the wider maritime sector, e.g. transfers of raw materials from producer countries to consumer countries, has become more pressing. As a result, the issue was brought to the United Nations Conference on Trade and Development (UNCTAD) in 1965, a forum dominated exclusively by developing states and becoming more hostile to the maritime interests of large states[114].

The fact is that the IMO's involvement in the issues of marine pollution and maritime safety, even before its official establishment (1959), enhanced its status as a specialized international instrument in maritime affairs within the UN framework. Furthermore, during the 1960s, his survival was questioned because his scope of action was limited. Consequently, substantial changes were made to the organisation's structure with the apparent aim of integrating the new branch of marine pollution into its activities. Specifically, the establishment of the subcommittee on oil pollution was completed under the control of the Maritime Safety Committee (MSC is the oldest and most important of all the committees of the IMO). At the same time, the procedures were initiated for the establishment of the ad hoc Legal Committee to investigate and examine the issue of the shipwreck of The Torrey Canyon (1967). This Committee later became a permanent body of the Agency. In addition, the subcommittee on marine

[112] Young, R. (1958). The Geneva Convention on the continental shelf: a first impression. *American Journal of International Law*, **52**(4), 733-738. DOI: https://doi.org/10.2307/2195594.
[113] Bennett, C. (2015). The development agency of the future. *Fit for protracted crises*.
[114] Taylor, I., & Smith, K. (2007). *United Nations Conference on Trade and Development (UNCTAD)*. Routledge.

pollution was replaced in 1973 by the Marine Environment Protection Committee (MEPC), which is now one of the central bodies of the Organisation[115].

1.2.2 Structure of the International Maritime Organisation

1.2.2.1 The Assembly

The Assembly is the highest administrative body of the IMO. It comprises the representatives of each member state of the member states, and the ordinary meetings are scheduled once every two years. In addition, however, it can be convened in extraordinary circumstances, on special occasions, at the request of one-third (1/3) of the members of the Council (out of a total of 170 member states and three associate members)[116].

While its decisions are not binding, they are often incorporated into a Member State's internal legislation or international treaties. The Convention is also responsible for the election of the Council members, the appointment of the IMO's Secretary-General, the budget study, and the examination of reports and amendments to the Treaties. Each member state has only one vote, and most votes have taken decisions[117].

1.2.2.2 The Council

The Council has considerable independence and meets twice a year (sometimes under exceptional circumstances, e.g. wreck of the Torrey Canyon). The primary responsibilities of the council are to examine and comment on the various reports of the Committees before their presentation before the Convention. At the same time, it has extensive administrative responsibilities regarding the organisation's staff. The Council's meetings are also attended by representatives of the national ministries of the Member States as well as experts belonging mainly to transport departments[118].

The Council is composed of fourth Member States, following the amendments to Articles 17 and 18 of the Convention (1974), which are elected in accordance with the specific rules laid down in the Convention to strike a balance between the States

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[115] IMO, (2022). Marine Environment Protection Committee (MEPC). Available at: Marine Environment Protection Committee (MEPC) (imo.org), last assessed: 29-8-2022.
[116] Okamura, B. (1995). Proposed IMO Regulations for the prevention of air pollution from ships. *J. Mar. L. & Com.*, **26**, 183.
[117] Valenzuela, M. (1986). IMO. In *Yearbook Maritime Law* (pp. 333-339). Springer, Dordrecht. DOI: 10.1007/978-94-017-3707-4_28.
[118] Rendtel, J., & Lunsford, R. (2006). From the IMO Council. *WGN, Journal of the International Meteor Organisation*, **34**, 62.

with the most significant maritime interests, in the form of the provision of services, and the States that are mere members of the IMO based on fair geographical distribution. The members of the Council are elected during the session of the Convention for two years and may be re-elected[119].

In practice, the traditional maritime states, the states with a large share in international trade, e.g., Belgium, Australia, Canada, and most European states, are represented without interruption in the Council. On the other hand, the developing countries did not receive the same reception until 19784. At the same time as the 1974 amendments entered into force (1978), the percentage of small states elected rose to 58%, which now constituted the majority in the Council[120].

1.2.2.3 The Secretariat

The Secretariat comprises about three hundred scientists and administrators as staff, specialising in maritime affairs, and is one of the smallest agencies in the UN structure. It is led by the Secretary-General elected by the Council with the approval of the Assembly. Its task is to prepare international conventions and to report on pressing matters. The secretariat cannot take political initiatives and can only represent the IMO and the Secretary-General in discussing issues of international importance[121].

Initially, the traditional maritime states reacted by establishing this body as an independent decision-making organ. Specifically, Britain proposed that the Secretariat should not exist as an independent body but that its work should be replaced by individuals proposed by the Member States voluntarily[122].

1.2.2.4 The IMO Conferences

These conferences are organised by the Secretary-General, with the Assembly's consent, and a competent committee makes its initial preparatory actions. But, first, an initial material for discussion is submitted. Then, the representatives of the member-states and states that are members of the UN but not of the IMO are invited to the

[119] IMO, (2022). Council. Available at: IMO Council, last assessed: 28-8-2022.
[120] Khalimonov, O. (1999). Framework for co-operation and recent IMO activities in preventing and managing marine pollution. *Sing. J. Int'l & Comp. L.*, **3**, 370.
[121] Campe, S. (2009). The secretariat of the International Maritime Organisation: A tanker for tankers. *Managers of global change: The influence of international environmental bureaucracies*, 143-68.
[122] Mensah, T. A. (2007). Prevention of marine pollution: The contribution of IMO. In *Pollution of the Sea—Prevention and Compensation* (pp. 41-61). Springer, Berlin, Heidelberg. DOI: 10.1007/978-3-540-73396-6_5.

following conference. The agreement of 2/3 of the participants is required for each project article[123].

The conference adopts a final list of issues-for-discussion issues, which are ultimately distributed to the governments of the member states for ratification. This material automatically takes the shape of International Law only when a certain number of states sign and ratify the final proposal[124].

Most of the IMO's work is executed by five Committees and many subcommittees.

a) Maritime Safety Committee (MSC)

As of 1978, its member states were fourteen, of which eight needed to possess large merchant fleets. Today this committee consists of all Member States as its members in accordance with Article 28 and is convened twice per year. It is considered the IMO's pre-eminent technical body and, most times, involves subject experts from the transport ministries of the Member States. The work of MSC is assisted by various subcommittees, whose name usually indicates the area of engagement. It is distinguished in the subcommittees of i) Navigation and Safety, ii) Radio-Communications, iii) Training and monitoring of crews (Standards of Training and Watchkeeping), iv) Carriage of Dangerous Goods by Sea, v) Ship Design and Equipment, vi) Fire Protection, vii) Stability and Load Lines, viii) Fishing Vessels Safety, ix) Avoiding collisions at sea (Preventing Collisions at Sea), x) Containers and Cargoes, xi) Bulk Chemicals, xii) Regulations on maritime safety and rescue (Life Saving, Search and Rescue)[125].

b) Legal Committee

Which the Council initially was established as an ad hoc committee to examine and assess the possible impact on Maritime Law following the Torrey Canyon accident

[123] IMO, (2022). Conferences. Available at: Conferences (imo.org), last assessed: 29-8-2022.
[124] Edwards, D. T., & Pascoe, D. B. (1991). Outcome of the IMO Conference on International Co-Operation on Oil Pollution Preparedness and Response. In *International Oil Spill Conference* (Vol. 1991, No. 1, pp. 357-360). American Petroleum Institute. DOI: https://doi.org/10.7901/2169-3358-1991-1-357.
[125] Simmonds, K. R. (1963). The Constitution of the Maritime Safety Committee of IMCO. *International & Comparative Law Quarterly*, **12**(1), 56-87. DOI: 10.1093/iclqaj/12.1.56.

(1967)[126]. The Legal Committee entered into force during the 1975 amendments, and since then, it has become one of the IMO's leading bodies. The committee's work concerns the study of various legal issues in the areas of i) liability and compensation for cases of marine pollution by oil and other substances, ii) issue of the elimination of shipwrecks and assistance at sea, iii) merchant ships in foreign ports, iv) passengers and baggage and v) Implementation of IMO regulations[127].

c) Marine Environment Protection Committee (MEPC).

It was founded in 1973 by the Assembly to substitute the sub-committee on Marine Pollution (1969) of the MSC, which was responsible for formulating the Convention for the Prevention of Marine Pollution by Ships (MARPOL '73/78). The initial proposal for creating the MEPC was made on the initiative of the USA[128].

While the Convention on the Law of the Sea (Montego Bay Convention 1982) was in development, the US government suggested the enhancement to the international status of the current IMO body (then IMCO), having as a principal role the controlling and combating of marine pollution in the maritime zones (inland waters, territorial sea, continental shelf, contiguous zone, exclusive economic zone, high seas) of all coastal states[129].

With the establishment of the Committee within the IMO, the marine pollution area was as crucial as maritime safety. The MEPC Committee focuses on the environmental guidelines for shipping. In addition, it has the first say on the amendments to MARPOL '73/78, dealing with technical issues, such as regulations on the types of oil cargo[130].

d) Technical Co-operation Committee.

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[126] Balkin, R. P. (1999). The establishment and work of the IMO Legal Committee. *Current Maritime Issues and the International Maritime Organisation*, *4*, 291.

[127] Gaskell, N. (2003). Decision making and the legal committee of the international maritime organisation. *International Journal of Marine and Coastal Law*, **18**(2), 155-214. DOI: https://doi.org/10.1163/157180803100380429.

[128] Peet, G. (1994). The role of (environmental) non-governmental organisations at the Marine Environment Protection Committee (MEPC) of the International Maritime Organisation (IMO), and at the London Dumping Convention (LDC). *Ocean & coastal management*, **22**(1), 3-18. DOI: https://doi.org/10.1016/0964-5691(94)90080-9.

[129] Klein, N. (2005). *Dispute Settlement in the UN Convention on the Law of the Sea* (Vol. 39). Cambridge University Press.

[130] IMO, (2022). Marine Environment Protection Committee (MEPC). Available at: Marine Environment Protection Committee (MEPC) (imo.org), last assessed: 29-8-2022.

It was established by the Council (at its 28th meeting) in 1969 to meet the emerging desire of numerous countries to acquire technical assistance in their developing maritime industries[131].

This Committee has become the main body of the IMO since 1977 and reports to the Convention through the Council. In addition, it supervises the financing of states from the Development Programme (UNDP) and the United Nations Environment Programme (UNEP)[132].

e) Facilitation Committee.

It is an ancillary body established by the Council and charged for the IMO's activities to facilitate issues upon the international maritime movement of ships.

Regardless of their subject matter, all the organisation's committees accept all member states in their meetings without discrimination[133].

1.2.3 The Activities of the International Maritime Organisation

The Agency's tasks focus mainly on maritime safety, maritime security, safe navigation, maritime technology, environmental protection, the emerging issues of marine sustainability, maritime corporate social responsibility, and legal matters.

The usual procedure for convening international conferences was challenged by most member states, resulting in the establishment of international conventions. These Conventions are first signed[134] and then ratified[135] by the Member States and ultimately

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[131] Bergesen, H. O., Parmann, G., & Thommessen, Ø. B. (2018). International Maritime Organisation (IMO). In *Yearbook of International Cooperation on Environment and Development 1998–99* (pp. 210-211). Routledge.

[132] UNEP, (2022). International Day of Clean Air for Blue Skies. Available at: UNEP - UN Environment Programme, last assessed: 29-8-2022.

[133] IMO, (2022). Facilitation Committee. Available at: Facilitation Committee (imo.org), last assessed: 29-8-2022.

[134] The signature is the meaning of the consent of the parties to the negotiations At the negotiation stage, the members of the international community agree on the subject matter of the treaty and its precise content and then move on to the stage of adopting the contractual text which is identical to the signature of the treaty by the parties. The signature may also take place ad referendum, i.e. be temporary and need confirmation from the state of the representative.
The signature has the legal consequence that the State whose representative signed the text is obliged "to refrain from acts that would deprive the treaty of its object and purpose" (A state is obliged to refrain from acts which would defeat the object and purpose of a treaty). a reasonable period of time until the State ratifies or accepts or approves the Treaty or, conversely, expresses its will not to be bound by it.

[135] The ratification, which always takes place after signature, is the manifestation of the positive will of the competent state body to bind the State by this treaty in the international arena. That wish shall be

are included in each signatory member's national legislation. Also, in many cases, essential conventions brought the need for immediate and uniform ratifications and implementation of codes, recommendations, and directives. As a result, in the last thirty years, the IMO has adopted nearly forty international conventions and protocols (mandatory for member states) and a little more than seven hundred codes and recommendations[136].

Problems in the smooth functioning of the Agency arise when there are phenomena of delay in the procedures for the signing/ratification of the IMO Conventions by the Member States, e.g. the Tonnage Measurement of Ships (1969) entered into force in 1982 because the necessary condition of the 25 signatures of states that must have 65% of the world's tonnage has resulted in a delay in its implementation by up to ten years of 1980. The above problem is combined with the performance of the various IMO conventions, which, only if the Member States ratify, then include them in their national legislation, is not mandatory; that is, it depends solely on the dispositions of a Member State[137].

In addition, many governments of the Member States that have ratified the conventions, particularly on protecting the marine environment, are required to send regular reports to the IMO on the faithful implementation of their provisions. For example, a study of Dutch origin on marine casualties and areas of responsibility

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expressed by each party in a document known as the 'instrument of ratification' containing the entire text of the Treaty. Ratification can be carried out conditionally or never done without a question of international responsibility being raised at the expense of the state. The state that signs the treaty does not undertake any obligation to ratify the treaty.

To apply in the international arena and to bind each member state, an international treaty must be subject to an internal, intra-state process which completes through internal acceptance the granting of the consent of the Member State to its content. Usually after the negotiation and signing phase of a final text, the Treaty penetrates into the internal legal order of each candidate State party where it passes the following test of acceptance: the parliaments of the future Member States discuss the content of the Treaty and vote on it, thus ratifying the Treaty, which surrounds the type of internal legislative act, while in a second stage the Head of State ratifies the Treaty, thus completing for the requirements of international law the requirements for its acceptance by the Member State. A clear distinction must be made between ratification, which is an act of international law, and ratification of the treaty within the state, which is normally an act of parliament. Parliamentary ratification is directly linked to ratification, but it is an act of purely domestic law.

Ratification is the express provision of the competent bodies of the State, which includes the text of the Treaty and gives to it in the wording prevailing in Greece "full and legal force" or "full force of law".

[136] Busha, T. S. (1986). The IMO Conventions. *Ocean Yearbook Online*, **6**(1), 160-170. DOI: https://doi.org/10.1163/221160086X00121.

[137] Hesse, H. (2003). Maritime security in a multilateral context: IMO activities to enhance maritime security. *The International Journal of Marine and Coastal Law*, **18**(3), 327-340. DOI: https://doi.org/10.1163/092735203770223567.

collected 300 petitions from the North Sea states. It showed that only 51 (17%) were faithfully followed by the coastal countries. Similarly, in 64 cases, there was no official charge of possible marine pollution because the data were considered insufficient. In comparison, only 18 instances followed the legal route of criminal prosecution, but even in these cases, the fines imposed on those responsible were extremely low[138].

Finally, it seems that the work of the IMO is hampered by unilateral legislation, e.g. the American OPA '90, which contradicts the organisation's conventions in the areas of the responsibility of a shipowner, and does not follow the standards set by the CLC 1969 and FUND 1971 conventions and the protection of the marine environment concerning the construction requirements of new tankers and effective measures to deal with severe pollution (it sets aside the MARPOL 73'78 and OPRC Conventions. 1990)[139].

It has also been argued that the Commission of the European Communities has recently not followed an ordinary course with the IMO because, in a way, it adopts the regulations laid down by the OPA '90. Therefore, the lack of uniformity of regulations, and indeed internationally, will inevitably lead to a malfunctioning system and pose a threat to the issues of maritime safety and the protection of the marine environment[140].

1.3 International Convention for the Safety of Life at Sea (SOLAS)

1.3.1 The background

The Convention on Safety of Life at Sea (SOLAS, 1974), which entered into force in 1980, holds a primary position. It refers to issues such as the maritime safety and security of crew and passengers on board, cargo handling, machinery and electrical facilities on board, fire detection and neutralization provision, lifesaving instructions, navigation tools handling, etc[141].

[138] Feld, L. P., & Voigt, S. (2003). Economic growth and judicial independence: cross-country evidence using a new set of indicators. *European Journal of Political Economy*, **19**(3), 497-527. DOI: https://doi.org/10.1016/S0176-2680(03)00017-X.

[139] Sulaiman, O., Saharuddin, A. H., & Kader, A. S. A. (2013). Towards sustainable green ship technology. *African Journal of Business Management*, **7**(2), 96. DOI: 10.5897/AJBM10.1634.

[140] Board, O. S., & Board, M. (1998). *Double-Hull Tanker Legislation: An Assessment of the Oil Pollution Act of 1990*. National Academies Press.

[141] IMO, (2022). SOLAS. Available at: SOLAS (imo.org), last assessed: 29-8-022.

The SOLAS Convention is maybe the oldest international convention on maritime matters. This was preceded by the efforts of the year 1914 at the London Conference after the sinking of TITANIC[142], maybe the most famous maritime accident to date, but it never entered into force because of the outbreak of the First World War. In 1929, the Convention was initiated for the first time and entered into force in 1933. In 1948, another version of SOLAS entered into force on the initiative of Britain, which was significantly delayed in its implementation and entered into force in 1952. Finally, in 1960, another version of SOLAS was adopted and entered into force in 1965, considered the first achievement of IMO, but he faced difficulties establishing the amendments[143]. Nevertheless, this version was considered by the maritime industry as the most efficient and effective version so far, of the modernization of its regulations and the inclusion of rules relevant to the technical developments of this era. The former Secretary General of the organisation, C. Goad, argued that the 1960s version of the SOLAS Convention, together with its amendments, constituted the raison d'être (raison d'être) for the IMO until the end of the 1960s[144].

The SOLAS 1974 focused heavily on vessel seaworthiness and can be argued to complement each other with MARPOL 73/78 regarding maritime safety issues and counter environmental pollution. According to the Convention, the jurisdiction of the vessel belongs to each flag state, and, at the same time, each coastal State also has a degree of control, depending on which maritime zone the ship is sailing. This control was becoming absolute if a vessel, flying the flag of a Contracting State, utilised its ports. In case of a vessel's non-compliance with the conditions of the Convention, the competent authorities had the authority to implement any necessary measures, even

[142] Schröder-Hinrichs, J. U., Hollnagel, E., & Baldauf, M. (2012). From Titanic to Costa Concordia—a century of lessons not learned. *WMU journal of maritime affairs*, **11**(2), 151-167. DOI: https://doi.org/10.1007/s13437-012-0032-3.

[143] The first conference of the Organisation on Maritime Safety was held in 1960 and culminated in the SOLAS Convention of the same year (preceded by the Convention on Safety at Sea of 1948 with the initiatives of Britain which, due to the development of new technologies in shipping, required a revision). The 1960 Convention contained regulations on the subdivision and stability of ships, mechanical and electrical installations, fire protection and extinguishing, life-saving appliances, the transport of grain, the transport of dangerous cargoes and fire-powered ships. However, due to the high demands for possible amendments to the Convention, it was replaced by the new version of 1974.

[144] Parsons, J., & Allen, C. (2018). The history of safety management. In *Managing Maritime Safety* (pp. 16-31). Routledge.

forbidding the vessel's departure, unless the destination of the ship is a port for repairs, absent of any kind of threat to crew health and ship safety[145].

In 1978, at the IMO Conference on Tanker Safety and Pollution Prevention (TSSP), the Protocol to the Convention was adopted, which established: (a) The Inert Gas System, a gas (such as nitrogen or carbon dioxide or a mixture of gases) containing a sufficient amount of oxygen to prevent the combustion of hydrocarbons; b) Additional Radars and c) Emergency steering gear. In the amendments of the year 1983, the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk 1971 and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk 1971, and the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk 1975 were established, also known as IBC and IGC codes, which are considered mandatory for states that have signed the convention[146].

The outcomes of this conference were followed by the amendments to the SOLAS Convention in 1988, 1989, and 1990 referring to Ro-Ro ships[147] regarding the stability for general cargo vessels of more than one hundred metres in length and, along with the Global Maritime Distress Safety System (GMDSS[148]), entered into force in February 1992. Finally, the amendments of 1991 and 1992 refer to issues of protection against navigation, fire fighting, and pilot operations and proceed to replace Chapter VI

[145] Joseph, A., & Dalaklis, D. (2021). The international convention for the safety of life at sea: highlighting interrelations of measures towards effective risk mitigation. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **5**(1), 1-11. DOI: https://doi.org/10.1080/25725084.2021.1880766.

[146] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).

[147] changes to Chapters II 1 and II 2, III, IV, V and VI

[148] On 1/2/1992, the partial implementation of the GMDSS system began, while its full mandatory implementation for all ships began in the year 1999. With the implementation of the system, a clear improvement of the services of the rescue teams is foreseen, since thanks to the satellite system one will immediately know the location of the endangered ship (or people). On the other hand, however, the adoption of GMDSS leads to the abolition of the specialty of radio operator. The issue acquires particular importance, since nowadays communications are associated with both security, as well as with the efficiency and functionality of the ship. Thus, deck officers are now called upon to shoulder the role of radio communications officer, burdening their already increased hours. If we add to this disadvantage the inadequacy in their theoretical training, then we realise that until the new system proves its reliability and effectiveness, it might be necessary to extend the transitional period beyond the year 1999, and to keep the radio officer on board, for at least a transitional period for the adaptation period of the officers of the bridge.

by installing the International Code for the Safe Carriage of Grain as mandatory in bulk carriers[149].

In 1994, during the IMO Conference, a new chapter was added to the existing SOLAS Annex, providing all the necessary applications of the newly emerging International Safety Management Code for all passenger ships, tankers, chemical carriers, and bulk cargo carriers over grt. 500 by 1 January 1998 and for other cargo ships by 1 January 2002[150]. The ISM established new regulations regarding the safe management and organisation of the shipping companies, leading to more efficient and effective vessel operations and thus enhancing the protection of the marine environment. Additionally, In 2002, at the Diplomatic Conference on maritime security issues, several amendments were made to the Convention aimed at enhancing maritime security on board the ship and in areas of ship-port interconnection. These amendments lead to the creation of a new chapter in SOLAS that only concerns maritime safety and contains the International Ship and Port Facility Security Code (ISPS Code). The ISPS Code, assessed in Chapter 2, incorporates specific instructions for member states, port authorities, and shipping companies[151]. Specifically, the first section (Part A) contains mandatory provisions, and the second section (Part B) includes sets of rules to enhance port operations' safety and security further. The application and enforcement of ISM & ISPS Codes greatly impacted the structure and scope of SOLAS and all other organisations, relocating the focus to other issues, such as the safe operation of shipping companies and even recently to sustainable shipping management[152].

During the Amendments of May 2006, a new regulation on the Long Rang Identification and Tracking Systems (LRIT) system was included in The SOLAS Chapter V, relating to maritime safety, which will be mandatory for i) passenger ships,

[149] Mitroussi, K. (2004). Quality in shipping: IMO's role and problems of implementation. *Disaster Prevention and Management: An International Journal*. DOI: https://doi.org/10.1108/09653560410521698.
[150] Mallia, P. (2009). *Migrant smuggling by sea: combating a current threat to maritime security through the creation of a cooperative framework*. Brill.
[151] Mukherjee, P. K. (2007). The ISM Code and the ISPS Code: A critical legal analysis of two SOLAS regimes. *WMU Journal of Maritime affairs*, **6**(2), 147-166. DOI: https://doi.org/10.1007/BF03195110.
[152] Vassalos, D. (1999). Shaping ship safety: the face of the future. *Marine Technology and SNAME News*, **36**(02), 61-76. DOI: https://doi.org/10.5957/mt1.1999.36.2.61.

with the inclusion of high-speed craft, ii) cargo ships, with the inclusion of high-speed vessels with a capacity of three hundred tonnes or more, iii) coastal drilling units[153].

Those amendments established a multifaceted agreement to share LRIT information for safety, research, and rescue purposes between SOLAS signatory members, bringing all members closer to a more collaborative status[154].

The LRIT Systems reserve the right of States flags to safeguard all information regarding their vessels deemed confidential. At the same time, those systems gave coastal states access to information upon ships sailing their maritime zones. This new SOLAS amendment upon LRIT does not install any more rights on coastal states over passing vessels other than those already established with another international naval framework[155].

Subject to LRIT information, ships must broadcast the ship's identity, location, date, and time of position. In any case, there is no connection between LRIT and AIS[156]. Specifically, the most crucial distinction between LRIT and AIS, in addition to their apparent extent, is that AIS is an emission system[157]. At the same time, the data from the LRIT are available only to those stakeholders entitled to receive such private information. Therefore, they will only be available to recipients entitled to receive such

[153] Robards, M. D., Silber, G. K., Adams, J. D., Arroyo, J., Lorenzini, D., Schwehr, K., & Amos, J. (2016). Conservation science and policy applications of the marine vessel Automatic Identification System (AIS)—a review. *Bulletin of Marine Science*, **92**(1), 75-103. DOI: https://doi.org/10.5343/bms.2015.1034.

[154] At the 10th session of the IMO Assembly it was decided to convene a conference in Hamburg with a view to establishing the Convention on Maritime Search and Rescue (S.A.R., 1979) which entered into force on 22/6/1985. The Convention was designed to improve the existing search and rescue network following an accident at sea, and this is because it was deemed necessary to install a considerable network of radiocommunications for the rapid transmission of the signals of ships in distress. Despite the great importance of the convention, unfortunately today large areas in the world do not have any internationally organized search and rescue coverage. Of these regions, the lack of organisation that surprises the most is that of the Mediterranean region. For this region, France has been commissioned by the IMO to collect information on the SAR capabilities that the countries of the basin can offer. Other areas without coverage are the Eastern and Western South Atlantic, the Eastern and Western South Pacific, the Western North Pacific, the Indian, Black Seas and the Arctic Ocean region. The only area with a full and functional international SAR project is the North Sea. In contrast, the North Atlantic, the Baltic, the Eastern North Pacific and the Caribbean have SAR projects that the IMO considers satisfactory and substantially adequate.

[155] Chen, Y. (2014). Satellite-based AIS and its Comparison with LRIT. *TransNav, International Journal on Marine Navigation and Safety od Sea Transportation*, **8**(2). DOI: 10.12716/1001.08.02.02.

[156] Pietrzykowski, Z. (2010, October). Maritime intelligent transport systems. In *International Conference on Transport Systems Telematics* (pp. 455-462). Springer, Berlin, Heidelberg.

[157] Cairns, W. R. (2005). AIS and long range identification & tracking. *The Journal of Navigation*, **58**(2), 181-189. DOI: 10.1017/S0373463305003267.

information, and guarantees concerning the confidentiality of this data have been incorporated into the regulatory provisions. Thus, SOLAS signatory members are entitled to receive a notification upon sailing ships at a maximum distance of one thousand nautical miles[158].

Furthermore, those amendments provide for a phase-in implementation of a ship-building programme before the arranged day of application, the 1st of January 2008, and a period of exemption for ships in operation in specific areas of operations where these belong to the AIS. Finally, which authorities should have access to LRIT information has been identified. Additionally, the SOLAS Convention adopted "*The efficient standards and functional requirements for LRIT*" and an MSC decision on "*Arrangements for the timely introduction of long-power identification and the detection system*"[159].

1.3.2 The most recent amendments

1.3.2.1 The 2010 Amendments

On July 1st, 2010, SOLAS adopted new amendments, which entered into force and are the following[160]:

a) Chapter II-2 Amendments – Protection against fire

Those amendments include related to Regulation 9 – Fire containment, to include a requirement for sprayers to be tested and approved under the instructions approved by the Agency and regulation 15 – Regulations for combustible oil, lubricating oil, and other flammable oils, the new text on the application of the regulation to ships built from 1 February onwards and from 1 July 1998 and then.

b) Chapter III Amendments – Lifeguard devices and settings

Subject to Regulation 7 – Personal lifeguards, those amendments add a new requirement for baby life jackets. For passenger ships on voyages lasting less than 24

[158] Høye, G. K., Eriksen, T., Meland, B. J., & Narheim, B. T. (2008). Space-based AIS for global maritime traffic monitoring. *Acta Astronautica*, **62**(2-3), 240-245. DOI: https://doi.org/10.1016/j.actaastro.2007.07.001.

[159] IMO, (2022). Long-range identification and tracking (LRIT). Available at: Long-range identification and tracking (LRIT) (imo.org), last assessed: 29-8-2022.

[160] IMO. (2022). Maritime Safety Committee (MSC). Available at: https://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/Pages/MSC.aspx, last assessed: 20-8-2022.

hours, several baby life jackets equal to at least 2.5% of the number of passengers on board should be provided. In addition, for passenger ships, on a journey of 24 hours or more, baby life jackets should be provided for each infant on board. If the life jackets for adults are not designed for persons with a breast circumference of up to 1750 mm, a sufficient number of suitable accessories that can be provided for such persons should be available on board.

c) Chapter IV Amendments – Radio communications

The amendments are closely related to the provision of radio equipment, as set in Regulation 7, requiring ships to have an EPIRB capable of emitting an emergency alarm through the polar satellite service in orbit (COPAS-SARSAT) operating in the band of 406 MHz^ and, in Regulations 9 and 10, to clarify that the initiation of emergency alarms from a ship to land can be done through the geostationary satellite service INMARSAT[161] through a ground-based ship station.

d) Amendments to Chapter V – Maritime safety

That amendment adds a new paragraph to Regulation 22 – Visibility of a maritime bridge allowing the release of ballast into the sea, stating that the captain should first decide that this operation is initially safe and after he considersaccount, any increased blind areas or reduced horizontal fields of visibility due to the process, to ensure that an appropriate observatory is constantly maintained. Then, the operation must follow the ship's ballast water management plan, considering the recommendations for releasing the ballast. Finally, the start-up and termination of the procedure must be recorded in the ship's maritime activities record. The utilisation of this method leaves a lot of space for misuse of the new BWM Convention, as analysed in Chapter 3.

e) Amendments to the International Code for Fire Protection Systems (FSS Code)

[161] Over time, conventional means of radio communication did not meet the needs of modern shipping and the IMO proceeded to draw up the Convention on the Establishment of an International Maritime Satellite System (INMARSAT, 1976), which entered into force in 1979 with the aim not only of improving maritime communications from a business point of view. As a result of this convention, the International Maritime Satellite Organisation (INMARSAT), which now operates as an independent UN body and is based, like the IMO, in London, was established. In 1977, the IMO adopted the Plan for the Establishment of a Worldwide Navigational Warning Service for maritime safety and the provision of meteorological information with the participation of the national port authorities of the Member States.

Those amendments replace the section of Convention's Chapter 5, "Permanent gas fire-fighting systems", with a revised text.

f) Amendments to the International Lifeguard Code (LSA Code)

The modifications include the requirement that all lifeguards should withstand stacked an air temperature range from 30°C to +65°C, and personal lifeguards should continue to operate on an air temperature range from -15°C to +40°C. Additionally, "international or bright reddish-orange or a comparatively fairly visible colour in all places that will help locate at sea" - the existing part 2.2, setting the general requirements for life jackets is utterly revised and replaced. Finally, further modifications are related to immersion and protective suits' specifications.

g) Amendments to the Directives on the authorization of organisations acting on behalf of the Administration (Decision A.739(18))

Those amendments to the directives, which have been installed as mandatory under SOLAS Chapter XI-1, add a new paragraph (2-1) that requires the use of only exclusive researchers and listeners for research and certification. However, radio surveys may subcontract non-exclusive researchers.

The following amendments were made in December 2006, with effect from July 1st, 2008 and July 1st, 2010[162].

a) Amended safety standards for passenger ships.

This set of SOLAS amendments was an outcome of an extensive review of passenger safety for vessels built in the 2000s aiming to assess the adequacy of the current regulation, especially for the largest passenger ships that are now being built. This work on developing the most recent and amended regulation is based on two principles. Initially, there should be more focus on preventing an accident from its occurrence, and the newly built passenger ships must be designed to improve survival so that, during an emerging accident, the crew and the passengers on board will remain safe until the vessel is navigated to a safe port. Those amendments will also include new concepts, such as including the accident threshold criteria in SOLAS Chapters II-

[162] IMO. (2022). Maritime Safety Committee (MSC). Available at: https://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/Pages/MSC.aspx, last assessed: 20-8-2022.

1 and II-2 (namely, the overall amount of damage that a ship can withstand upon an impact, considering the basis of the design, to be enabled to return safely to port). Those amendments also provide flexibility in the regulatory framework so that the ship's designers can meet any challenge to its safety that the future may bring. The amendments include: i) alternative plans and arrangements, ii) safe areas and the safety systems to be maintained while the ship is navigated towards the port after an accident, while the basic systems of the ship are operational, iii) safety centres on board, from where security systems can be controlled, operated and monitored, iv) fixed fire detection and alarm systems, including requirements for fire detectors and manual call points to be located remotely and individually, v) installation of fire prevention processes, including amendments aiming to enhance the efficiency of the currently set processes, fireproof methods of escape and the time for systematic evacuation and abandonment, including the requirements for the basic systems to be kept in operation, in case one of the main vertical zones is disabled because of a fire.

b) Fire safety regulations on the balconies of the cabins

Those amendments have been applied to chapter II-2 of SOLAS and the International Code of Fire Safety Systems (FSS Code), aiming to enhance any current fire protection methods concerning the balconies of cabins installed on passenger ships. There is the case of Star Princess, as it passed between Grand Cayman and Montego Bay, Jamaica, in March 2006[163]. The fire started on an outdoor terrace and spread to more than one deck. The described amendments to Chapter II-2 of SOLAS are intended to ensure that existing regulations 4.4 regarding the elementary deck covers), 5.3.1.2 upon the roofs and claddings, 5.3.2 regarding the utilisation of flammable materials, and six upon the potential production of tobacco and toxic will also apply to cabin balconies for newly built passenger ships.

As for the existing passenger ships, the relevant provisions stipulate that the furniture on the terraces of the cabins must be made of materials of limited fire risk, there must be fixed water spraying systems, fire detection and alarm systems, and that

[163] Lau, Y. Y., Tam, K. C., Ng, A. K., Nguyen, H. O., & Nikolova, N. (2017). Cruise shipping accidents in Asia: The trends, causal factors and implications. *18th Annual General Assembly of the International Association of Maritime Universities*, 1, 372-382.

the partitions separating the balconies must be made of non-flammable materials, very similar to those four new passenger ships[164].

c) Prevention of lifeboat accidents

The amendment to the SOLAS III Regulation / 19.3.3.4 concerns the provisions for the commencement of the free fall of lifeboats during ship abandonment drills. Those amendments will enable, during a ship abandonment exercise, the lifeboat to either fall free with only the crew required on board or descend into the water with the help of secondary means with no action of the crew on board and then move into the water. The goal is to prevent lifeboat accidents that may occur during vessel abandonment.

d) Protection investments

Those amendments to the regulations of SOLAS II-1 / 3-2 have become mandatory for the safe execution of a ballast tank's ballast water unload process, including all newly built vessels and for the double-bottom areas of bulk cargo trucks. Those SOLAS amendments entered into force on July 1st, 2008 and will be applied to ships for which their construction is placed on or after July 1st, 2008, or without a construction contract[165].

1.3.2.2 The 2020 Amendments

Over the recent years, IMO[166] adopted new amendments to Chapter II-1 of SOLAS regarding subdivision and vessel stability, focusing mainly on the existing and newly built passenger ships. These amendments are an outcome of the 2012 Costa Concordia incident[167].

Specifically, the significant inclusions are the following[168]: i) amendments upon SOLAS II-1/1 and II-1/8-1 regarding computerized stability in case of flooding on a

[164] Witthohn, R. (2022). Cruise Shipping. In *International Shipping: The Role of Sea Transport in the Global Economy* (pp. 597-675). Wiesbaden: Springer Fachmedien Wiesbaden.

[165] IMO. (2022). Maritime Safety Committee (MSC). Available at: https://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/Pages/MSC.aspx, last assessed: 20-8-2022.

[166] IMO. (2019). SOLAS amendments entering into force 1 January 2020. Available at: https://www.imo.org/en/MediaCentre/PressBriefings/pages/35-SOLAS-EIF-2020.aspx#:~:text=%E2%80%8BMeasures%20aimed%20at%20preventing,launching%20appliances%20and%20release%20gear, last assessed: 28-8-2022.

[167] Schröder-Hinrichs, J. U., Hollnagel, E., & Baldauf, M. (2012). From Titanic to Costa Concordia—a century of lessons not learned. *WMU journal of maritime affairs*, **11**, 151-167. DOI: https://doi.org/10.1007/s13437-012-0032-3.

[168] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek)

passenger ship, (MSC 99) ii) amendments on damage control drills, subject to SOLAS regulations III/1.4, III/30 and III/37, (MSC 98) iii) SOLAS regulation II-2/3.56 regarding vehicle carrier and vehicle space (MSC 97), iv) SOLAS regulation II-2/9.4.1.3 fire integrity of windows for ships carrying not more than thirty-six passengers (MSC 98), v) uniformity upon survey periods for non-ESP Code cargo ships and protection against noise (MSC 97) vi) amendments upon FSS Code (Fire Safety Systems), FTP Code (International Code for the Application of Fire Test Procedures, 2010), and the IGC Code (International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk) (MSC 97), vii) amendments on IS Code (Intact Stability) (MSC 96), viii) amendments to the IMDG Code, Certificates of fitness, and modernization of the GMSS (MSC 99)[169].

Lastly, the subsequent amendments are scheduled for 2024, focusing upon technical issues relevant to i) Safe mooring operations, ii) Modernization of the GMDSS, iii) Watertight integrity, iv) Watertight doors on cargo ships, v) Fault-isolation of fire detection systems, vi) Life-saving appliances, vii) Safety of ships using LNG as fuel[170].

The recent amendments are evident in that they follow a cycle of development, ratification, and enforcement, which is becoming shorter over the years. Nevertheless, as the accident of Costa Concordia and many other incidents proved, maritime accidents are not in decline, and the marine legislations are still reactive to counter emerging issues, such as pollution from new sources and rapid technological advancements[171].

[169] IMO. (2020). A set of important amendments to the International Convention for the Safety of Life at Sea (SOLAS) and various codes enter into force on 1 January 2020. Available at: https://www.imo.org/en/MediaCentre/PressBriefings/Pages/35-SOLAS-EIF-2020.aspx, last accessed 16-8-2022.

[170] IIMS. (2022). What's new with SOLAS 2024? Available at: https://www.iims.org.uk/whats-new-with-solas-2024/, last assessed: 29-8-2022.

[171] Giustiniano, L., e Cunha, M. P., & Clegg, S. (2016). The dark side of organisational improvisation: Lessons from the sinking of Costa Concordia. *Business Horizons*, **59**(2), 223-232. DOI: https://doi.org/10.1016/j.bushor.2015.11.007.

1.4 International Convention for the Prevention of Pollution from Ships (MARPOL)

1.4.1 The background of MARPOL

The International Convention on the Pollution of the Sea by Ships (MARPOL 1973) with the 1978 Protocol entered into force in 1983 (International Convention for the Prevention of Pollution from Ships)[172].

From its initiation until the official recognition from IMO, Britain was entrusted with exercising the agency's powers as a traditional naval power. Previously, on the initiative of the British Government, the International Conference in London (1954) was held, which drew up the first Convention for the Prevention of Pollution of the Sea by Oil (OILPOL 1954). The IMO recognised this convention in 1959[173].

In contrast with SOLAS Convention, where crew and passenger safety were always relevant and vital issues, MARPOL Convention dealt with an emerging issue: the utilization of oil as a fuel[174]. Specifically, the first estimates of the presence of oil at sea were made following the end of the First World War in Britain in 1921. The meeting was attended by representatives of shipowners, oil companies, and coast guard officials. The problem was the impressive increase in ships burning oil as fuel. As a result, the Oil in Navigable Waters Act, 1922[175], was implemented. By imposing a fine of £100, the treaty prohibited the dumping of oil or oil residues into the water in the territorial waters of Britain and Northern Ireland. It also obliged shipowners to maintain a register of oil on board ships flying the British flag, establishing regulations for the loading, unloading and transporting of oil cargo. Two years later, a Commission with members of London and Liverpool shipowners proposed establishing a 150 n.m. prohibition zone off the British coast and unique ports' facilities to collect residues. At the same time, in the USA, public demands for a rapid solution to the problem forced President Harding to accelerate the convening of an International Conference in Washington (1926). The American proposal was to limit the rate of an oily mixture

[172] IMO. (2020). International Convention for the Prevention of Pollution from Ships (MARPOL). Available at: https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx, last assessed: 27-8-2022.
[173] Ibid.
[174] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek)
[175] Clayton, H. D. (1922). Use of the Water in Navigable Streams for Commerce and Power. *Cent. LJ*, **94**, 442.

containing over 100 ppm to less than 50 n.m. distance from shore and only in specified areas, e.g. the North Sea, the Baltic, and the Black Sea[176].

This proposal was followed by the amendments of 1962, containing more severe measures for oil discharges to the sea, e.g. the introduction of the 100 instead of 50-mile zone. However, the results were not favourable because a) the degree of difficulty in detecting violations of the rules of discharge was relatively high, and b) it was almost a given the reluctance of the vessel's flag State to prosecute the masters when and if it detected violations on their part and c) the many Member States expressed their opposition to the construction and installation of residue reception stations, mainly because there was no previous experience and knowledge (know-how) and because of the expected high construction cost[177].

A year later (1963), while private companies well called to participate in the IMO conferences (SHELL, EXXON), they came up with a cheaper and more practical alternative, the adoption of the Loadontop system (LOT), which enabled the various governments and oil companies to avoid the financial burdens of building residue reception stations[178].

Later on, in 1969, new amendments were installed according to which tankers were obliged to discharge oil en route (during the voyage) at sea only by lot method, the disposal rate should not exceed 60 litres for each mile, and the total disposal quantity should not exceed 1/15,000 of the total tonnage of the ship.

In practice, however, the amendments of 1969 and consequently the convention was criticized because a) the LOT system does not apply to short journeys (e.g. intra-Mediterranean), b) most ports do not yet have reception facilities, and c) the convention concerns only the deliberate disposal, refers only to oil and not to other pollutants and d) it enables the master in extraordinary circumstances to dispose of oil anywhere with the sole obligation to report it in his government[179].

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[176] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek)
[177] Ibid.
[178] Few years later, the grounding of the tanker Torrey Canyon on the English coast in 1967 resulted in the dumping into the marine environment of 120,000 tons of crude oil. The wreck of the Torrey Canyon was the most serious pollution incident recorded up to that time. Thus, questions began to be raised about the safety measures in force until that time, while at the same time the inadequacies of the existing system for providing compensation to the victims of pollution became apparent.
[179] Pritchard, S. Z. (1977). Load on Top-From the Sublime to the Absurd. J. Mar. L. & Com., **9**, 185.

In contrast with the provisions of the Convention (1954) and the amendments (1962-1969), which cover operational pollution, the new revisions of 1971, which never entered into force, refer to accidental pollution (the occasion was the sinking of the Torrey Canyon on the coast of Brittany in 1967)[180]. The Conference did not find the requested response, perhaps because the other states did not face similar pollution problems then. Discharge of cargo with oil content below 500 parts per million; This was followed by a new effort at the initiative of Britain, and under the instructions of a special committee, a provisional draft convention was prepared[181], which was distributed to the parties, but more significant events occurred. Germany and Italy's refusal to participate in future conferences on the marine environment and the outbreak of the First World War prevented development. In 1952 the British Government decided to establish a committee under the instructions of Mr. Faulkner (Faulkner Committee, 1952[182]), which was to propose technical solutions to the problem of marine pollution. In analysing the effects of oil on the marine environment, the Committee concluded that crude oil and its components caused the most significant pollution. It was also found that the established zone of 50 n.m. (in Britain) was no longer sufficient since discharges of passing tankers were observed at 100 and 150 n.m. depending on climatic conditions, causing significant pollution on the adjacent coasts. The committee's proposal was based on the installation of reception facilities. The Faulkner Committee was the forerunner of OILPOL in 1954[183].

According to an IMO statistic in September 1981, the seas' oil pollution rate decreased by about 30% in the 1970s-80s, although oil transport increased by 17%. from stranding or collision of tankers with the establishment of limits on the dimensions of cargo tanks as well as the special protection of the Great Barrier Reef15. But over time, the OILPOL was replaced by the MARPOL 73/78[184].

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[180] Utton, A. E. (1967). Protective Measures and the Torrey Canyon. *BC Indus. & Com. L. Rev*., **9**, 613.
[181] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek)
[182] Chase, R. (1952). Howe, Irving. William Faulkner: A Critical Study (Book Review). *Commentary*, **13**, 188.
[183] Mitchell, R. B., & Mitchell, R. B. (1994). Intentional oil pollution at sea: environmental policy and treaty compliance. mit Press.
[184] IMO. (2020). International Convention for the Prevention of Pollution from Ships (MARPOL). Available at: https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx, last assessed: 27-8-2022.

The IMO then addressed the problem of pollution by discharges by drawing up the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972)[185], which entered into force in 1975[186].

The said Convention defines dumping as the '*deliberate dumping of waste at sea by ships and aircraft, but separates the discharge of waste relating to the operational procedures of ships and aircraft*'[187]. The London Convention is considered global and does not refer to any particular area. Instead, it comprises three annexes, the first called the black list, containing the chemicals and their compounds and high-risk radioactive waste. Disposal of such substances, included in the black table, is prohibited.

The second annex contains less toxic waste and is called the grey list. In particular: arsenic, lead, copper, zinc, phyto-drugs, and the least toxic radioactive compounds. The disposal of those substances is allowed only if a special permit has been issued by the competent Port Authorities or a Contracting Government. Finally, the third Annex contains all substances not included in the black and grey list. The disposal of this waste is permitted immediately after a previous permit has been issued[188].

In 1978 and 1980, many amendments to the Annexes were adopted, paying particular attention to the incineration of waste at sea following the issue of a special permit. Accordingly, each Contracting Party should take the necessary legislative

[185] Farnelli, G. M., & Tanzi, A. (2017). Convention on the prevention of marine pollution by dumping of wastes and other matter 1972 and 1996 protocol. *In Elgar Encyclopedia of Environmental Law* (pp. 175-183). Edward Elgar Publishing. DOI: https://doi.org/10.4337/9781783477210.V.16.

[186] In addition to the London Convention, which is of global scope, there are also two regional conventions which deal with the problem of dumping: (a) the Oslo Convention (1972) and (b) the Protocol to the Barcelona Convention (1976). More specifically, the Protocol to the Barcelona Convention concerns the "Dumping Protocol" in the Mediterranean, which was adopted and signed in Barcelona on February 16, 1976 and entered into force on 12/2/1978. The Oslo Convention is regional and covers the sea areas of the North-East Atlantic south to Spain and north to the eastern coasts of Greenland and the Northern Cape, as well as the North Sea region. The content of the Convention can be summarised as follows: (a) the obligation that no harmful substance may be disposed of without the approval of the competent authorities of the Contracting States, (b) no authorisation shall be granted for high-risk harmful substances for disposal (blacklist) and (c) in respect of other substances which are not considered to be so polluting there is a condition that significant quantities may be rejected; if the competent authorities issue a special permit (grey list). In all other provisions the Convention is identical to the London Convention. See. G. J. Timagenis "International Control of Marine Pollution", 1980

[187] IMO. (2019). Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. Available at: https://www.imo.org/en/OurWork/Environment/Pages/London-Convention-Protocol.aspx, last assessed: 25-8-2022. Article 3.

[188] Ibid.

measures for a) ships and aircraft flying a flag of a member state or registered with its armed forces, b) ships and aircraft loading waste destined for disposal into its territory or territorial sea, and c) ships and aircraft under its jurisdiction that are likely to be involved in such discharges[189].

1.4.2 The MARPOL Convention

The International Convention for the Prevention of Pollution from Ships (MARPOL 1973) occupies a dominant position in protecting the marine environment with the 1978 Protocol, which entered into force in 1983[190].

The principal aim of the Convention is to eliminate the international pollution of the marine environment from all harmful substances and to minimise the accidental disposal of oil and other pollutive cargoes. It also establishes more severe measures for specific areas to achieve the elimination of any source of pollution. Any discharge of petroleum products by tankers and other ships with a dwt of more than 40,000 is prohibited in those areas. The Mediterranean Sea is considered by the MARPOL Convention as such an area, along with the Baltic Sea, the Black Sea, the Clear Sea, and the Persian Gulf[191].

The ratification of the Convention has been time-consuming due to financial and technical difficulties. It was, therefore, necessary to speed up the ratification procedures by adopting the Protocol in 1978 (during the Conference on Tanker Safety and Marine Pollution Prevention, TSSP), which displayed the conditions for a Member State to become a Member State of the Convention (acceptance of the first Annex was sufficient). However, there was an additional claim: the states that would ratify the convention would have held 50% of the world's tonnage[192].

According to the Convention, tankers from 150 grt. and above are subject to any necessary inspection to be granted the International Oil Pollution Prevention (IOPP)

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[189] Coenen, R. (1997). Dumping of wastes at sea: Adoption of the 1996 Protocol to the London Convention 1972. *Rev. Eur. Comp. & Int'l Envtl. L*., **6**, 54.

[190] IMO. (2020). International Convention for the Prevention of Pollution from Ships (MARPOL). Available at: https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx, last assessed: 27-8-2022.

[191] The IMO has recently been discussing the establishment of the Antarctic sea area as a special area of protection, and this is because the existing treaty (Antarctic Treaty 1961), which was ratified for the next 30 years, prohibits the use of the sea area for military purposes and nuclear drills, but does not set regulations for the protection of the marine environment mainly from oil extraction.

[192] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek)

certificate[193]. Also, according to Article 20, the above ships must keep an oil register. Furthermore, the Convention treats oil pump platforms in the same way as ships that are not tankers of more than 400 grt. and obliges coastal States, particularly those near particular areas, to upgrade their port facilities for the reception of the treatment of oil residues[194].

The convention also extends to the separation of 'existing' and 'new' ships. New equipment installation may occur after a grace period depending on their deadweight or capacity for existing vessels. In particular, all tankers from 40,000 to 70,000 dwt. can operate with a tank system for clean ballast tanks until 1987. After this date, they will have separate ballast tanks (Segregated Ballast Tanks) or a crude oil washing system for the tanks. All tankers over 150 GRT will have Slop Tanks and monitoring and control devices for the oil to be disposed of (Monitoring and Control System). Ships over 400 grt. will be equipped with an oil/water separator (Oil-Water Separator). The differences between the MARPOL Convention and the OILPOL Convention 1954 and the amendments of the years 1962 and 1969 are[195]:

(a) The re-establishment of specific areas, i.e. the Mediterranean, the Baltic, the Black Sea, the Red Sea, and the Persian Gulf, Article 10 (the first three regions are already under one protection regime, while the latter two will be protected in the future).

(b) No discharge of oil shall be permitted in these areas, even for tankers fitted with the load on the top system. On the contrary, it establishes the SBT, COW, OWS, Adequate Sludge Tanks, and Inert Gas System (Inert Gas System adopted by the corresponding PROTOCOL of SOLAS 1974 at the TSSP Conference).

(c) It covers all sea pollution by ships and is not limited to oil.

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[193] Mattson, G. (2006). MARPOL 73/78 and Annex I: an assessment of its effectiveness. *Journal of International Wildlife Law and Policy*, **9**(2), 175-194. DOI: https://doi.org/10.1080/13880290600728195.

[194] It is worth mentioning that those rules started to become increasingly stricter due the wrecks of the ARGO MERCHANT in 1976 near the coast of the USA and the AMOCO CADIZ in the year 1978 on the coast of Brittany resulting in the dumping of about 220,000 tons of crude oil, marking it as the greatest pollution up to that time.

[195] Mitchell, R. B. (1995). Compliance with international treaties: lessons from intentional oil pollution. *Environment: Science and Policy for Sustainable Development*, **37**(4), 11-41. DOI: https://doi.org/10.1080/00139157.1995.9929234.

(d) Provides for measures to avoid or reduce pollution that ship accidents may cause.

However, it should be noted that MARPOL's requirements for the control of discharges do not apply in cases of a) ship safety or saving human life at sea and b) as a result of damage if the crew did not act intentionally or disregarded[196].

During the Tanker Safety and Pollution Prevention (TSPP, 1978), because numerous countries had not signed and ratified the MARPOL Convention or its annexes in connection with severe unavoidable tanker accidents during the period 1975-197822, they inspired President Carter (Carter Initiatives) to proceed with an action plan for the prevention and suppression of pollution, i.e. increased assistance systems for the prevention of accidents at sea, mainly for the collision of ships as well as inert gas systems, improvement of navigation systems and installation of double bottoms on all tankers over 20,000 DWT[197].

During the conference, it was decided that the new measures would be incorporated into the MARPOL and SOLAS Conventions protocols. Accordingly, two decisions were established after the IMO's MSC and MEPC Committees. The first (Package #1) approached the American positions, requiring separate ballast tanks (SBT) and inert gas systems (IGS) for all tankers, old and new, over 20,000 DWT. Greece, Sweden, and Norway supported the proposal. The second (Package #2) was led by Britain, introducing the tank wash system with cargo (COW) for all tankers over 70,000 DWT[198].

As a result, the TSSP not only introduced stricter regulations than the hitherto rivals of MARPOL and SOLAS (the reluctance of most shipping countries to approve the impending changes to the conventions was well known, but they were pressured by the threat of the American proposal advocating unilateral implementation) but also accelerated the relevant procedures for ratifying the two conventions[199].

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[196] IMO. (2020). International Convention for the Prevention of Pollution from Ships (MARPOL). Available at: https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx, last assessed: 27-8-2022.

[197] Snider, W. D. (1978). *IMCO* Conference on Tanker Safety and Pollution Prevention. *Marine Technology and SNAME News*, **15**(03), 297-307. DOI: https://doi.org/10.5957/mt1.1978.15.3.297.

[198] Ibid.

[199] Alexopoulos, A. B., Katarelos, E. D., Fournarakis, N., Sakkas, K., & Avjiyannis, K. (2001, January). A Critical Analysis of the IMO's Conventions and Codes from the Techno-Economic & Managerial

At the 53rd meeting of the IMO Commission (MEPC), the Committee for the Protection of the Marine Environment amended Annex I of MARPOL 73/78 and, with the cooperation of the Steering Committee, composed of maritime experts from member states, adopted regulations on the 13 F regarding new-built tankers and 13 G referring to existing tankers[200]. According to 13 F, this includes all tankers over 600 tonnes of DWT and promotes explicitly the:

a) Construction of double hull and double bottom tankers.
b) Construction of mid-deck tankers.
c) Alternative projects which can ensure an increased level of protection against pollution from oil in the event of collisions or strandings.

The regulation refers to tankers of 600 tonnes DWT or more, which: a) the shipbuilding contract will be made after 6-7-1993, b) the construction works began after 6-1-1994, and c) the construction works will be completed after 6-7-1996[201].

New tankers with a deadweight of fewer than 600 tonnes shall be exempted from the obligation to comply with this Regulation. New tankers with a deadweight of 600 to 5 000 dwt are required to have applied only double-bottomed and not side tanks, provided, however, the maximum capacity of each tank will not exceed 700 cubic metres. At this point, it is worth indicating that while the smaller tanker may be excluded from side tanks at an international level, they can be obliged to make this regulation unilaterally applied by a country and be enforced on all ships trading in this country. For example, the US OPA '90 requires the installation of a double hull for all tankers, regardless of their size[202].

As for new tankers, with a deadweight of more than or equal to 5 000 tonnes, they are obliged by the regulation to be fitted with a double hull. However, according to paragraphs 4 and 5 of the same regulation, a new tanker is allowed, instead of

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perspectives. *In Proceedings of International Conference on: Technology and Environment*, University of Piraeus.

[200] Shi, Y. (2016). Reducing greenhouse gas emissions from international shipping: Is it time to consider market-based measures? *Marine Policy*, **64**, 123-134. DOI: https://doi.org/10.1016/j.marpol.2015.11.013.

[201] Urrutia, B. (2006). The EU regulatory action in the shipping sector: a historical perspective. *Maritime Economics & Logistics*, **8**, 202-221. DOI: https://doi.org/10.1057/palgrave.mel.9100154.

[202] Vanem, E., Endresen, Ø., & Skjong, R. (2008). Cost-effectiveness criteria for marine oil spill preventive measures. *Reliability Engineering & System Safety*, **93**(9), 1354-1368. DOI: https://doi.org/10.1016/j.ress.2007.07.008.

adopting the double-deck method, to adopt the alternative equivalent methods known as (a) the intermediate deck method and (b) the hydrostatic equilibrium method[203].

The same regulation also lays down the additional requirements relating to the total capacity of ballast tanks, the technical characteristics of suction wells, and cargo tanks, the location of cargo and ballast piping, and the oil storage location (as cargo or fuel). Regulation 13F allows for the adoption of double-wall alternatives for new tankers weighing 5,000 tonnes or more but under the necessary condition[204].

The requirements of the 13 G regulation for the existing tankers came into force on 6 July 1995 and were applied to crude oil tankers of 20,000 dwt. or more and oil tankers transporting products of 30,000 dwt. or more. According to the regulation, existing tankers would have a time limit of thirty years from their delivery until they comply with regulation 13 F, with no construction modifications, only operational arrangements, e.g. gradual disposal of side cargo tanks for ballast used. Also required (13G regulation): a) an increased visa program, b) amendments to the supplement to the MARPOL IOPP certificate[205] to include the requirements introduced by the new regulations, and c) stricter criteria for the disposal of petroleum products from ships, e.g. 15 ppm for residues of engine room linen, while the instant rate of discharge is reduced to 30 litres per n.m. travelled[206].

The exemptions granted by this Regulation were limited only to those tankers which would have to comply with Regulation 13 F or be sent for scrapping or to those oil tankers which, although not subject to the requirements of the Regulation, by their own choice complied with its requirements. 13 F concerning the existence of double walls. Still, they differed only in terms of the dimensions satisfied by the double and side walls. Therefore, in this case, tankers may continue to operate with no conversion,

[203] Bérengier, M., & Garai, M. (2001). A state-of-the-art of in situ measurement of the sound absorption coefficient of road pavements. In *11th International Congress on Acoustics*, Rome, Italy (Vol. 2).

[204] Shi, Y. (2016). Reducing greenhouse gas emissions from international shipping: Is it time to consider market-based measures? *Marine Policy*, **64**, 123-134. DOI: https://doi.org/10.1016/j.marpol.2015.11.013.

[205] 1999 (Annexes I and II) amendments (MEPC.78(43)) (amendments to regulations 13G and 26 and IOPP Certificate of Annex I and addition of new regulation 16 to Annex II), Various provisions including amendments to Annex I related to pollution prevention measures for existing tankers; the SOPEP and IOPP Certificate. Shipboard Marine Pollution Emergency Plan (SMPEP) for NLS introduced under Annex II.

[206] Burgherr, P. (2007). In-depth analysis of accidental oil spills from tankers in the context of global spill trends from all sources. *Journal of hazardous materials*, **140**(1-2), 245-256. DOI: https://doi.org/10.1016/j.jhazmat.2006.07.030.

provided that they meet the criteria of the IBC Code (International Code for the Carriage of Hazardous Substances in Bulk)[207].

The 2003 amendments and the revision of the 13 G Regulation accelerated the date of gradual withdrawal of 1st class single hull oil tankers (oil tankers manufactured before the MARPOL Convention) from 2007 to 2005 and single-hull oil tankers of 2nd and 3rd class (oil tankers built after the MARPOL Convention and smaller oil tankers) from 2015 to 2010[208].

Existing oil tankers to which the 13 G regulation applies are required to undergo a programme of extensive inspections during specific, intermediate, and annual reviews. The purpose and frequency of these inspections are the compliance of tankers with the instructions to be issued by the IMO[209].

Existing oil tankers over five years of age are required to have available for each competent authority of a Member State of the International Convention MARPOL 73/78 a complete file of inspections, measurements, and reports on the operations conducted. In addition, a report assessing the condition of the ship, together with conclusions on the state of its construction and permissible tolerances, shall be included in this file in such a way as to demonstrate that it has been accepted by the Administration of the flag flying the ship[210].

A necessary amendment in 2003 was the introduction of a new regulation, 13 H, which prohibits the transport of crude oil from single-hull oil tankers with a capacity of 5,000 dwt or more after the end of the regulation's date of entry into force (5 April 2005). In addition, it is also forbidden to transport crude oil from single-hull oil tankers with a capacity of over 600 dwt but less than 5,000 dwt after 2008.

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[207] 1992 (Annex II) amendments (MEPC.57(33)) (list of chemicals and the designation of the Antarctic as a Special Area), Addition of a new special area under Annex II. Amendments to various discharge provisions of Annex II and to the lists of chemicals in Appendices II and III to provide reference to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code).

[208] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek)

[209] Knapp, S., & Franses, P. H. (2010). Comprehensive review of the maritime safety regimes: present status and recommendations for improvements. *Transport reviews*, **30**(2), 241-270. DOI: https://doi.org/10.1080/01441640902985934.

[210] Griffin, A. (1993). MARPOL 73/78 and vessel pollution: a glass half full or half empty. *Ind. J. Global Legal Stud.*, **1**, 489.

Concerning Annex V of MARPOL 73/78 on pollution from waste, it is stipulated that the treatment and final disposal of waste generated by ships should follow the requirements of the society to which the port belongs. Therefore, according to MARPOL, every vessel with a gt. of 400 tons or more, as well as any ship that is certified to carry fifteen people or more, as well as any permanent and floating platform engaged in the exploration and exploitation of the seabed will be provided with a Garbage Record Book[211] and will carry a waste management plan. This plan will provide written procedures for collecting, storing, treating, and disposing of waste, including the equipment on board[212].

1.4.3 The most crucial amendments of MARPOL 73/78 (period of 2000-2010)

The most recent amendments of MARPOL 73/78 refer to annexes mainly of technical nature, which the tacit acceptance procedure can adopt. Those annexes, as has already been mentioned for the abovementioned amendments to SOLAS, enter into force one on a specific date, usually after two years of ratification, unless a particular number of Member States express objections. Nevertheless, in practice, the amendments are usually adopted either by IMO's Marine Environment Protection Committee (MEPC), incorporated into the latest provision, or by signatory members of the MARPOL Convention[213].

The Conference was held on 1 July 1999 and dealt with the amendment of Annex I to the 13 G Regulation, which concerns the prevention of oil pollution. The amendments entered into force on 1 January 2001. They provided for the enhancement of construction requirements, enforcing even installations to the existing tankers of 20,000-30,000 dwt carrying petroleum products as those applicable to crude oil tankers. The 13G Regulation generally requires the current tankers to comply with the requirements applicable to tankers in Regulation 13F. These amendments extend the application of Regulation 13G to tankers 20,000-30,000 dwt, which carry heavy diesel oil and diesel fuel. Thus, with the adoption of these regulations, it is now clear that the pollution caused by oil derivatives is as severe as the pollution from crude oil.

[211] 1995 (Annex V) amendments (MEPC.65(37)) (guidelines for garbage management plans). Addition of new regulations relating to Garbage Management Plans, Garbage Record Books, and placards.
[212] Martínez-López, A., Ruiz-García, A., & Pérez, I. (2020). Social cost benefit analysis of port handling plans for Annex IV waste of MARPOL: a case study in las palmas port. *Sustainability*, **12**(6), 2382. DOI: https://doi.org/10.3390/su12062382.
[213] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).

Therefore, all rules applicable to vessels carrying crude oil should also apply to ships transporting their derivatives[214].

At the same Conference, amendments were also adopted concerning the supplementary part of the IOPP (International Oil Pollution Prevention) certificate to cover issues such as oil separation and filtration equipment, as well as the preservation and disposal of its residues[215].

Also, at the Conference in June 1999, the Annex II of the MARPOL Convention was amended, which refers to the Regulations relating to the control of pollution by harmful liquid substances transported in large quantities. The result of the amendment was finally the addition of a new Regulation (Regulation 16), which requires the drawing up of an emergency plan in cases of sea pollution by harmful liquid substances[216].

Finally, the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk, IBC Code) was amended. Modifications consider the maintenance of ventilation systems[217].

On 27 April 2001, a new timetable was adopted – not definitive, as a new timetable followed in December 2003 – for the revisions of Annex I to the MARPOL Convention relating to the withdrawal of single-bottom tankers. According to it, most single-bottomed tankers will have to be withdrawn by 2015 or earlier. It is therefore recognised that double-bottomed tankers offer excellent environmental protection against contamination when specific types of accidents occur[218].

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[214] Knapp, S., & Franses, P. H. (2010). Comprehensive review of the maritime safety regimes: present status and recommendations for improvements. *Transport reviews*, **30**(2), 241-270. DOI: https://doi.org/10.1080/01441640902985934.

[215] 1999 (Annexes I and II) amendments (MEPC.78(43)) (amendments to regulations 13G and 26 and IOPP Certificate of Annex I and addition of new regulation 16 to Annex II), Various provisions including amendments to Annex I related to pollution prevention measures for existing tankers; the SOPEP and IOPP Certificate. Shipboard Marine Pollution Emergency Plan (SMPEP) for NLS introduced under Annex II.

[216] Julian, M. (2000). MARPOL 73/78: the International Convention for the Prevention of Pollution from Ships. *Maritime Studies*, **2000**(113), 16-23. DOI: https://doi.org/10.1080/07266472.2000.10878605.

[217] IMO. (2019). IGC Code. Available at: https://www.imo.org/en/ourwork/safety/pages/igc-code.aspx, last assessed: 27-8-2022.

[218] IMO. (2019). Construction Requirements for Oil Tankers - Double Hulls. Available at: https://www.imo.org/en/OurWork/Environment/Pages/constructionrequirements.aspx, last assessed: 29-8-2022.

Nevertheless, the year 2015 is considered being the starting date for the withdrawal of single-bottom tankers. Thus, the flag State administration is allowed to register some newer single-bottomed ships that meet certain technical specifications to continue operating until 25 years[219]. On the other hand, the Port Authorities of any state may refuse entry to their port or terminals to single-bottomed ships, even if their operation is under the Regulation[220].

An additional precautionary measure in the Regulation following the amendments is that of the Condition Assessment Scheme (CAS)[221]. The CAS plan shall state the ship's condition as a structure and verify that the procedures relating to the certificates and inspections have been conducted correctly and comprehensively.

The revised Regulation specifies the following categories of tankers:

a) Category I: tankers of 20,000 dwt or more carrying crude oil, oil fuel, heavy diesel oil and lubricants, as well as tankers of 30,000 dwt or more, carrying other types of oil and not complying with the regulations regarding the appropriate installation of separate ballast tanks and other systems (pre-MARPOL tankers).
b) Category II: tankers of 20,000 dwt or more, carrying crude oil, oil fuel, diesel heavy oil and lubricants, as well as tankers of 30,000 dwt or more, transporting other types of oil and complying with the regulations on the appropriate placement of separate ballast tanks (MARPOL tankers).
c) Category III: tankers from 5,000-20,000 dwt.

All Class I ships must be equipped with the CAS project after 2005, while ships of the second category should be equipped with such a plan after 2010.

In December 2003, new amendments to the 13G Regulation followed, which entered into force in April 2005. According to them, the final date for the withdrawal of pre-MARPOL tankers (category I tankers) is set in the year 2005, while that of categories II and III is set in 2010. The CAS project has also been significantly

[219] Ibid.
[220] Alexopoulos, A. B., & Mavranezoulis, A. (2002). Oil Spills in the Eastern Mediterranean Region. The Case of Single-Hull Tankers. *Cyprus Journal of Science & Technology*, **2**, 1-11.
[221] 2001 (Annex I) amendments (MEPC.95(46)) (amendments to regulations 13G of Annex I and to the Supplement to the IOPP Certificate), Regulation 13G replaced and reference to Condition Assessment Scheme (CAS) added. Consequential amendments to the IOPP Certificate.

strengthened, and it is envisaged that it must be applied to all single-wall tankers aged 15 years and over.

In addition, the 2003 Conference adopted the new Regulation 13H on preventing pollution by heavy-grade oil tankers (HGO). Thus, under this regulation, it is forbidden to transport HGO from single-wall tankers smaller than 5,000 dwt from April 5, 2005, when the Regulation came into force. In addition, it is prohibited to transport heavy oil alloys from single-walled tankers of 600-5,000 dwt no later than 2008[222].

According to Regulation 13G, HGO (Heavy Grade Oil) the following items are considered: i) Crude oil with a density greater than 900 kg/m3, ii) Oil fuel with a density greater than 900 kg/m3, iii) tar and its emulsions[223].

Nevertheless, Regulation 13H allows the continued operation of tankers of 5,000 dwt or more carrying crude oil of a density of 900 kg/m3-945 kg/m3, provided that the results of the ship's CAS project are satisfactory in such a way as to guarantee that a ship is fit for its continued operation, considering: i) the ship's size, ii) the age, iii) the areas of operation and iv) the structural condition[224].

Furthermore, the provision continues to apply even after the lapse of 25 years from the ship's delivery date; it must cease its operation. Similar arrangements apply to single-hull tankers of 600-5,000 dwt.

Two more amendments to MARPOL 73/78 followed the following year. The first was in April 2004 and referred to the disposal of ships' wastewater in the marine environment. The April amendments entered into force in August 2005. They applied to all newly built ships of 400 gt. and more operating on international voyages or certified for transporting more than fifteen passengers. All existing ships will have to comply with the requirements of the revised Annex IV 5 years after its entry into force. According to the Annex, therefore, all vessels must be equipped with any of the following systems: i) either with a unique sewage treatment plant, ii) with a sewage

[222] Aksu, S., Vassalos, D., Tuzcu, C., Mikelis, N., & Swift, P. (2004). A risk-based design methodology for pollution prevention and control. *In International Conference on Design and Operation of Double Hull Tankers* (pp. 1-9).
[223] Ibid.
[224] Waldron, J. K. (2005). EVOLVING POLLUTION-RELATED REQUIREMENTS INTERNATIONALLY AND IN THE UNITED STATES. *In International Oil Spill Conference* (Vol. 2005, No. 1, pp. 865-868). American Petroleum Institute.

comminuting and disinfecting system and disinfecting wastewater, ii) or with a sewage holding tank[225].

The new Annex provides for wastewater discharge into the marine environment only if the ship successfully operates an approved wastewater management facility or discharges pulverized and disinfected wastewater at a distance of more than 3 nm. from the closest shore. Otherwise, it should be rejected for a marine area over 12 nautical miles from the coast[226].

After the above-stated amendments, amendments to MARPOL 73/78 were adopted on 16 October 2004 and have only been in force since 1 January 2007. The outcome of those amendments was the revisions of The Convention's Annexes I and II. The revisions of Annex I[227], which concerns regulations on the prevention of oil pollution, include all the amendments adopted until the entry into force of the Convention in 1983, including the amendments to the 13G Regulation and Regulation 13H on the gradual application of double hulls to all tankers.

Moreover, according to the amendments to the same annex to MARPOL, the Sea of Oman is designated as a particular region, such as the Mediterranean Sea, the Baltic, the Black Sea, the Red Sea, the Gulf region, the Antarctic region, and northern European waters. In these areas, stricter controls are in place on dumping oil waste[228].

The revision of Annex II to MARPOL 73/78 refers to the regulations on controlling pollution by harmful liquid substances in bulk. The revised chapter will enter into force on 1 January 2007 and concerns a new system for categorising toxic liquid

[225] Karim, M. S. (2016). Prevention of pollution of the marine environment from vessels. Berlin: Springer International Pu.

[226] Boviatsis, M., Polemis, D., & Tselentis, V. (2022). Implementing the ballast water management convention in shipping practice: emerging threats, operational issues and solutions. *J Ship Ocean Eng*, **12**, 53-60. DOI: 10.17265/2159-5879/2022.02.003.

[227] 2004 (Annex I) amendments (MEPC.117(52)) (revised Annex I) Restructure of chapters to separate the construction and equipment provisions from the operational requirements and make clear the distinctions between the requirements for new ships and those for existing ships. Completely revised to incorporate various amendments adopted since MARPOL entered into force in 1983, including amended regulations on the phasing in of double hull requirements for oil tankers and the carriage of heavy grade oil. Addition of new requirements for pump-room bottom protection and accidental oil outflow performance.

[228] Kachel, M. J. (2008). Marine Protected Areas in Multilateral Instruments. Particularly Sensitive Sea Areas: The IMO's Role in Protecting Vulnerable Marine Areas, 95-134. DOI: 10.1007/978-3-540-78779-2_5.

substances[229]. The new requirements of the revised Annex I can be summarised as follows:

a) Category X: liquid, harmful substances which, if discharged into a marine environment following a tank cleaning procedure, will pose a significant risk to marine resources and human health. That is why it is necessary to prohibit their unauthorized discharge.
b) Category Y: all liquid, harmful substances which, in case of being discharged into a maritime area following the process of cleaning the tanks, will pose a significant risk to both marine resources and human health or cause damage to the tourist or other legal use of the sea and therefore it is necessary to control the quality and limit the number of their discharges, especially when into maritime protected areas.
c) Class G: liquid, harmful substances which, if disposed of into the marine environment after the tank cleaning process, will pose a small risk to both marine resources and human health; therefore, the enforcement of stricter inspections and more complicated systems and controls is required.
d) Other substances: this category includes substances, after their evaluation, were found not to fall into any of the above categories (X, Y, G) because they are not considered a threat to the marine environment, to local communities, and to the regional economic activities, when disposed of in it after the process of cleaning the tanks of ships. The discharge of those substances is not subject to the requirements and restrictions of Annex to MARPOL Convention 73/78. Still, mixed with any of Class X, Y or G materials can further increase the pollution caused by authorised or unchecked disposal of those harmful liquid substances[230].

In parallel with the revision of Annex II, chemicals posing a risk to the marine environment were also assessed. This evaluation categorizes the substance according

[229] 2004 (Annex II) amendments (MEPC.118(52)) (revised Annex II), Inclusion of new categories for the classification of noxious liquid substances (categories X, Y, Z and other substances). Revisions to reduce the maximum permitted residue volume after discharge for products in categories X, Y and Z and to require vegetable oils to be carried in chemical tankers.

[230] Czermański, E., Oniszczuk-Jastrząbek, A., Spangenberg, E. F., Kozłowski, Ł., Adamowicz, M., Jankiewicz, J., & Cirella, G. T. (2022). Implementation of the Energy Efficiency Existing Ship Index: An important but costly step towards ocean protection. *Marine Policy*, **145**, 105259. DOI: https://doi.org/10.1016/j.marpol.2022.105259.

to its bioaccumulation, biodegradation, toxicity, and long-term effects on health and marine life[231].

The outcome of the risk assessment process and the new categorisation system, chemical substances will have to be transported by specialised chemical tankers[232]. However, regulation 4 (Annex II) contains some provisions for which ships certified for transporting chemical substances are exempted from the relevant requirements[233]. Furthermore, in October 2004, the amendments to the International Code on the Transport of Chemical Substances in Bulk Form were adopted[234]. The amendments incorporate the revisions in categorising specific consignments as prospective marine pollutants and regarding the ship type and transport requirements following their assessment by the respective hazardous substances assessment team[235].

1.4.4. MARPOL's most recent and upcoming amendments

Recently, the attention of the international maritime community is upon further enhancing environmental standards by reducing all types of harmful emissions to almost minimal levels. Therefore, the current shipping trend and the future strategy are sustainable shipping operations, utilising eco-friendly ships and relevant applications. To this end, many MARPOL amendments have been installed, such as[236]:

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[231] Nielsen, M. B., Baun, A., Mackevica, A., Thit, A., Wallinder, I. O., Gallego, J. A., ... & Hansen, S. F. (2021). Nanomaterials in the European chemicals legislation–methodological challenges for registration and environmental safety assessment. *Environmental Science: Nano*, **8**(3), 731-747. DOI: https://doi.org/10.1039/D0EN01123A.

[232] Boviatsis, M., Alexopoulos, A., & Vlachos, G. (2022). Assessing the Potential Impact on Previous Maritime Accidents Had the HNS Convention Been Applied. *Journal of Environmental Science and Engineering B*, **11**(2), 37-42. DOI: 10.17265/2162-5263/2022.02.002.

[233] Boviatsis, M., Alexopoulos, A. B., & Vlachos, G. P. (2022). Evaluation of the response to emerging environmental threats, focusing on carbon dioxide (CO2), volatile organic compounds (VOCs), and scrubber wash water (SOx). *Euro-Mediterranean Journal for Environmental Integration*, **7**(3), 391-398. DOI: https://doi.org/10.1007/s41207-022-00325-3.

[234] 2004 (Annex V) amendments (MEPC.116(51)) (amendments to the Appendix to Annex V), Amendments to the form of Garbage Record Book to add requirements for recording the discharge of cargo residues.

[235] 2008 (Annex VI) amendments – (MEPC.176(58)) (revised Annex VI), Completely revised to establish more stringent regulations to further reduce air emissions from ships. Various amendments made including, requirements for ozone depleting substances record books and VOC management plans; addition of NOx Tier II and Tier III performance standards and NOx emission control areas; provisions related to sulphur content of fuel oil to progressively reduce SOx emissions; provisions to ensure fuel oil quality and availability and reception facilities.

[236] IMO. (2020). International Convention for the Prevention of Pollution from Ships (MARPOL). Available at: https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx, last assessed: 27-8-2022.

a) MARPOL Annex I:

Regulation 28: This amendment installed special requirements for the utilisation of oil tankers' stability instruments, which can detect possible damages to the overall stability of a ship, creating threats to the navigation process[237].

b) MARPOL Annex V:

Introduction of "E-waste" requirements[238] and amendments to garbage[239] and electronic record books[240].

c) MARPOL Annex VI:

These amendments installed Tier III requirements upon the NOx emissions from diesel engines[241], on the IAPP record of Construction format[242], in NOx certification for gas-fueled or dual-fueled marine engines[243].

The most significant amendment was the installation of the global Sulphur cap, which entered force on 1-1-2020, at 0,5% and 0,1% in Emission Control Areas (ECAs)[244], with consecutive operational and regional amendments such as MEPC.286 (71)[245] and MEPC.324(75)[246].

Finally, with MEPC.328(76), new requirements relating to Existing Ship Energy Efficiency Index (EEXI) and Operational Carbon Intensity Indicator (CII)[247] are being introduced for all vessels.

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[237] IMO Resolution MEPC.248(66)
[238] MEPC.277(70).
[239] Boviatsis, M., Polemis, D., & Tselentis, V. (2022). Implementing the ballast water management convention in shipping practice: emerging threats, operational issues and solutions. *J Ship Ocean Eng*, **12**, 53-60. DOI: 10.17265/2159-5879/2022.02.003.
[240] MARPOL Annexes I, II, V and VI and the NOx Technical Code, 2008, to permit the use of Electronic Record Books. The amendments are contained in Resolution MEPC.314(74), Resolution MEPC. 316(74) and Resolution MEPC.317(74).
[241] IMO Resolution MEPC.251(66)
[242] IMO Resolution MEPC.258(67)
[243] MEPC.1_Circ.854, Application of Regulation 13 of MARPOL Annex VI Tier III Requirements
[244] Boviatsis, M., & Tselentis, B. (2019, September). A comparative analysis between EU MRV and IMO DCS—the need to adopt a harmonised regulatory system. *In 16th international conference on environmental science and technology* (pp. 2018-2019).
[245] MEPC.286(71) introduces two new NOx Emission Control Areas (ECAs) in the Baltic Sea and the North Sea, which requires Tier III engines for ships operating in those areas, which are constructed on or after 1 January 2021 or have 'non-identical' replacement engines or additional engines installed.
[246] MEPC.324(75) introduces new requirements for In-use and onboard fuel oil sampling and testing and new requirements for both new and existing ships for fuel oil sampling points.
[247] MARPOL Annex VI Regulations 23, 25 and 28 - entering into force on 1 November 2022.

1.5 International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW)

1.5.1 The background of the STCW Convention

The IMO Convention's International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) was adopted on 7 July 1978 and entered into force in 1984[248]. Establishing such a Convention was considered an international success for the maritime community since the two stakeholders, namely the ship owners and the maritime labour unions, mutually agreed for the first time upon the implementation of such a convention. Specifically, the ship owners always met similar proposals for a unified maritime labour convention with skepticism to keep the wages and the required facilitation of the crew on board to a minimum. On the other hand, the maritime labour unions strived to establish unified regulations, to ascertain that the fundamental rights of all crew are effectively protected, regardless of national or flag rules in effect. Similar efforts, such as establishing the Maritime Labor Convention (assessed above), were not met with such uniform agreement from both parties, adding to the impact and the importance of the STCW[249].

Initially, the course of ratification of the STCW started with the "Tanker Safety Pollution Prevention Conference on tanker safety and pollution prevention (1978)" which not only accelerated the procedures for ratifying the MARPOL Convention but also led the IMO to adopt the STCW Convention[250]. This conference was convened because of the severe tanker accidents that caused massive marine pollution[251].

In accidents that were caused due to a technical malfunction, such as the case of Amoco Cadiz, the human factor was crucial to the outcome[252]. This was the principal reason why IMO drafted the STCW Convention. But unfortunately, at the same time, many more accidents emerged as the route caused the human factor, namely the

[248] IMO. (2022). International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Available at: https://www.imo.org/en/ourwork/humanelement/pages/stcw-conv-link.aspx, last assessed: 28-8-2022.
[249] Young, C. (1995). Comprehensive Revision of the STCW convention: an overview. *J. Mar. L. & Com.*, **26**, 1.
[250] Stenstrom, B. (1979). Meeting the new IMCO safety and pollution prevention requirements. *Tanker Bulker Int.*;(United Kingdom), 2(1).
[251] Snider, W. D. (1978). IMCO Conference on Tanker Safety and Pollution Prevention. *Marine Technology and SNAME News*, **15**(03), 297-307. DOI: https://doi.org/10.5957/mt1.1978.15.3.297.
[252] Carter, L. J. (1978). Amoco Cadiz incident points up the elusive goal of tanker safety. *Science*, **200**(4341), 514-516. DOI: 10.1126/science.200.4341.514.

explosions on the tankers Betelguese and Independent, the collisions between Venoil and Venpet, Atlantic Empress and Aegean Captain[253].

For example, during the accident of the "M/V Energy Concentration"[254], which was the most significant vessel loss in terms of tonnage in the years 1979-1980, while unloading in Rotterdam, it suffered a large crack in the outer casing due to poor handling during the unloading process, resulting in flooding of the middle part of the ship and the two sides to reach the port bottom. As a result, the master and the first mate were sentenced to four months in prison for negligence. Due to such accidents, the purpose of the STCW Convention is to establish informal requirements, such as the development of certificates of competence for the master and the crew, initiated and approved by the flag state and the port authorities of coastal states. The Convention consists of two parts and eight Chapters. Part A contains all the mandatory provisions, which each signatory member should apply to its national legislation, and which are the basis of the Convention. Part B includes recommendations for best practices and guidance upon effectively implementing processes from Part A, usually implemented by the most prestigious flags and utilised by the most prominent shipping companies, to comply with the standards of the most demanding clients[255].

Specifically, Part A, which contains mandatory provisions, provides training, certification, and watch-keeping standards. In particular, the minimum standards of competence for the maritime profession are detailed in relevant tables that provide information on the content of the teaching program or the criteria for assessing competence, as well as specifying the qualifications and competencies of the persons performing the responsibilities. It should be noted that the scope of these regulations on training includes both the activity that occurs on board and that which occurs on land. Part B of the Code contains no binding regulations but recommendations as proposed directives to assist the contracting parties in implementing the Convention. These non-compulsory regulations concern training, certification, and watch-keeping issues aimed

[253] Hetherington, C., Flin, R., & Mearns, K. (2006). Safety in shipping: The human element. *Journal of safety research*, **37**(4), 401-411. DOI: https://doi.org/10.1016/j.jsr.2006.04.007.

[254] Sumi, Y. (2019). Structural safety of ships developed by lessons learned from the 100-year history of break-in-two accidents. *Marine Structures*, **64**, 481-491. DOI: https://doi.org/10.1016/j.marstruc.2018.12.003.

[255] IMO. (2022). International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Available at: https://www.imo.org/en/ourwork/humanelement/pages/stcw-conv-link.aspx, last assessed: 28-8-2022.

at determining how the essential requirements of the Convention can be met. It should be noted that the recommendations, in general, reproduce an approach entirely in line with discussions held within the framework of the IMO and consultation with other international organisations[256].

It is argued that after the entry into force of the Convention, the cases of "fake" certificates and the methods used to be obtained have disappeared. However, it has become clear that the coastal State's controls on a foreign ship have benefited from the installation of STCW, making the facilitation of Port State Control Processes faster and more objective[257].

1.5.2 Purpose and amendments of STCW Convention

The STCW Convention is the only maritime convention whose drafting effectively included requirements from shipping companies and thus was met with overall approval from the shipping community. Its main objectives include the creation of a reporting standard on issues of training and education of seafarers worldwide, focusing mainly on quality control and competence-based training and establishing a structure based on which it is possible to ensure that the standards set are met[258].

The STCW is a piece of legislation that incorporates international regulations to ensure and maintain the highest standards of competence for seafarers at an international level. Not only seafarers but also shipowners, educational establishments, and national maritime administrations fall within the scope of its provisions. The common goal of all the above stakeholders is to ensure the smooth operation of ships and consequently maintain safety in the marine environment and global merchant shipping[259].

The Convention was adopted in 1978 at the IMO Conference in London and entered into force in 1984. Back then, its initial focus was almost exclusively on the theoretical knowledge that a seafarer should have. It tried to formulate a regime of

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[256] Ibid.

[257] Young, C. (1995). Comprehensive Revision of the STCW convention: an overview. *J. Mar. L. & Com.*, **26**, 1.

[258] Ghosh, S., Bowles, M., Ranmuthugala, D., & Brooks, B. (2014). On a lookout beyond STCW: Seeking standards and context for the authentic assessment of seafarers. *15th Annual general assembly International Association of Maritime Universities*, 77-86.

[259] McCarter, C. P. (1999). STCW'95: implementation issues: What is the pass mark?. *Marine Policy*, **23**(1), 11-24. DOI: https://doi.org/10.1016/S0308-597X(97)00046-8.

necessary training specifications and other issues, such as the issuance of relevant certificates, the observance of prisons, and the safety of the crew while seeking to determine and evaluate the qualifications of officers to ensure safe and effective operation on board. All signatory members are obliged to fulfil or even exceed all those standards and effectively enforce those standards to all competent stakeholders[260].

As in the case of all Conventions, the present Convention underwent a course of amendments to its provisions. It should be noted that the IMO conducted the overall review of the STCW on 7-7-1995, a revision deemed necessary to achieve the effective update and enhance the provisions of the Convention and circumvent or supplement ambiguities identified. Furthermore, the central aim of the amended Convention was the consolidation of training and the certification and assessment of the knowledge, skills, perception, and after that, proven abilities of seafarers[261].

Also noteworthy are the amendments adopted to the text of the Convention and its corresponding code in the context of the Diplomatic Conference in Manila in 2010[262]. Even after these amendments, however, the skills of the staff continued to be at the heart of the provisions of the Convention, and after that, the burden did not shift to any other sector or issue. The above amendments, which entered into force on 1-1-2012, in accordance with the procedure of tacit acceptance, aimed to update the Convention and the Code in accordance with the latest developments and to form a regulatory framework suitable to address issues that may arise soon. For adopting the above new arrangements by the maritime administrations, a transitional period was set, with a final period of incorporation in January 2017[263].

Finally, it is worth mentioning that the scope of the standards in the Convention presently includes seafarers of all classes serving on merchant ships registered under the flag of countries that have ratified the Convention. The last Manila amendments in 2010 aimed to ensure that the STCW standards continue to be relevant,

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[260] Kristiansen, S. (2013). *Maritime transportation: safety management and risk analysis*. Routledge.

[261] Knapp, S., & Franses, P. H. (2009). Does ratification matter and do major conventions improve safety and decrease pollution in shipping?. *Marine Policy*, **33**(5), 826-846. DOI: https://doi.org/10.1016/j.marpol.2009.03.00.

[262] IMO. (2022). International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Available at: https://www.imo.org/en/ourwork/humanelement/pages/stcw-conv-link.aspx, last assessed: 28-8-2022.

[263] Trenkner, P., & Cole, C. (2010). Raising the Maritime English bar: The STCW Manila amendments and their impact on Maritime English. *In Proceedings of the 22nd international maritime English conference* (pp. 3-16).

appropriate, and capable of providing the development and maintenance of seafarers' professional skills, encompassing all the changes agreed upon as early as 1995 and considering the new circumstances, as the consolidation of new technologies shapes them. Given these new developments, it is imperative to add and assume extra responsibilities on board the ship, given the obligation of shipping companies and crews to comply with the new rules and the need to highlight any inconsistencies and give appropriate interpretations[264].

To sum up, the text of the amended STCW Convention 2010 establishes a framework of stricter requirements concerning prevention by providing greater responsibilities for members concerning issuing certificates and visas. Specifically, training of any kind is subject to the approval status of the flag issuing the certification. At the same time, based on the 2010 amendments, stricter procedures for checking the controls of training centres were introduced while providing for the obligation for administrations to keep a register of approved providers. Therefore, for all trainers, supervisors, and evaluators, a minimum of qualifications and appropriate experience is provided in the respective type and level of training and evaluation where they participate[265].

1.5.3 Principal provisions of the STCW Convention

The STCW Convention, except for its focus on training seafarers, installs practices for enhancing maritime awareness related to protecting the marine environment, avoiding maritime accidents, and sustainable shipping management. Specifically, Chapter 5 contains provisions for crews employed on tankers, but they are more general, and their application is based mainly on the flag state. Regulation V/1 provides that[266]:

[..] officers with related duties on... the cargo or equipment of the cargo on tankers and have not worked on ships of this type, before carrying out their duties, must have fulfilled a training program on land to deal with fire and fire and (a) an acceptable

[264] Ahmad, M. R. (2011). The Manila Amendments to the STCW Convention and Code–An Overview. In *The paper was presented at National Maritime Conference on The Manila Amendments to the STCW Convention and Code–How Do They Impact You*, Malaysia.
[265] Mejia, M. Q. (2010). The STCW conference in Manila. *WMU Journal of Maritime Affairs*, **9**, 231-234. DOI: https://doi.org/10.1007/BF03195178.
[266] IMO. (2022). International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Available at: https://www.imo.org/en/ourwork/humanelement/pages/stcw-conv-link.aspx, last assessed: 28-8-2022.

period of employment on board ships to obtain sufficient knowledge of safe operational practice or (b) an acceptable qualification a familiarization letter with the operational management of tankers which includes procedures for basic maritime safety measures and the prevention of marine pollution.

Masters or other officers and any other person directly responsible for loading, unloading, and transporting cargo must have (a) relevant experience in accordance with their duties on tankers and (b) fulfilment of a unique training program relating to tanker safety issues, fire protection, pollution prevention and control systems, operational practices and obligations under the applicable regulations [..]'.

It is established that the enforcement of regulations depends solely on the flag State, except that the basic levels of training vary internationally; thus, inconsistencies are often found among the Member States. The IMO has anticipated (Resolution 16) the problem and asks the parties to the Convention to offer technical assistance to other States when they have needs. The Convention provides measures on port operation but is limited to the certificate verification regarding crew competency and whether an incident raises suspicions upon non-compliance with the relevant legislation[267].

Additionally, according to the Convention, ships may be denied departure from the port due to[268]:

> (a) failure to crew the vessel properly, abiding by the minimum manning requirements based on the vessel's type and size.
>
> (b) evident threat to the crew's welfare, vessel's condition, and local marine environment.

However, the convention does not give the right to the coastal state to press charges against responsible parties. Furthermore, it can be said that the Convention artfully avoided adopting more provisions relating to ports because four years later, the Paris Memorandum (M.O.U.) was created, dealing only with port controls on ships calling at European ports[269].

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[267] Balkin, R. (2006). The International Maritime Organisation and Maritime Security. *Tul. Mar. LJ*, **30**, 1.
[268] Wang, J., & Zhang, S. M. (2000). Management of human error in shipping operations. *Professional safety*, ***45***(10), 23.
[269] RUAN, W. (2017). Reviews of International Maritime Safety Management Philosophies and Approaches. In *Management Information and Optoelectronic Engineering: Proceedings of the 2016*

When a merchant ship approaches a port or terminal, the problems may increase because the number of people involved in the ship's management, e.g., pilots, tugs, and other vessels, increases equally, and the risks of accident, grounding, or collision. Upon this, the Convention does not provide specific legislation for each competent stakeholder but only generic guidance, leaving other legislation to deal with each separate issue, such as Pilotage Act 1989[270].

It would be hasty to consider that the STCW convention did not turn out to be as valuable as promised. Therefore, it is preferable to adopt a convention including introductory provisions, as is the case with most IMO conventions, and thus achieve a compromise upon each stakeholder rather than applying higher standards from its initiation and being met with broad disapproval from the international community even from its reenactment. This is the case with the most specialized environmental legislation, such as the Hazardous and Noxious Substances Convention (accessed in Chapter 2)[271] , and relevant to the ship recycling legislations, which were met with disapproval and even hostility from the shipping community[272].

The question is whether this field of research, namely the human element, should also be expanded to all aspects and operations of the maritime profession. Training personnel should be of utmost importance, effectively leading to the depreciation of shipping accidents. However, it is almost impossible to legislate measures that eliminate human error[273].

The analysis of the human element was initially the responsibility of the International Labor Organisation (ILO). Still, the adoption of STCW, a direct Convention to the IMO's authorization, shifted this responsibility to the new Convention. This change was highly approved by all relevant parties, namely the ship

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International Conference on Management, Information and Communication (ICMIC2016) and the 2016 International Conference on Optics and Electronics Engineering (ICOEE2016) (pp. 9-18).

[270] Petrinović, R., Mandić, N., & Siriščević, E. (2016). The importance of maritime law in seafarer training pursuant to amendments to the STCW convention. *Transactions on Maritime Science*, **5**(1), 53-64. DOI: 10.7225/toms.v05.n01.007.

[271] Boviatsis, M., Alexopoulos, A., & Vlachos, G. (2022). Assessing the Potential Impact on Previous Maritime Accidents Had the HNS Convention Been Applied. *Journal of Environmental Science and Engineering B*, **11**(2), 37-42. DOI: 10.17265/2162-5263/2022.02.002.

[272] Boviatsis, M., Alexopoulos, A., & Polemis, D. (2022). Evaluation of the Impact of the Present Ship Recycling Regulations by Assessing the Most Prominent Shipbreaking Countries in the Shipping Industry. *Journal of Shipping and Ocean Engineering*, **12**(2). DOI: 10.17265/2159-5879/2022.02.004.

[273] Mejia, M. Q. (2010). The STCW conference in Manila. *WMU Journal of Maritime Affairs*, **9**, 231-234. DOI: https://doi.org/10.1007/BF03195178.

owners and the member states. In addition, the ILO has shown interest since 1933 in enhancing vessel standards and improving seafarers' working conditions. Sadly, this was met with disapproval from the shipping community, which responded with countermeasures, such as the development of Flags of Convenience (FOC), which disregarded the ILO's MLC and only implemented the minimum requirements of all IMO's Conventions[274].

Upon its adoption, STCW relied upon many of ILO's installed standards, processes, and certifications[275] , which already enforced minimum working standards and living conditions upon ships, certificate of competence, right to a fair wage, medical security, and other fundamental rights.

After its initiation, the first amendments to the Convention in 1991 focused on properly training communication operators to align with the current international training standards. The introduction of STCW's 1995 amendments was sparked from an IMO conference upon amending specific aspects of the Convention with regards to[276]:

(a) educational issues caused by rapid technological innovations often found older seamen unable to implement the new requirements effectively.

(b) incorporation of amendments caused by the development of the ISM Code.

(c) integrate the newly installed 'functional approach' of crews' functional specialisation.

Specifically, those amendments incorporated processes, such as the certification that each seafarer possesses: a) the required training regarding the operational processes of each vessel, b) the appropriate knowledge to avoid or counter specific threats, such as those arise (such as firefighting), c) the awareness and the expertise to execute processes relevant to the protection of maritime safety and environment[277].

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[274] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).
[275] The certificates incorporated from STCW are: a) Officers' Competency Certificates No 53 (1946), b) Able Seamen No. 74 (1946), c) Wages, Hours of Work and Manning (1958), d) Crew Accomodation No 133 (1970), e) Concerning Continuity of Employment of Seafarers No 145 (1976), f) Minimum Standards in Merchant Shipping No 147 (1976).
[276] IMO. (2022). International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Available at: https://www.imo.org/en/ourwork/humanelement/pages/stcw-conv-link.aspx, last assessed: 28-8-2022.
[277] Ibid.

Those revisions of the initial Conference in 1978 were made to adapt the training levels of seafarers to modern methods of handling merchant ships and to ensure the validity of certificates of competency. The amendments came into force in February 1997, and all training programs were harmonized with the new amendments the following year. As of 1-2-2002, all seafarers must hold certificates issued in compliance with the latest STCW amendments to be able to travel under the flag of their choice[278]. The provisions of the Convention concern the following[279]:

(a) definition of unified provisions regarding crew competence,

(b) installation of specific processes for the approval of national and foreign certificates,

(c) incorporation of relevant information upon each coastal state's distinct legislation,

(d) definition of the control methods for safety issues,

(e) possession of a record of certificates (by the administration) in accordance with the imposed criteria,

(f) the effective implementation of the Convention by IMO to establish the white list effectively.

(g) delegation of responsibilities regarding the training processes upon the competent stakeholders.

The Convention also created procedures to be applied to identify the validity of certificates of competency worldwide. Specifically for granting relevant certificates, relevant criteria, such as age, skills, and mental and physical health, should be audited. In addition, with the certification, each seafarer will acquire specific basic knowledge about safety on board before signing on[280].

[278] Evans, U. F., Mkpandiok, A., & Okonna, K. O. (2017). An evaluation of the level of awareness of the STCW-78 as amended in Manila 2010, using maritime education and training institutions as collective compliance mechanism. *Australian Journal of Maritime & Ocean Affairs*, **9**(3), 168-181. DOI: https://doi.org/10.1080/18366503.2017.1306915.

[279] Ali, A. (2006). Simulator instructor-STCW requirements and reality. *Pomorstvo*, **20(**2), 23-32.

[280] Özcayir, D. Z. O., & General, I. (2000). Flags of Convenience and the Need for International Co-operation. *International Maritime Law*, **7**(4), 111-117.

The new amendments of the STCW Convention were deemed necessary to provide an opportunity for the Convention to be supplemented more efficiently and quickly when circumstances so required, which was difficult to achieve under the previous version. Those amendments refer to the effective enhancement of maritime training, the requirements, and experience of maritime trainers, and other issues, such as the recognition of maritime training certificates[281].

The new amendments are also closely related to the installation of conditions and responsibilities for shipping companies, as the principal stakeholders for the delivery and the practical outcomes of training, along with the imposition of penalties for those companies that do not effectively enforce the amendments[282]. Therefore, it can be said that those amendments have brought up the issue of proactiveness, namely implementing the necessary training processes to avoid the possibility of a shipping accident effectively. Furthermore, this concept was promoted and effectively supported by the initiation of internal and external audits and the imposition of fines, leading even to the company's termination of operations[283].

The 1995 amendments, therefore, introduced stricter measures. However, the certificates issued under the previous Convention (1978) were acceptable until 2002, but not the compulsory training of seafarers, which since 1998 has been following the requirements of the new Convention[284].

1.5.4 The overall status of STCW amendments and the impact on the maritime industry.

The STCW amendments had principally provided enhanced requirements on crew training, certificate acquisition, skill enhancement, and delegation of authorities. All able seamen should be adequately trained and in a good state, both mental and physical, to be involved in vessel operation. The exact qualifications for executing these

[281] By the year 1978 the International Labour Organisation (ILO) had established two conventions, namely the Officers Competency Convention 1936 and the Convention on The Certification of Able Seamen (1946). Those conventions had already been incorporated in the majority of national legislation and their importance declined with the initiation of STCW.

[282] Terminella, E. J. (2017). Standards of Training, Certification, and Watchkeeping: Why, what, and how?. *Coast Guard Journal of Safety & Security at Sea, Proceedings of the Marine Safety & Security Council*, *74*(2).

[283] The importance of DOC (Document of Compliance) rests evidently with the enhancement of competent authority's power, to be able to terminate a company's operations, by the removal of the company's legality, which is executed by the withdrawal of DOC.

[284] Zhu, G. (2020). STCW Convention Changes and Its Impact on Crew. *International Journal of Social Science and Education Research*, **3**(4), 170-176. DOI: 10.6918/IJOSSER.202004_3(4).0022.

conditions are the outcome of STCW, and the avoidance of those responsibilities by a shipping company could lead from the imposition of fines up to the withdrawal of the company's DOC. The required conditions to be fulfilled vary, subject to the characteristics of a vessel and the needs of a voyage[285].

The 1995 amendments specifically apply to seafarers serving on vessels flying the flag of a signatory member, except: a) warships, fleet auxiliary ships, or other state ships not employed in commercial services, b) fishing boats, and c) yachters who are not professional and wooden ships of outdated technology[286].

The amended 1995 Convention presents a package of measures designed to fill the gaps in the original Convention and to promote the level of seafarers internationally. In this context, three essential sections are developed: i) uniformity in Standards of Competence, ii) measures to ensure the implementation of the Convention by the Member States, and iii) company liability[287].

In detail, we observe[288]:

a) Uniformity in Standards of Competence

For the first time, common standards are established for the certification of the competence of seafarers; specific criteria are presented which determine the required level of knowledge as well as the assessment of the professional competence of candidates for a diploma in the various maritime specialties.

(b) Measures to ensure the implementation of the Convention by the Member States

Member States had to submit a report to the IMO by 1 August 1998 at the latest, containing: i) legislative and administrative measures taken to implement the Convention, ii) details of the Training Programs, iii) details of the methods of assessing learners at the national level.

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[285] IMO. (2022). International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Available at: https://www.imo.org/en/ourwork/humanelement/pages/stcw-conv-link.aspx, last assessed: 28-8-2022.

[286] Trenkner, P., & Cole, C. (2010). Raising the Maritime English bar: The STCW Manila amendments and their impact on Maritime English. In *Proceedings of the 22nd international maritime English conference* (pp. 3-16).

[287] Trenkner, P., & Cole, C. W. (2012). The STCW Manila Amendments and their Impact on Maritime English. *Constanta Maritime University Annals*, *17*.

[288] Weintrit, A., & Neumann, T. (2011). *Human Resources and Crew Resource Management*. CRC Press.

c) Liability for companies

In accordance with the Convention, a company is usually the ship's owner and holds the sole responsibility for any emerging incidents or liabilities regarding the vessel. Companies must therefore ensure that seafarers onboard their ships have the required qualifications for their position and follow a familiarization program on board the vessel in the first stage of their embarkation[289].

After the 1995 amendments, the most significant amendments were the 2010 amendments, installed by a Conference of member states, held in Manila, Philippines, which introduced: i) enhanced measures to avoid and counter fraudulent certificates, ii) improve medical standards, iii) revision of work hours and countermeasures to prevent the use of drugs and alcohol, iv) new certifications related to specialised positions, v) incorporation of new technologies, such electronic charts and information systems (ECDIS), vi) specialised training with regards to fire-fighting, arm robberies, piracy and traversing polar areas, vii) specialised training regarding the type and size of the vessel, such as liquified gas carriers[290].

Despite the call from the shipping industry for further reviews on STCW in 2020, focusing on improving the quality of life at sea and the additional training on personnel onboard vessels carrying dangerous cargo, no Conference was convened[291]. In light of the recent Covid-19, it is apparent that the subsequent STCW amendments will focus on protecting crew health and welfare[292].

[289] Ibid.

[290] IMO. (2022). International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Available at: https://www.imo.org/en/ourwork/humanelement/pages/stcw-conv-link.aspx, last assessed: 28-8-2022.

[291] ICS. (2019). A review of the STCW Convention 2020, available at: A review of the STCW Convention 2020 | International Chamber of Shipping (ics-shipping.org), last assessed: 14-8-2022.

[292] Boviatsis, M. (2022). Implementation of Aggregated Response Plan to Effectively Protect Crew Health and Safety and Prevent Spread of Covid-19 Pandemic Aboard Ships. *Transactions on Maritime Science*, **11**(2). DOI: https://doi.org/10.7225/toms.v11.n02.020.

1.6 The Maritime Labour Convention (MLC)

1.6.1 The Structure of MLC

The Maritime Labour Convention (MLC), often characterised as the fourth pillar of International Maritime Law, preceded all the abovementioned conventions and is regarded as an international effort to codify maritime legislation while incorporating the characteristics of a labour-focused Convention[293]. However, due to the requirements installed by the modern maritime shipping industry, it became necessary to draw up and implement a new Convention that would collect and modernize all the provisions and rules adopted for the regulation of safety and health issues of personnel in shipping from 1920 onwards[294].

The above need came to be covered by the Maritime Labour Convention (MLC), which was drawn up in 2006 and approved on 23-2 of the same year. It is noted that the Convention entered into force only on 20-8-2013, while more than 84 countries have already acceded to it, representing over 90% of the world's tonnage in shipping. The most impressive fact is that the MLC is a Convention of the International Labour Organisation (ILO). Until the adoption of STCW in 1978, ILO was invested in protecting maritime labour rights, setting minimum standards of operation for the maritime community. Even after the implementation of STCW and the reallocation of various responsibilities from ILO to IMO's STCW, ILO's MLC is considered paramount in effectively protecting maritime labour rights[295].

As far as its structure is concerned, the Convention is divided into 16 articles and five titles. Each title incorporates the regulation of a specific area of interest and includes provisions for binding principles and obligations and non-mandatory guidelines. The titles are further divided into the following parts[296]:

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[293] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek)

[294] ILO. (2022). Maritime Labour Convention, 2006. Available at: https://www.ilo.org/global/standards/maritime-labour-convention/lang--en/index.htm, last assessed: 2-9-2022.

[295] Exarchopoulos, G., Zhang, P., Pryce-Roberts, N., & Zhao, M. (2018). Seafarers' welfare: A critical review of the related legal issues under the Maritime Labour Convention 2006. *Marine Policy*, **93,** 62-70. DOI: https://doi.org/10.1016/j.marpol.2018.04.005.

[296] McConnell, M., Devlin, D., & Doumbia-Henry, C. (2011). *The Maritime Labour Convention, 2006: A legal primer to an emerging international regime*. Brill.

- Regulations: establish fundamental rights and general principles for regulating matters falling within the regulatory scope of the Convention and provide for corresponding obligations for states.
- Code (The Code): includes the regulation of the details and individual issues of application of the Regulations consisting of two parts:

  a) Standards which are mandatory provisions

  b) Guidelines that are not mandatory should nevertheless be considered by governments when implementing the Convention.

This Convention has rightly been described as a "bill on the rights of seafarers", and this is because its above provisions establish the following rights of workers in shipping, namely: i) the right to work in an area safe according to international standards, ii) the right to fair terms of employment, iii) the right to work and live on board under decent conditions and the right to protect the crew welfare, iv) the right to medical care, and v) social welfare[297].

In addition to regulating social and labour rights, this Convention also governs issues related to ensuring employers' rights and responsibilities, namely shipowners. In particular, thanks to the Convention, an auditable process is created by establishing a certification system that provides specific incentives for shipowners to proceed with its ratification[298]. Moreover, even further from the certification mechanisms, the Convention successfully addresses unfair competition issues that arise due to the practice of certain shipowners and states allowing degraded or even inhuman conditions onboard their vessels. The above approach is even more critical concerning developing economies that, as already noted, "produce more economical workers" than countries with a developed economy[299].

1.6.2 The objectives, protection status, and amendments to the Convention

It is already stated that this Convention contains a wide range of provisions to ensure decent working and living conditions for workers on board those ships operating

[297] Lillie, N. (2008). The ILO Maritime Labour Convention, 2006: A new paradigm for global labour rights implementation. *Cross-border social dialogue and agreements: An emerging global industrial relations framework*, 191-220.
[298] Ibid.
[299] Lavelle, J. (Ed.). (2013). *The Maritime Labour Convention 2006: international labour law redefined*. CRC Press.

internationally in foreign ports. Next, the main objectives of MLC, as formulated by the members of the Convention, include:

a) The definition of a set of rights and practices.
b) Ensure a significant degree of flexibility for the Contracting Parties on how to implement the rights and principles it establishes.
c) Ensure that rights are appropriately applied.

In addition, according to relevant research, [300] it is evidenced that the risk of injury or death for seafarers, especially seafarers, is significantly greater than the corresponding risk for professionals in other disciplines. Researchers concluded that although fatal accidents have been drastically reduced since 1970, the maritime profession should still be regarded as one of the most dangerous occupations. Furthermore, the lack of health conditions of seafarers has led to their admission to hospitals most times. Also noteworthy are the issues seafarers may face concerning their mental health. However, according to researchers, most disorders of this type are related to the difficulties of adapting from life on board to the living conditions of the land. In the light of the above, the existence of a single internationally recognized and modern legislation based on which all issues related to the work of the seafarer will be regulated, and specific rights will be awarded to them was necessary, and therein lies the importance but also the necessity of the present Convention[301].

Of course, to ensure the above objectives of the Convention, its provisions must be adapted appropriately to the national legislation of all member states within the dynamic and complex environment that it tries to regulate. This is achieved by amending the provisions of the Convention whenever deemed necessary.

As for amendments, since this convention entered into force in 2013, it has been amended three times, namely in 2014, 2016, 2018, and 2022. Its first amendment in 2014 was a decision of the International Labour Organisation (ILO) and entered into force in January 2017. These amendments sought to establish a financial security

[300] Roberts, S. E., & Hansen, H. L. (2002). An analysis of the causes of mortality among seafarers in the British merchant fleet (1986–1995) and recommendations for their reduction. *Occupational medicine*, **52**(4), 195-202. DOI: https://doi.org/10.1093/occmed/52.4.195.

[301] Piniella, F., Silos, J. M., & Bernal, F. (2013). Who will give effect to the ILO's Maritime Labour Convention, 2006?. *International Labour Review*, **152**(1), 59-83. DOI: https://doi.org/10.1111/j.1564-913X.2013.00169.x.

system to ensure the payment of compensation to seafarers and their families by shipowners in the event of abandonment, death, or long-term disability due to occupational damage, illness, or danger[302]. Subsequently, and specifically in February 2016, the meeting of the Special Tripartite Committee (STC) of the Convention occurred. In this margin, the necessary amendments were discussed, which finally entered into force in January 2019[303].

These amendments mainly concerned: the protection of seafarers in cases of harassment and intimidation at sea and the extension of the validity of the Maritime Labour Certificate[304]. Furthermore, the 2018 amendments to the Convention were adopted in the context of the third ILO conference in April 2018. Finally, the specific amendments entered into force in January 2021 and relate to which employment contracts of seafarers are subject to regulation 2.1, the safeguarding of the seafarers' right to repatriation and in case of captivity due to piracy or armed robbery, but also wage issues and in particular the assurance that the Convention continues to be valid even in the case of the captivity of an employee[305].

For this reason, the obligation to pay salaries is maintained until his release[306]. Finally, the final Amendments were approved by the ILC at its 110th Session of 2022 and will enter into force in December 2024. Those amendments focus on crews' repatriation, health and safety protection, and accident avoidance[307]. Those amendments were heavily impacted by the recent Covid-19 incident and were proposed in conjunction with many more amendments proposed by ILO to protect employees' health and safety[308].

[302] ILO, 2014, Amendments (2014) to the Maritime Labour Convention, available at: Seafarers: Amendments (2014) to the Maritime Labour Convention (ilo.org), last assessed: 16-8-2022.
[303] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).
[304] ILO, 2016, Amendments (2016) to the Maritime Labour Convention, available at: Tire-a-part Amendements 3-1A E.indd (ilo.org), last assessed: 16-8-2022.
[305] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks.
[306] ILO, 2018, Amendments (2018) to the Maritime Labour Convention, available at: Amendements Code MLC Signature E-F.indd (ilo.org), last assessed: 16-8-2022.
[307] ILO, 2018, Amendments (2018) to the Maritime Labour Convention, available at: wcms_848492.pdf (ilo.org), last assessed: 16-8-2022.
[308] Boviatsis, M., & Daniil, G. (2022). Legal Analysis of Impact of Revised BIMCO Clauses on Crew Health and Safety During COVID-19 Era . *Transactions on Maritime Science*, **11**(1), 270–277. DOI: https://doi.org/10.7225/toms.v11.n01.020.

1.6.3 Compliance with the provisions of the Convention

As noted above, the International Maritime Labour Convention has as its primary aim the establishment of a single, international, and modern framework for the regulation of the essential issues of the shipping industry. All participants in maritime activities with any role will then have to comply with this regime[309].

First, seafarers should receive appropriate information about their rights, but also about those cases in which they will have to make complaints, either at sea or on land, subject to the provisions of the Convention. Subsequently, shipowners, and in particular the individuals who own or operate vessels with a gross tonnage of 500 GT or more participating in international or national voyages, are obliged to draw up and implement plans to ensure compliance with the provisions of the Convention. Furthermore, the masters of the above ships are responsible for the implementation of the company's projects, systems, and processes, but also for maintaining the appropriate records in accordance with the requirements of the Convention. As far as flag States are concerned, under the existing framework, their obligations include conducting inspections on the above ships, as well as revision of the plans of the shipowners, as well as the control and certification of their observance[310].

The above provisions of the Convention were essentially reiterated in the Paris Protocol (Paris MOU) concerning merchant ships considered being registered. In particular, the Protocol reiterated the obligation to obtain international certification for all s vessels of 500 GT and above that make international voyages. Accordingly, those vessels below the limit of 500 GT, although there is no mandatory international certification, should nevertheless be able to prove their compliance at any time[311]. These ships are therefore obliged to keep the following documents: Maritime Labour Certificate (MLC) and Declaration of Maritime Labour Compliance (DMLC). Those documents shall serve as proof of the compliance of these ships with the requirements of the Convention, inter alia, in the areas of i) minimum age, ii) employment agreement for seafarers, iii) working and rest hours, iv) payment of wages, v) medical treatment

[309] Adăscăliţei, O. (2014). The Maritime Labour Convention 2006–A Long-awaited Change in the Maritime Sector. *Procedia-Social and Behavioral Sciences*, **149**, 8-13. DOI: https://doi.org/10.1016/j.sbspro.2014.08.163.

[310] Lavelle, J. (Ed.). (2013). *The Maritime Labour Convention 2006: international labour law redefined*. CRC Press.

[311] Bauer, P. J. (2007). The maritime labour convention: an adequate guarantee of seafarer rights, or and impediment to true reforms. *Chi. J. Int'l L.*, **8**, 643.

at sea, vi) accommodation, vii) food, health and safety protection and viii) accident prevention[312].

At the same time, flag States' obligations include assessing the effectiveness of their national compliance systems by drawing up reports that they will have to hand over to the ILO. At the same time, flag States issue certificates to ships flying their flag after first checking and attesting that the working and living conditions comply with the relevant national legislation and regulations. Finally, the auditing process of the Convention is directly linked to the certificates kept by the master onboard, evidencing the training standards and the level of expertise of the crew on board[313].

This Convention has been drawn up in such a way as to ensure its implementation at a global level, its easy understanding and amendments in accordance with international developments, but also its consistent application, acting entirely complementary to the basic conventions of the International Maritime Organisation (IMO) for the regulation of issues of ship safety and the protection of the marine environment. Thus, MLC 2006 is important because it brings together the international minimum standards for seafarers worldwide in its provisions. At the same time, it demonstrates that a more constructive operation at the international cooperation level for globalised industries can address specific challenges, such as ensuring decent working and living conditions for seafarers, while ensuring the formation of an environment of fair and equal competition for shipowners[314].

It should also be noted that the MLC and its provisions contribute decisively to the comprehensive regulation of safety issues of the crew on board ships, as well as to the formation of a regime in shipping that may improve continuously over time. Furthermore, as already stated, the Convention aims to implement the control and enforcement mechanisms it provides to ensure employers' rights and responsibilities while safeguarding the most fundamental rights of seafarers and ensuring compliance with basic principles and rules in the maritime profession. Thus, despite the characterisation of the MLC as obsolete in light of the STCW, this Convention is one

[312] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).
[313] Progoulaki, M., Katradi, A., & Theotokas, I. (2013). Promoting and developing seafarers' welfare under the maritime labour convention: A research agenda. *SPOUDAI-Journal of Economics and Business*, **63**(3-4), 75-82.
[314] ILO, 2018, Amendments (2018) to the Maritime Labour Convention, available at: Amendements Code MLC Signature E-F.indd (ilo.org), last assessed: 16-8-2022.

of the most critical pieces of legislation for shipping at the international level and shiny evidence of how fundamental rights and principles safeguarded by one International Organisation can effectively pass and directly affect the "mentality" of other International Organisations[315].

1.6.4 Crew management under the pandemic conditions, utilising MLC and STCW rules and guidelines.

1.6.4.1 Safety, health, and repatriation issues

In accordance with the content of the provisions of Article 4, para. 1 and 4 of the MLC Convention, '*every seafarer is entitled to work in a safe workplace that meets safety and health protection standards, medical care rules, welfare measures, and other social protection'*. Furthermore, according to Regulation 4.1, paragraph 1 of the same Convention, flag States are obliged to ensure, especially in managing the COVID-19 pandemic and given the global deficiencies, especially in its principles in medical equipment, that the health of all crew members is adequately protected. This obligation includes the provision of personal protective equipment and the possibility of immediate access of crews to adequate medical care while they are on board and working[316].

In a statement at the start of the first wave of the pandemic, the Special Tripartite Committee (STC) of the MLC Convention underlined the urgency of the need for the Member States to exhaust the available means to facilitate the delivery of essential medical supplies, fuel, water, and spare parts for ships and workers on board. In particular, unfortunately, in some ports around the world, entry was denied, and supplies were not provided to those ships that had previously approached ports that had been affected by the spread of Covid-19. In addition, there were various reports of incidents of obstruction of suppliers' attempts to approach ships to provide the crew with masks and necessary protective equipment[317].

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[315] Boviatsis, M. (2022). Implementation of Aggregated Response Plan to Effectively Protect Crew Health and Safety and Prevent Spread of Covid-19 Pandemic Aboard Ships. *Transactions on Maritime Science*, **11**(2). DOI: https://doi.org/10.7225/toms.v11.n02.020.

[316] Exarchopoulos, G., Zhang, P., Pryce-Roberts, N., & Zhao, M. (2018). Seafarers' welfare: A critical review of the related legal issues under the Maritime Labour Convention 2006. *Marine Policy*, **93,** 62-70. DOI: https://doi.org/10.1016/j.marpol.2018.04.005.

[317] Carballo Piñeiro, L., Mejia Jr, M. Q., & Ballini, F. (2021). Beyond COVID-19: the future of maritime transport. *WMU Journal of Maritime Affairs*, ***20***(2), 127-133. DOI: https://doi.org/10.1007/s13437-021-00243-1.

In addition, as has been said in the context of the present, a fundamental right of seafarers enshrined in the regulatory framework under investigation in the present regulatory framework is the right to repatriation, at no cost, under the terms and conditions provided for in the Code. In particular, the right of seafarers to return to their homelands during the pandemic and despite its above-enshrined provisions in the MLC seemed to be without prejudice to the adoption of measures to limit the transmission of the disease by national legal orders internationally. In particular, with the imposition of travel ban measures, the closure of borders, and the imposition of house arrest in various countries worldwide, numerous seafarers could not travel to and from ships[318].

In another statement at the same time, the above Tripartite Committee of the MLC Convention underlined that seafarers should be exempted from the application of measures to restrict travel and prevent repatriation if they comply with the disease detection tests and standards set by the authorities internationally. Furthermore, labour-offering countries must make it easier for working seafarers to return to their home countries when their employment contract has been completed, and they have undergone the prescribed medical checks[319].

The difficult situation created by the unprecedented conditions of the first months began to normalize gradually, with the first important step being the placement of crew changes in the equation of global air transport with the deadline given by the seafarers' associations of the ITF and IMEC (International Maritime Employers' Council). With more than 200,00 contracts to be completed while the first wave of the pandemic was underway, the resumption of flights in India, the Philippines, and Qatar gradually allowed for the safe change of crews. In contrast, charter flights were soon utilised, with Doha airport having a key role in the transfer of seafarers to ships and their repatriation[320].

[318] Hebbar, A. A., & Mukesh, N. (2020). COVID-19 and seafarers' rights to shore leave, repatriation and medical assistance: a pilot study. *International maritime health*, **71**(4), 217-228. DOI: 10.5603/IMH.2020.0040.

[319] De Beukelaer, C. (2021). COVID-19 border closures cause humanitarian crew change crisis at sea. *Marine Policy*, **132**, 104661. DOI: https://doi.org/10.1016/j.marpol.2021.104661.

[320] Doumbia-Henry, C. (2020). Shipping and COVID-19: protecting seafarers as frontline workers. *WMU Journal of Maritime Affairs*, **19**, 279-293. DOI: https://doi.org/10.1007/s13437-020-00217-9.

1.6.4.2 Contractual termination under extenuating circumstances.

Moreover, despite the measures taken by the governments to manage this crisis, many seafarers were forced to remain on board ships for longer than the predetermined time under the employment contract. Therefore, the extension of employment contracts was necessary for light of the framework established by the existing singular laws and law rules. At this point, it should be emphasized that under the provisions of Regulation 2.1 of the MLC, seafarers have the opportunity to review their contract and seek advice on the terms and conditions provided before signing it[321].

Thus, due to the situation of the travel ban and the impossibility of changing crews, several seafarers were forced to remain on board for a period exceeding the maximum of 11 months previously provided for in the Convention as a maximum period of service. It should be noted, however, that the Employment Agency considered that the competent authorities could, under specific conditions, allow the exit of seafarers on imperative grounds of public health, such as the need to contain the pandemic[322].

1.6.4.3 Management of Infected Crew.

The outbreak of the pandemic highlighted another challenge for the shipping industry and maritime authorities. In particular, it highlighted the challenge of conducting the required inspections in accordance with Title 5 of the MLC Convention. In other words, under the conditions created by the pandemic, it became impossible to conduct the required inspections. As a result, some governments and port authorities have considered extending the validity of the existing certificates for not more than three months from the expiry of the original certificate. The necessary checks and inspections should then have been conducted after the situation had been somewhat normalized, as it did[323].

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[321] Boviatsis, M., & Daniil, G. (2022). Legal Analysis of Impact of Revised BIMCO Clauses on Crew Health and Safety During COVID-19 Era . *Transactions on Maritime Science*, **11**(1), 270–277. DOI: https://doi.org/10.7225/toms.v11.n01.020.

[322] Lucas, D., Jego, C., Jensen, O. C., Loddé, B., Pougnet, R., Dewitte, J. D., ... & Jegaden, D. (2021). Seafarers' mental health in the COVID-19 era: lost at sea?. *International maritime health*, **72**(2), 138-141. DOI: 10.5603/IMH.2021.0023.

[323] Boviatsis, M. (2022). Implementation of Aggregated Response Plan to Effectively Protect Crew Health and Safety and Prevent Spread of Covid-19 Pandemic Aboard Ships. *Transactions on Maritime Science*, **11**(2). DOI: https://doi.org/10.7225/toms.v11.n02.020.

Finally, as provided for in the Regulation of the MLC Maritime Convention and in particular in Regulation A4.2.1, shipowners are obliged to bear the expenses of seafarers in case they become ill or injured. Therefore, if they showed symptoms during quarantine, they usually fell within the protection of the above provisions of the MLC. It is important to note that based on the requirements above, the cost of medical care, self-isolation, or the seafarer's stay in case of quarantine before or during repatriation should be covered by the shipowners until it is considered that the seafarers have been fully repatriated. Nevertheless, it was highly disputed who should bear the costs of the processes required for handling the infected crew. After many disputes between the ship owners and the charterers, new BIMCO terms were initiated and facilitated the dispute, sharing the liability between each party[324].

1.7 Research Outcomes

The shipping industry is undergoing **unprecedented changes**; undoubtedly, the maritime landscape has been considerably altered over the last few years. Nevertheless, the most fascinating is not the changes that happened but the changes that are yet to come.

Under this everchanging environment, IMO, the **foundation of shipping** has adopted new amendments to the most fundamental conventions, namely MARPOL, SOLAS, STCW, and supportively ILO is continuing to address issues of the maritime profession while amending MLC. However, while the amendments incorporated by the said Conventions, the **four pillars of shipping** as they are called, are effective but not impactful.

Initially, **SOLAS Convention**, after the 2012 accident of Costa Concordia, which resulted in the loss of thirty-four lives, adopted new amendments to **Chapter II-1 of SOLAS** in regard to subdivision and vessel stability, focusing mainly on the existing and the newly built passenger ships. Thus, while the amendments are **efficient** and **considerably improve** the safety onboard cruise ships, another accident had to

[324] Boviatsis, M. (2022). Legal assessment of BIMCO's infectious or contagious diseases (IOCD) clauses for voyage and time charter parties. *Marine Policy*, **144**, 105206. DOI: https://doi.org/10.1016/j.marpol.2022.105206Get rights and content.

remind the shipping practice that **regulations need constant development** in light of the tremendous technological innovations.

The **MARPOL Convention**, following the steps of international environmental legislation, has adopted a series of amendments to **enhance the environmental standards** by further **reducing all types of harmful emissions** to almost minimal levels. Specifically, Annex I upgraded the standards for tanker navigational tools to improve maritime safety, and Annex V introduced the concept of "E-waste". Undoubtedly, an essential amendment was on Annex VI, which installed the Tier III requirements and certification for the NOx emissions from diesel engines. Still, the paramount was the adoption of the new requirements relating to the **Existing Ship Energy Efficiency Index (EEXI) and Operational Carbon Intensity Indicator (CII)**, introduced with MEPC.328(76). Nevertheless, **while those amendments are effective, there are not impactful**. Regarding the installation of the global Sulphur cap, the two monitor systems installed, namely **EU MRV and IMO CDS**, have been **overlapping**, creating confusion in the operations of shipping companies. Yet again, the **installation of new amendments comes after the set milestone or is left to shipping practice to adjust itself, implementing "the market rules".**

With regard to **STCW**, which is most appreciated in the shipping industry, the installation of the **2010 Manila amendments** was effective. But, while those amendments enhanced the training processes and improved the medical standards on board the vessels, they proved **ineffective against Covid-19**. Specifically, while Covid-19 was the third pandemic after Ebola and SARS in the last twenty years, the shipping industry was greatly hampered during the vessel operation, and the **maritime profession greatly suffered** during this crisis. Moreover, while STCW has announced new amendments since 2020 to counter Covid-19 even after its emergence, **no efficient measures have been installed**.

On the same page with STCW was the performance of ILO's **MLC** during the Covid-19 pandemic. While MLC and its provisions contribute decisively to the comprehensive Regulation of crew safety issues on board ships to ensure **employers' rights and responsibilities**, its' effectiveness was questioned during the outbreak of Covid-19. While various regulations were adopted, implementing countermeasures for

spreading or treating the infected, those amendments came after the massive spread of the virus. Thus, as with STCW, **the impact** of MLC on battling the virus **was limited**.

Thus, regarding the "**four pillars**" of shipping, new regulations are adopted, such as the **overlapping of systems** during the enforcement of the low sulfur cap. Most notably, **the poor facilitation of Covid-19** proved that the system is **flawed**. The ingredient that international shipping is missing is called "**proactiveness"**. Sadly, while the shipping industry is **invested in countering and reacting to emerging events, time should be spent predicting** and implementing measures to **counter** those before they even emerge. The utilisation of **proactive measures** along with **fast and efficient responses** is the key to **avoiding** another "Costa Concordia" or the **destruction of crews' resilience** and lead the shipping sector towards a **sustainable future**.

Chapter 2

The principal environmental and operational framework: Exploring the evolution of safety management.

The second chapter assesses all the relevant environmental legislation and established maritime codes and systems from the perspective of proactiveness, with the integration of the concept of due diligence. Specifically, UNCLOS, CLC, FUND Convention, HNS, and LLMC Conventions are assessed, in addition to the evaluation of US OPA 1990. Additionally, the initiation and the impact of ISM and ISPS Codes are explored, which led to the adoption of systems to enhance maritime safety. Finally, an evaluation between ISM and other newly emerged systems, such as TMSA, is initiated, including other maritime "tools" and guidelines, such as ISGOTT.

Research Layout

Chapter 2: Safety Management Legislation, Codes & Due diligence

Made by author.

2.1 The United Nations Convention on the Law of the Sea (UNCLOS Convention)

The United Nations Convention on the Law of the Sea (UNCLOS) is a set of maritime rules, incorporating mainly customary law, which governs the relations between states regarding their naval borders, jurisdictions, and rights[325]. Before UNCLOS, the relationship between nations was governed by bilateral agreements, subject to the customs of a region[326].

The evolution of the UNCLOS Convention occurred gradually, with substantial steps from 1950 onwards. The Law of the Sea was finally convened in Montego Bay[327]. The participation of 157 states resulted in adopting of the UNCLOS International Convention in 1982, of which four states voted against it, and 17 abstained from voting. The Convention finally entered into force in 1994[328].

Undoubtedly UNCLOS Convention is an essential Convention in the maritime sector, effectively installing the concept of maritime zones, the rights of the flag and coastal state[329], fundamental rights for maritime navigation, such as the right of innocent passage[330] , and creating the International Tribunal for the Law of the Sea[331] to resolve any disputes deriving from the treaty[332].

2.1.1 Historical background

The basic principles of the international Law of the Sea, having their roots in customary international law, were created through the practice of seafarers throughout

[325] Huang, Y., & Yang, W. (2021). The Legal Framework of Marine Scientific Research under UNCLOS: Present and Prospects. In *Marine Scientific Research, New Marine Technologies and the Law of the Sea* (pp. 11-26). Brill Nijhoff. DOI: https://doi.org/10.1163/9789004469372_003.
[326] Johnston, D. M. (1988). *The theory and history of ocean boundary-making*. McGill-Queen's Press-MQUP.
[327] Singh, A. J. (2022). UNCLOS: Facilitating ocean governance and maritime security. *Maritime Affairs: Journal of the National Maritime Foundation of India*, 1-19. DOI: https://doi.org/10.1080/09733159.2022.2097643.
[328] Barnes, R., & Barrett, J. (2016). *Law of the Sea-UNCLOS as a Living Treaty*. BIICL.
[329] UNCLOS Convention, 1982, Article 94, Duties of the flag state. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[330] UNCLOS Convention, 1982, Article 17, Right of innocent passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[331] UNCLOS Convention, 1982, Article 186, Seabed Disputes Chamber of the International Tribunal for the Law of the Sea. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[332] Hong, N. (2012). *UNCLOS and ocean dispute settlement: Law and politics in the South China Sea*. Routledge.

thousands of years and are the principle of i) the freedom of the high seas[333], ii) the complete sovereignty of the territorial sea[334] or the internal waters[335], iii) the innocent passage through the territorial sea[336]. They were codified at the first UN Conference (1958) in Geneva by the following four Conventions[337]:

a) Convention on the Territorial Sea and the Contiguous Zone

b) Open Seas Convention

c) Continental Shelf Convention

d) Convention on fishing and protecting biological resources on the High Seas.

In addition, international organisations also played an essential role in developing the Law of the Sea[338], having (ILO, FAO, UNCTAD, IMO) or not having a direct connection with the maritime object (IAEA, WHO, UN, OECD, EU)[339].

2.1.2 UNCLOS 1982

The UNGA convened the second conference on 17-27 April 1960 in Geneva to achieve a substantial result in determining the extent of the territorial sea and the boundaries of fishing, as these points were considered unsatisfactorily resolved by the first Conference (1958)[340]. The great innovation came about with the Third UN Conference in New York (December 1973), resulting in the signing in Montego Bay, Jamaica, on 10 December 1982, of the United Nations Convention on the Law of the Sea (UNCLOS), consisting of 320 Articles and 9 Annexes[341].

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[333] UNCLOS Convention, 1982, Article 87, Freedom of the high seas. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[334] UNCLOS Convention, 1982, Article 3, Breadth of the territorial sea. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[335] UNCLOS Convention, 1982, Article 8, Internal waters. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[336] UNCLOS Convention, 1982, Article 45, Innocent passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[337] Pictet, J. S. (1952). Geneva convention. *International Committee of the red cross*.
[338] Fitzmaurice, G. (1959). Some Results of the Geneva Conference on the Law of the Sea: Part I—The Territorial Sea and Contiguous Zone and Related Topics. *International & Comparative Law Quarterly*, **8**(1), 73-121. DOI: doi:10.1093/iclqaj/8.1.73.
[339] Beckman, R., & Sun, Z. (2017). The Relationship between unclos and imo Instruments. *Asia-Pacific Journal of Ocean Law and Policy*, **2**(2), 201-246. DOI: https://doi.org/10.1163/24519391-00202003.
[340] Harrison, J. (2011). *Making the law of the sea: a study in the development of international law* (Vol. 80). Cambridge University Press.
[341] Schneider, A. R. H. (1982). UNCLOS III Revisited. *Envtl. Pol'y & L.*, **9**, 108.

To this Convention, 157 states participated, of which 4 (USA, Syria, Israel, Venezuela, Turkey) voted against, while 17 abstained from voting (the then Soviet Union of the Eastern Bloc, Britain, Belgium, Italy, Spain, Luxembourg, the Netherlands, the then W. Germany and Thailand). Finally, the Conference entered into force upon depositing the 60th instrument of ratification. In Greece, it was ratified by Law 2321/1995 with incorporated into the country's domestic law on June 23, 1995.

2.1.3 Maritime zones

From the 17th century, customary law referred to two maritime zones: territorial and high seas. The maritime zones were further separated with the entry into the 21st Century. Each state determines on its domestic legislation the boundaries of the maritime zones (different status for each zone) based on international law. Apart from the sea, however, states also have air sovereignty[342].

2.1.3.1 Internal Waters

The first zone is called internal waters, which, according to Article 8 of UNCLOS[343], means "*the waters (on the landward side) between the coast and the point where the metric for the territorial sea begins*[344]", except for the waters of the archipelagic states, which are governed separately. Specifically, internal waters include bays, shores, estuaries, and beaches[345].

The primary issue concerning inland waters concerns the access of foreign ships to ports, usually established between a flag state and port state agreement[346]. The jurisdiction of coastal states is mainly upon issues of safety and environmental protection, and they closely relate to issues such as towing, navigation, marine pollution, and pilotage; in case of non-compliance, the coastal state can arrest any foreign ship, subject to civil proceedings[347]. Currently, most ports are open to

[342] Yorucu, V., & Mehmet, O. (2022). International Evidence in Maritime Dispute Settlement in Small Islands: Problems with UNCLOS. *Small Islands in Maritime Disputes: Greek Turkish Energy Geo-politics*, 53-82. DOI: 10.1007/978-3-031-05732-8_4.

[343] UNCLOS Convention, 1982, Article 8, Internal waters. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

[344] Yang, H. (2006). *Jurisdiction of the coastal State over foreign merchant ships in internal waters and the territorial Sea* (Vol. 4). Springer Science & Business Media.

[345] Sohn, L. B., & Noyes, J. (2021). *Cases and Materials on the Law of the Sea*. BRILL.

[346] Tzeng, P. (2016). Jurisdiction and applicable law under UNCLOS. *Yale LJ*, **126**, 242.

[347] Rachma, T. R. N., & Kardono, P. (2021, April). Application of GIS to define a juridical bay as part of Indonesia's internal waters. *In IOP Conference Series: Earth and Environmental Science* (Vol. 739, No. 1, p. 012093). IOP Publishing.

international shipping transportation, providing services to merchant vessels that are lucrative for many regional economies; thus, the port authorities exercise their rights with due diligence, having installed informal processes for ship inspection and control[348].

2.1.3.2 Territorial Sea

Territorial waters or otherwise territorial sea is considered the zone that extends beyond land and inland waters, including the seabed, subsoil, and overlying airspace. The coastal state has undisputed control over this maritime zone[349], with the only exception being the foreign ships' right of innocent passage[350], except for all cases that threaten or distort [351]the territorial integrity of the coastal State, subject to Articles 18[352] and 19[353] of the UNCLOS Convention[354].

2.1.3.3 Contiguous zone

It is part of the high seas, located immediately after the territorial sea, characterizing the intermediate situation, extending up to 24 n.m. from the baselines of the territorial sea[355]. In general, its only competence is limited to that of control without the element of sovereignty[356].

It is noted that Greece does not have a Contiguous zone. In contrast, Denmark, Norway, and Syria have adopted customs zones. India, Bangladesh, Pakistan, and

[348] Port State Control Processes (PSC)
[349] Agyebeng, W. K. (2006). Theory in search of practice: The right of innocent passage in the territorial sea. *Cornell Int'l LJ*, **39**, 371.
[350] UNCLOS Convention, 1982, Article 17, Right of innocent passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[351] Proelss, A. (2018). The Limits of Jurisdiction Ratione Materiae of UNCLOS Tribunals. *Hitotsubashi journal of law and politics*, **46**, 47-60.
[352] UNCLOS Convention, 1982, Article 18, Meaning of passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[353] UNCLOS Convention, 1982, Article 19, Meaning of innocent passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[354] O'Connell, D. P. (1971). The Juridical Nature of the Territorial Sea. *Brit. YB Int'l L.*, **45**, 303.
[355] Huang, Y., & Yang, W. (2021). The Legal Framework of Marine Scientific Research under UNCLOS: Present and Prospects. In *Marine Scientific Research, New Marine Technologies and the Law of the Sea* (pp. 11-26). Brill Nijhoff. DOI: https://doi.org/10.1163/9789004469372_003.
[356] UNCLOS Convention, 1982, Article 33, Contiguous zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

Venezuela exercise complete jurisdiction over the Contiguous zone, and Slovenia, Croatia, and France have security and ecological zones[357].

2.1.3.4 Exclusive Economic Zone

The zone beyond the Contiguous zone, the width of which covers 200 n.m[358]. from the baselines, is called Exclusive Economic Zone (EEZ)[359] . Its creation is justified because 90% or more of the fishing activity is conducted in that area. With regard to the states, article 56 of UNCLOS regulates all aspects of their control over the EEZ[360].

In the EEZ, the coastal State has three categories of rights[361], i) the sovereign rights it exercises within the continental shelf, ii) jurisdiction to place and use artificial islands and facilities regarding the safety and preservation of the marine environment and scientific research on it, iii) other rights and obligations deriving from the Convention. Foreign states have jurisdiction only in exercising the freedoms expressly recognised by the Convention, such as the right to innocent passage[362].

It is noted that the EEZ considerably differs from the other maritime zones and the high seas, which are governed by a particular regime[363]. Therefore, it is not identical to the principle of freedom of the high seas and the status of different maritime zones. Of the Mediterranean states, EEZs have been declared by Cyprus, Lebanon, Egypt, Syria and Israel[364].

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[357] Singh, A. J. (2022). UNCLOS: Facilitating ocean governance and maritime security. *Maritime Affairs: Journal of the National Maritime Foundation of India*, 1-19.DOI: https://doi.org/10.1080/09733159.2022.2097643.

[358] UNCLOS Convention, 1982, Article 57, Breadth of the exclusive economic zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

[359] UNCLOS Convention, 1982, Article 55, Specific legal regime of the exclusive economic zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

[360] UNCLOS Convention, 1982, Article 56, Rights, jurisdiction and duties of the coastal State in the exclusive economic zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

[361] ibid.

[362] Juda, L. (1986). The exclusive economic zone: Compatibility of national claims and the un convention on the law of the sea. *Ocean Development & International Law*, **16**(1), 1-58. DOI: https://doi.org/10.1080/00908328609545784.

[363] Beckman, R., & Davenport, T. (2012, May). The EEZ regime: reflections after 30 years. In *LOSI Conference papers* (Vol. 27).

[364] Sohn, L. B., & Noyes, J. (2021). *Cases and Materials on the Law of the Sea*. BRILL.

In addition, the main difference between the EEZ from the continental shelf, according to Article 56 of UNCLOS[365], lies in the fact that the state that declares an EEZ exercises special sovereign rights to explore and exploit the more expansive territory and its subsoil. Finally, Article 121 par. 2 of UNCLOS states that all habited islands have an EEZ and a continental shelf, defining both precisely[366].

2.1.3.5 High seas

High seas have a specified legal status as a separate maritime zone[367]. According to Article 86 of UNCLOS, the provisions of high seas apply to all parts of the sea that do not belong to the EEZ, the Contiguous zone, the internal waters, and the territorial sea of a state or archipelagic waters[368]. Furthermore, the high seas are governed by the principle of equal rights for all states, with no being able to exercise any kind of sovereign rights. According to Article 88 of the UNCLOS Convention[369], the oceans are available only for peaceful purposes in maritime trade[370].

Of course, the risks are more significant on the high seas and challenging to prevent effectively (piracy, maritime accidents, etc.). However, Article 221 of the UNCLOS[371] Convention stipulates that States may implement measures to protect against actual or threatened harm resulting from pollution, exercising such measures proportionate to the imminent threat.

2.1.4 Conflict of Laws, the Case of the Greco-Turkey dispute

2.1.4.1 Maritime zones and problems

As for the case of Greco-Turkey, the dispute is upon various issues relevant to the maritime zones, usually arising when the history of the region[372], the customary

[365] UNCLOS Convention, 1982, Article 56, Rights, jurisdiction, and duties of the coastal State in the exclusive economic zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[366] UNCLOS Convention, 1982, Article 121, Regime of islands. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[367] UNCLOS Convention, 1982, Article 86, Application of the provisions of the Part VII. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[368] Ibid.
[369] UNCLOS Convention, 1982, Article 88, Reservation of the high seas for peaceful purposes. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[370] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).
[371] UNCLOS Convention, 1982, Article 221, Measures to avoid pollution arising from maritime casualties. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
[372] Paulenoff, A. (2009). The Aegean Sea Continental Shelf Dispute: Greek and Turkish Interpretations. *Perspectives on Global Issues, Spring*.

law, and international law are conflicting. However, the most crucial point is the revisionism of the Turkish side, with new claims constantly emerging, creating *"an unstable agenda of negotiation*[373]*"*.

Expressly, subject to Article of UNCLOS, a sovereign state has the right to declare and extend the limits of its territorial sea up to 12 n.m., but this is not viable when the maritime borders of two states are much closer than the maximum limits that a territorial sea can be extended[374]. In such cases, the customary law dictates that a median line is drawn, splitting the conflicting maritime borders in the middle[375]. In the case of Greece-Turkey in the Aegean, the distance between the coast of both nations is less than one n.m. with Turkey not being a signatory member of UNCLOS, arguing about many provisions, such as Article 121[376], which dictates that islands are entitled to create maritime zones.

2.1.4.2 Greek territorial waters and expansion

Under Law 230/1936, Greece has declared six n.m. of the territorial sea but still has ten n.m. with the Presidential Decree 18/09/1931 for defensive purposes and airspace. The rest of the states in the Mediterranean have 12 n.m. territorial sea. In addition, Greece does not have a contiguous zone. Therefore, given that the upper limit of the territorial sea for each state is 12 n.m., based on the customary law and Article 3 of the UNCLOS, Greece is entitled to extend up to the maximum limit[377].

2.1.4.3 Greek International Straits

The provisions of the UNCLOS for the international straits are the only and not so favourable arrangements for Greece. The geomorphology and geopolitics of Greece in the Aegean region based on the six n.m. of territorial sea and the presence of scattered islands, islets, and rocks create a sufficient field to list its geographical wealth and its

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[373] Yıldız, E. (2020). The Conflict Between Greece And Turkey In The Mediterranean Sea (International Maritime Law Study). *Jurnal Hukum*, **36**(2), 126-138. DOI: http://dx.doi.org/10.26532/jh.v36i2.11393.

[374] Mondré, A. (2015). Choosing the UN Security Council: The Greco-Turkish Dispute in the Aegean Sea. In *Forum Shopping in International Disputes* (pp. 90-117). Palgrave Macmillan, London. DOI: 10.1057/9781137466655_4.

[375] UNCLOS Convention, 1982, Article 15, Delimitation of the territorial sea between States with opposite or adjacent coasts. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

[376] UNCLOS Convention, 1982, Article 121, Regime of islands. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

[377] Opeskin, B. R., & Rothwell, D. R. (1991). Australia's territorial sea: international and federal implications of its extension to 12 miles. *Ocean Development & International Law*, **22**(4), 395-431. DOI: https://doi.org/10.1080/00908329109545967.

scope. If Greece implements measures according to the definition of maritime routes under Article 42(1) of the UNCLOS Convention, the right of transit passage is equal to the right of innocent passage, often creating even more obligation than the right of Article 17.

2.1.4.4 The issue of the Greek continental shelf of the Aegean

Greece began to be active in licensing issues (Law 3948/1959) for seabed research in areas outside the territorial sea boundaries, but near the islands (1960-1970), under the knowledge of Turkey. However, a period of controversy began at the end of 1973, when Turkey decided to conduct exploration to locate oil fields in 27 areas of the Aegean continental shelf[378]. Recriminations from both sides followed, but in 1974, the Turkish hydrographic ship, accompanied by 32 warships, began its searches near the overlying waters of the continental shelf of some islands[379].

There was another similar incident, although Greece asked for an official assurance that the ship would be limited to scientific research. But, of course, Turkey did not provide any information on the matter. Because the escalation of the tension between them was threatened, Greece decided a) to appeal to the UN Security Council and b) to appeal to the IGC for the delimitation of its continental shelf. However, the Court (1978) dismissed the Greek action on insufficient justification[380].

2.1.4.5 The problem of the Greek EEZ

Like any state, Greece has the right to adopt its own EEZ, up to a maximum of 200 n.m. However, in the Aegean, it is almost impossible to exploit its entire range, as this imaginary line reaches approximately the coast of Turkey and between our numerous islands and islets[381]. So, if the Greek authorities decide on this, they will face six demarcations of the neighbouring states, namely Italy, Albania, Libya, Egypt,

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[378] ALKAN, U. (2015). LEGAL AND POLITICAL ASPECTS OF THE AEGEAN DISPUTE AND ITS IMPLICATIONS FOR TURKEY'S RELATIONS WITH GREECE AND THE EUROPEAN UNION. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, **29**(4), 691-719.

[379] Brown, E. D. (1981). Dispute settlement. *Marine Policy*, **5**(3), 282-286. DOI: https://doi.org/10.1016/0308-597X(81)90063-4.

[380] Macnab, R. (2004). The case for transparency in the delimitation of the outer continental shelf in accordance with UNCLOS Article 76. *Ocean Development & International Law*, **35**(1), 1-17. DOI: https://doi.org/10.1080/00908320490271483.

[381] Mazis, I. T., & Sgouros, G. A. (2013). The Greek EEZ: Principles of a Geopolitical Analysis. *Civitas Gentium*, **3**(1), 109-132.

Cyprus and, of course, Turkey[382]. Moreover, recently Greece initiated a bilateral agreement with Italy, Albania and Egypt, with Turkey convening with Libya, creating a further dispute in the conflict between the two countries[383].

In this regard, the complexity of international law appears since Greece invokes UNCLOS, which has been in force since 1994. The Greeks supported their position on the island of Kastelorizo and its potential 200 n.m. EEZ to the south, and by connecting some lines of other islands, Athens forms a map that cuts the EEZ that Turkey claims by half. As stated above, Ankara and the US have never signed UNCLOS, so customary law is imperative[384]. Turkey is called upon to obey based on historical weight and established practice. Still, it cannot be brought before the International Court of Justice unless it consents to an appeal[385]. To this day, and in recent years, the various incidents between the two countries and after the constant threats from the Turkish side, tensions have arisen at unprecedented levels[386]. As of 2022, the Russo-Ukrainian war has sparked an international trend for revisionism. Until the cessation of hostilities to normality and peace, the bilateral relations between the two nations are unlikely to improve[387].

2. 2 International conventions on civil liability for oil pollution damage (CLC)

At the Brussels Conference (1969), the IMO established the International Convention on Civil Liability for Oil Pollution Damage (CLC, 1969), which established the principle of limited liability of the owner of oil tankers and provided for a system of compulsory insurance for oil tankers[388]. The Convention applies to

[382] Kariotis, T. C. (1990). The case for a greek exclusive economic zone in the Aegean sea. *Marine Policy*, **14**(1), 3-14. DOI: https://doi.org/10.1016/0308-597X(90)90033-N.
[383] Yorucu, V., & Mehmet, O. (2022). Small Greek Islands of the Aegean, Turkish Continental Shelf: Legal Precedent and Procedure in Maritime Conflict Resolution. In *Small Islands in Maritime Disputes: Greek Turkish Energy Geo-politics* (pp. 13-33). Springer, Cham. DOI: 10.1007/978-3-031-05732-8_2.
[384] Ibid.
[385] Tsaltas, G. I. (2022). The Application of the United Nations Convention on Law of the Sea in the Archipelagos of the Aegean Sea. DOI: https://doi.org/10.1007/698_2021_834.
[386] Yorucu, V., & Mehmet, O. (2022). International Evidence in Maritime Dispute Settlement in Small Islands: Problems with UNCLOS. *Small Islands in Maritime Disputes: Greek Turkish Energy Geo-politics*, 53-82. DOI: 10.1007/978-3-031-05732-8_4.
[387] Christofis, N. (2022). Securitizing the Aegean: de-Europeanizing Greek–Turkish relations. *Southeast European and Black Sea Studies*, **22**(1), 83-100. DOI: https://doi.org/10.1080/14683857.2022.2027679.
[388] International Oil Pollution Compensation Funds (IOPC Funds), 2022, The Old Regime: the 1969 Civil Liability Convention and the 1971 Fund Convention. Available at IOPC FUNDS | The Old Regime: the 1969 Civil Liability Convention and the 1971 Fund Convention, last assessed: 21-8-2022.

pollution damage caused by the escape of petroleum products by laden tankers into the territory, the territorial sea, and the exclusive economic zone of a Contracting State[389]. Thus, the criteria are mainly territorial, with no regard for the ship's registration to a particular flag or the owner's nationality[390].

The CLC Convention was amended in 1992, altering many technical issues and issues with the responsible stakeholders and is structured around specific principles, the so-called "*4 pillars of liability"*, namely[391]:

a) strict liability for the registered shipowner

b) limitation of liability only under specific circumstances

c) compulsory insurance

d) direct action against the insurer

Initially, the CLC Convention applies only to vessels transporting oil or its sub-products, not when bunker oil is spilt after an accident. Thus, the Convention does not cover oil spills from ships other than tankers[392].

By referring to petroleum products, it is mainly for persistent oil, i.e., crude oil, fuel oil, lubricating oils, and heavy diesel and not non-persistent ones, such as gasoline, kerosene, etc., which are not covered by the Convention[393]. The CLC Convention also covers damage or preventive measures following an incident that resulted in oil leakage. But it does not cover the cost of the measures to avoid the threat of oil spills even if no

[389] CLC Convention, 1992, Article II. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.
[390] Hadavand, M., AZADBAKHT, F., & Ghazanfari, H. (2022). International Maritime Organisation and Civil Liability for Offshore Oil Pollution. *International Studies Journal (ISJ)*. DOI: 10.22034/ISJ.2022.306679.1610.
[391] Craik, N. (2022, April). Insurance and Compensation Fund Design for Deep-Seabed Liability: Lessons from Existing Civil Liability Regimes. In *The United Nations Convention on the Law of the Sea, Part XI Regime and the International Seabed Authority: A Twenty-Five Year Journey* (pp. 273-300). Brill Nijhoff. DOI: https://doi.org/10.1163/9789004507388_017.
[392] CLC Convention, 1992, Article I. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.
[393] Boviatsis, M., Alexopoulos, A., & Vlachos, G. (2022). Assessing the Potential Impact on Previous Maritime Accidents Had the HNS Convention Been Applied. *Journal of Environmental Science and Engineering B*, **11**(2), 37-42. DOI: 10.17265/2162-5263/2022.02.002.

discharge has occurred. This case is protected thanks to the initiatives of private maritime operators[394].

The Convention establishes, at one-point, strict liability and, at the same time, the exclusion of liability for the owner. Upon this issue, a severe controversy has sparked. It has been argued, for example, that if the tanker carries wine and the cargo is spilt overboard, there will be no pollution. But on the other hand, pollution is created because the ship is carrying oil, so the risk depends on the product being transported[395]. However, from another point of view, the Convention could not decide differently but to adopt the principle of the shipowner's liability because often, the cargo owner carried changes from port to port, as well as during the voyage[396].

According to the Convention[397], the owner is solely responsible for any damage caused by oil pollution and is liable for compensation unless the damage resulted from: i) an act of war or any subsequent hostilities that were unavoidable, ii) an act or

[394] Tanker Owners Voluntary agreement Concerning Liability for Oil Pollution Damage (TOVALOP), 1969, with the amendments of 1978 and 1986: voluntary agreement (special fund) between the largest tanker owners (about 90% of the world's displacement) established in 1969 shortly before the advent of the CLC. Its primary objective was to offer some amount of compensation to the victims of the pollution incident, e.g. governments, private individuals. It did not set criteria for specific sea areas and the amount of coverage reached USD 100. for each ton of the tonnage of the ship with a maximum of 10 cm. Dol. for each event. The 1978 amendments raised the thresholds respectively to USD 160. for each ton and the total amount is 16,8 mil. Dol. The recommendation of TOVALOP was initially temporary, but time indicated the opposite. The CLC has not been universally accepted, as it was envisioned at the initial stage. The year 1986 was followed by new amendments (TOVALOP Supplement), which entered into force in 1987, setting: (a) for tankers up to 5,000 GRT an amount of 3.5 million ECU. (b) for tankers over GRT 5,000 an additional USD 493. for every ton up to 140.000 GRT. c) for tankers over 140,000 GRT an amount of 70 mil. Dol. The new limits will only apply to events where a tanker carries CRISTAL cargo.

[395] Jacobsson, M., & Trotz, N. (1986). The Definition of Pollution Damages in the 1984 Protocols to the 1969 Civil Liability Convention and the 1971 Fund Convention. *J. Mar. L. & Com.*, **17**, 467.

[396] Mason, M. (2003). Civil liability for oil pollution damage: examining the evolving scope for environmental compensation in the international regime. *Marine Policy*, **27**(1), 1-12. DOI: https://doi.org/10.1016/S0308-597X(02)00051-9.

[397] There is also another Convention Regarding an Interim Supplement to Tanker Liability for Oil Pollution Damage (CRISTAL), 1971 with the 1986 amendments: the second special fund is an agreement between oil companies which also aims to compensate persons for pollution of the sea. Its intention is to offer additional amounts where TOVALOP does not apply. It ended up being the mirror of the Fund Convention that we analyze below. It allows a shipowner to get some sort of compensation for part of the liability stipulated by the CLC Convention (informally called roll back relief). The amount set by CRISTAL can reach up to EUR 36 million. Dol. which can be increased up to twice as much as 72 cm. And the shipowners will be compensated for part of the liability up to the amount of USD 160 per ton. or a total of USD 16.8 million, depending on what is the smallest amount. b) for tankers over 5,000 and up to 140,000 GRT an additional amount of USD 733 for each ton, c) for tankers over 140,000 GRT an amount of 135 million. Dol. The two voluntary agreements cover certain cases not provided for in international law: a) costs of preventive measures even when there is no oil spill and b) costs for fuel leaks or during the journey under ballast.

omission done with the intent to cause damage by a third party, iii) an act that causes damage as an outcome of the negligence or the wrongful act of a coastal state, such as the maintenance of maritime routes etc.[398].

However, the Convention, recognizing the unforeseen events which the shipowner may encounter during the carriage of the cargo, provides[399] that the latter is entitled to limit any liability to the amount of 133 Special Drawing Rights (SDRs) for each ton and also that the total amount may reach the 4 million SDR, depending on what amount is the smallest[400], unless the victim proves that some personal error of the owner caused the pollution incident. The above amount was differentiated after the CLC Board of Directors' amendment. The shipowner is therefore entitled to limit his liability to the sum of EUR 3 million for a ship with a tonnage of up to 5000 gross tonnages, while if the tonnage is greater, the liability is limited to 420 SDRs in addition to the amount indicated above for each additional tonnage unit[401].

An essential point for the convention to be applied is that the oil discharge must have been done by a tanker flying the flag of a contracting state (or using the ports and stations or territorial waters of the Member State). Finally, the tanker's owner carrying more than 2,000 tons of cargo must have insurance coverage or another financial guarantee (e.g., a bank or insurance organisation)[402]. Finally, according to the Convention, after 20-2-1999, all vessels must carry the CLC 1992 Certificate. Otherwise, the Port Authority may prohibit the departure until the ship is provided with the relevant Certificate. At the same time, the master or the owner is subject to the

[398] CLC Convention, 1992, Article III. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.
[399] CLC Convention, 1992, Article V. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.
[400] In its original form, the CLC convention used the Poincare Gold Francs monetary unit introduced under Prime Minister Poincare by the Monetary Law of 24.6.1928 and fixed the value of the franc at the expense of gold equal to 1/5 of the value it had at the beginning of the First World War. The International Monetary Fund (IMF) abandoned its use in the year 1976 and replaced it with the Droit de Tirage Special (DTS) which was of equal value to USD 1.5. USA. In parallel with the validity of the Protocol (1976) to the CLC Convention, the amounts are currently expressed in SDR (Special Drawing Rights) (based on the exchange rate on May 10, 2015 1 SDR = USD 1.47638).
[401] Soto-Onate, D., & Caballero, G. (2017). Oil spills, governance and institutional performance: The 1992 regime of liability and compensation for oil pollution damage. *Journal of Cleaner Production*, **166**, 299-311. DOI: https://doi.org/10.1016/j.jclepro.2017.08.021.
[402] CLC Convention, 1992, Article VII. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.

payment of a fine, and the company is liable for any emerging issues or delays caused by the absence of those certificates[403].

The most important aspects of the CLC are establishing the liability to the ship owner and ways to limit this liability by resolving the exclusions of Article III. The establishment of the shipowner's liability was a significant step towards the enhancement of maritime safety, installing the shipowner as the undisputed liable stakeholder in case of an accident, providing him at the same time with reasonable grounds to be excluded by the liability, should he first prove that he exercised due diligence[404]. The structure of this convention resembles the Hague-Visby Rules (Articles II & III) and encourages the shipowner to exercise and demonstrate his "utmost care" to limit liability.

While the shipowner's liability is paramount, even before the initiation of the ISM Code, the enforcement of compulsory insurance and direct action against the insurer are far more critical. There are many cases where the ship owner while being proved liable for an accident, decides to "*enveil*" himself behind the single ship company installed and while the affected stakeholders can exercise claims against the shipowner's vessel with an action *"in rem"*, the compensation may be not ever remotely enough for covering the damages[405]. Thus, the installation of P&I Club insurance is mandatory and gives more options to the affected parties for compensation[406]. At the same time, another stakeholder will enforce the implementation of acceptable practices to the shipowner for him to be accepted as a member and maintain the P&I coverage. The direct action against the P&I clubs hastens the compensation processes, especially when the ship owner systematically avoids his responsibilities[407].

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[403] *Landcatch Ltd v. International Oil Pollution Compensation Fund*, 1999 Lloyd 2, 1999 Lloyd's Rep. 2 316 (1999).

[404] Margetson, N. J. (2008). *The system of liability of articles III and IV of the Hague (Visby) Rules*. Uitgeverij Paris.

[405] Theotokas, I. (2018). *Management of shipping companies*. Routledge.

[406] Bryant, H. (1993). Lead Legal Regimes Dealing with Liability for Oil Pollution from Ships, The. *Eur. Envtl. L. Rev.*, **2**, 69.

[407] Craik, N. (2022). Insurance and Compensation Fund Design for Deep-Seabed Liability: Lessons from Existing Civil Liability Regimes. In *The United Nations Convention on the Law of the Sea, Part XI Regime and the International Seabed Authority: A Twenty-Five Year Journey* (pp. 273-300). Brill Nijhoff. DOI: https://doi.org/10.1163/9789004507388_017.

2.3 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND Convention)

The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND Convention) was initiated in 1971 and entered into force in 1978[408]. The main aim of the convention is to provide an additional fund for shipowners when the liability that emerged from an accident exceeds their control and the coverage from the CLC Convention is inadequate[409].

Based on the CLC Convention, the compensations provided were inadequate since it could not provide total compensation to the affected parties for pollution. It was, therefore, more than evident that a supplementary compensation had to be established, and the IMO proceeded with the adoption of the FUND Convention in 1971[410]. Due to its complementary nature and connection with the CLC, only the member states of the CLC convention can become parties to adopting the FUND Convention[411].

The primary purposes of the Convention are to provide additional compensation to victims of pollution who have not obtained adequate compensation under the CLC Convention and to provide compensation to the shipowner for a portion of his liability under the CLC Convention unless the owner's willful misconduct causes the pollution[412].

The capital Convention provides compensation to persons who were harmed by oil pollution and did not receive complete and adequate compensation under the provisions of the CLC because a) the owner is relieved of liability for compensation under the CLC Convention, b) the owner is financially unable to fulfil his obligations

[408] International Oil Pollution Compensation Funds (IOPC Funds), 2022, The Old Regime: the 1969 Civil Liability Convention and the 1971 Fund Convention. Available at IOPC FUNDS | The Old Regime: the 1969 Civil Liability Convention and the 1971 Fund Convention, last assessed: 21-8-2022.
[409] International Oil Pollution Compensation Funds (IOPC Funds), 2018, Article 2. Available at: Text-of-Conventions_e.pdf (iopcfunds.org), last assessed: 18-8-2022.
[410] Jacobsson, M., & Trotz, N. (1986). The Definition of Pollution Damages in the 1984 Protocols to the 1969 Civil Liability Convention and the 1971 Fund Convention. *J. Mar. L. & Com.*, **17**, 467.
[411] Bernard, S. R. (1997). The Civil Liability Convention and the International Compensation Fund Convention. *Ocean L. & Pol'y Series*, **1**, 129.
[412] International Oil Pollution Compensation Funds (IOPC Funds), 2018, Article 2. Available at: Text-of-Conventions_e.pdf (iopcfunds.org), last assessed: 18-8-2022.

under the liability convention, and c) the damage exceeds the liability of the owner under the IOPC Fund[413].

The Convention shall apply to damage caused by pollution[414] caused to the territory, including territorial waters, and the exclusive economic zone of the Contracting State, established under international law[415].

The FUND Convention is not subject to compensation[416]: a) if the pollution results from war or hostilities, b) if the disposal of oil came from a warship or government ship that is not used for commercial purposes, c) the plaintiff cannot prove that the source of the pollution was a ship or ships and d) the damage is the result of all or part of the intentional or illegal act of the plaintiff[417].

On the contrary, the Convention dictates compensation up to the amount of EUR 52.5 mil. SDR, including the amount paid by the shipowner or his insurer under the CLC Convention (the amount has been increased since 1987 to ECU 60 mil. SDR). Accordingly, it delivers a compensation amount to the owner of 33 SDRs for each and so on for a part of the total amount of liability[418]. Following the amendments made in 1992, the maximum amount of compensation is EUR 135 million. SDR, while for incidents involving three parties and at the same time, the total quantity of oil received in the territories of these parts during the preceding calendar year is equal to or exceeds EUR 600 mil. tons the amount of compensation is EUR 200 mil. SDR[419].

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[413] International Oil Pollution Compensation Funds (IOPC Funds), 2018, Article 4. Available at: Text-of-Conventions_e.pdf (iopcfunds.org), last assessed: 18-8-2022.

[414] Doud, A. L. (1972). Compensation for Oil Pollution Damage: Further Comment on the Civil Liability and Compensation Fund Conventions. *J. Mar. L. & Com.*, **4**, 525.

[415] International Oil Pollution Compensation Funds (IOPC Funds), 2018, Article 3. Available at: Text-of-Conventions_e.pdf (iopcfunds.org), last assessed: 18-8-2022.

[416] Nichols, J. (2005). Scope of Compensation for Environmental Damage Under the 1992 Civil Liability Convention and the 1992 Fund Convention. In *Marine Resource Damage Assessment* (pp. 59-66). Springer, Dordrecht. DOI: https://doi.org/10.1007/1-4020-3368-0_4.

[417] International Oil Pollution Compensation Funds (IOPC Funds), 2018, Article 4., par. 2. Available at: Text-of-Conventions_e.pdf (iopcfunds.org), last assessed: 18-8-2022.

[418] Bergesen, H. O., Parmann, G., & Thommessen, Ø. B. (2018). International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1971 (1971 Fund Convention). In *Yearbook of International Cooperation on Environment and Development* 1998–99 (pp. 106-107). Routledge.

[419] Nichols, J. (2005). Scope of Compensation for Environmental Damage Under the 1992 Civil Liability Convention and the 1992 Fund Convention. In Marine Resource Damage Assessment (pp. 59-66). Springer, Dordrecht. DOI: 10.1007/1-4020-3368-0_4.

Compensation payments are covered by contributions from individuals or companies in the Member States that procure over 150,000 tons per year (initial levy of USD 0.004 per ton of oil)[420]. Since 1985, some 80% of the annual contributions have been paid by the industrialized nations[421].

Until then, two "*ad hoc*" agreements have been observed by tanker owners and shippers based on a "*voluntary*" basis[422]:

a) TOVALOP (Tanker Owners Voluntary Agreement concerning Liability for oil Pollution 1969[423]) and

b) CRISTAL (Convention Regarding an Interim Supplement to Tanker Liability for Oil Pollution 1971[424]).

These are, in fact, liability insurance, with a new point of interest being that they allow direct recourse by private individuals affected by pollution directly against those responsible. It is planned to provide compensation, for TOVALOP, with a maximum of $ 100 per k. or $ 10,000,000 in total, while for CRISTAL, $ 30,000,000 in total. Even now that the Fund Convention has been ratified internationally, these agreements continue to provide additional financial support[425].

[420] International Oil Pollution Compensation Funds (IOPC Funds), 2018, Article 10. Available at: Text-of-Conventions_e.pdf (iopcfunds.org), last assessed: 18-8-2022.

[421] At the initiative of the IMO and the OECD, a conference was convened in 1984 with a view to revising the compensation limits of the CLC and FUND Conventions. In particular, in the two protocols: a) CLC: for tankers with a capacity ofup to 5,000 gross tonnage, the amount reaches 3 million ECU. SDR, for tankers over 5,000 and so on, the liability increases by 420 SDRs per added toll and reaches up to 59.7 cm. SDR, b) FUND: the limits of liability of the Convention are set in the first phase up to the amount of 135 mil. SDR and in the second phase will reach 200 cm. SDR together with the CLC Convention. The 1984 protocols also stipulate that damage caused by oil spills from an unladen tanker will be covered and that the costs of preventive measures will be reimbursed, even if there has been no oil spill, as long as there has been a serious risk of pollution

[422] Christine, B. (1994). Trends in marine pollution legislation. *Risk Management*, **41**(1), 59-61.

[423] Bekiashev, K. A., & Serebriakov, V. V. (1981). International Tanker Owners Pollution Federation, Ltd.(TOVALOP). In *International Marine Organisations* (pp. 180-184). Springer, Dordrecht. DOI: 10.1007/978-94-009-8261-1_13.

[424] Hetherington, A. S., & Steyn, H. A. (1977, January). TOVALOP/CRISTAL. where we are and where we are going.[Tanker Owners Voluntary Agreement Concerning Liability for Oil Pollution]. *In API Div. Transp. 1977 Tanker Conference Proceedings*;(United States) (No. CONF-7706212-).

[425] Brennan, B. V. (1989). Liability and Compensation for Oil Pollution from Tankers under Private International Law: TOVALOP, CRISTAL, and the Exxon Valdez.

The CLC[426] and FUND[427] Conventions were revised in 1992 and the amendments made are identified in summary in the following areas:

a) Geographical extension of their application.

b) Extension of the application of the legislation to oil tankers operating a voyage under ballast, provided that they carry residues from the last cargo of oil.

c) Recognition of the costs of taking preventive measures, even if no pollution was caused.

d) Only costs relating to reasonable remedial measures taken or taken under the new definition of pollution damage shall be covered.

e) The owner shall not be compensated by the international FUND convention. By extension, the owner's civil liability under the international CLC convention is the total liability arising for him or his insurer.

Eight years later, in October 2000, the two conventions were revised again. The amendments that have occurred have resulted in an increase in the amount of compensation by 50% compared to the amount fixed in the 1992 Protocol. This brings the new amount of compensation to SDR 203 million ($206 million)[428]. However, for incidents involving three parties and at the same time, the total quantity of oil received in the territories of these parties during the preceding calendar year shall be equal to or greater than EUR 600 million. tons, the amount of compensation is SDR 300,040,000 ($386 million).

In 2003, The Supplementary Fund Protocol was adopted and entered into force in 2005, further increasing the amount of compensation established by the FUND of 1992 with its recent amendment[429]. In addition, there are other Conventions, such as

[426] International Oil Pollution Compensation Funds (IOPC Funds), 2022, The 1992 Civil Liability Convention. Available at: IOPC FUNDS | 1992 Civil Liability Convention, last assessed: 21-8-2022.
[427] International Oil Pollution Compensation Funds (IOPC Funds), 2022, The 1992 Fund Convention. Available at IOPC FUNDS | 1992 Fund Convention and Supplementary Fund Protocol, last assessed: 21-8-2022.
[428] Ward, L. (1981). The SDR in transport liability conventions: some clarification. *J. Mar. L. & Com.*, **13**, 1.
[429] The Supplementary Fund Protocol, which was adopted in 2003, entered into force in 2005, thereby establishing the International Oil Pollution Compensation Supplementary Fund, 2003 (Supplementary Fund). The Supplementary Fund provides additional compensation beyond the amount available under

the Convention on Limitation of Liability for Maritime Claims[430] (LLMC Convention), which is an IMO treaty, entered into force in 1986, and in many cases, the limit of liability[431] can be raised considerably; even up to 250-300[432]%. Also, the International Convention on Civil Liability for Bunker Oil Pollution Damage (BUNKER) Convention was adopted in 2001 and entered into force in 2008[433]. The purpose of this Convention is "*to ensure that adequate, prompt, and effective compensation is available to persons who suffer damage caused by spills of oil when carried as fuel in ships' bunkers*"[434].

2.4 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea – (HNS Convention)

In May 1996, the IMO adopted the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious

the 1992 Fund Convention in 1992 Fund Member States which are also Parties to the Protocol. The total amount available for compensation for each incident is 750 million SDR, including the amounts payable under the 1992 Conventions. Annual contributions to the Supplementary Fund are made on the same basis as contributions to the 1992 Fund. However, the contribution system for the Supplementary Fund differs from that of the 1992 Fund in that, for the purpose of paying contributions, at least 1 million tonnes of contributing oil are deemed to have been received each year in each Member State.

[430] Griggs, P., Williams, R., & Farr, J. (2020). *Limitation of liability for maritime claims*. Taylor & Francis.

[431] Jafari, F., & Mokhtari, M. (2017). The Conditions for the Limitation of Liability of Owner of Sea-going Ships (The Survey of International Convention on Limitation of Liability for Maritime Claims 1976). *International Law Review*, **33**(55), 211-232.

[432] Grime, R. P. (1988). Implementation of the 1976 limitation convention: Liability for maritime claims. *Marine Policy*, **12**(3), 306-313. DOI: https://doi.org/10.1016/0308-597X(88)90070-X.

[433] Wu, C. (2002). Liability and compensation for bunker pollution. J. Mar. L. & Com., **33**, 553.

[434] IMO. (2019). International Convention on Civil Liability for Bunker Oil Pollution Damage (BUNKER). Available at: International Convention on Civil Liability for Bunker Oil Pollution Damage (BUNKER) (imo.org), last assessed: 13-8-2022. The convention is modelled on the International Convention on Civil Liability for Oil Pollution Damage, 1969. As with that convention, a key requirement in the bunkers convention is the need for the registered owner of a vessel to maintain compulsory insurance cover. Another key provision is the requirement for direct action - this would allow a claim for compensation for pollution damage to be brought directly against an insurer. The Convention requires ships over 1,000 gross tonnage to maintain insurance or other financial security, such as the guarantee of a bank or similar financial institution, to cover the liability of the registered owner for pollution damage in an amount equal to the limits of liability under the applicable national or international limitation regime, but in all cases, not exceeding an amount calculated in accordance with the Convention on Limitation of Liability for Maritime Claims, 1976, as amended.

Substances by Sea[435] (HNS)[436]. This Convention was based on a 'two-layer' system[437] already established by the CLC and FUND Conventions[438]. However, the HNS Convention goes a little further by covering damage from accidental pollution and the risk of fire and explosion, including loss of life or injury and loss or damage to property[439].

This Convention makes it possible to pay compensation of SDR 250 million ($ 320 million) to victims of accidents caused by the transport of Harmful and Dangerous Substances by sea[440]. This Convention entered into force 18 months after it was accepted by 12 states, of which four should have a fleet of no less than 2 million gross tonnage units. The signatory states are Cyprus, Morocco, Samoa, Tonga, Slovenia, the Russian Federation, Saint Vincent and the Grenadines, and in 2010 Canada, France, Germany, Greece, the Netherlands, Norway and Turkey signed[441].

Nevertheless, despite its importance in installing preventive measures, the HNS Convention still includes many vague and repeating clauses that are identical to the platform set by the CLC, as most conventions prepared by IMO refer to limitation of liability[442]. Chemical spills are pretty different from oil spills, not only by assessing the

[435] International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea. (2010). 2010 HNS Convention. Available at: 2010-HNS-Convention-English.pdf (hnsconvention.org), last accessed: 13-8-2022.

[436] Boviatsis, M., Alexopoulos, A., & Vlachos, G. (2022). Assessing the Potential Impact on Previous Maritime Accidents Had the HNS Convention Been Applied. Journal of Environmental Science and Engineering B, **11**(2), 37-42. Doi:10.17265/2162-5263/2022.02.002.

[437] Boviatsis, M., Alexopoulos, A. B., Vlachos, G. P., and Samiotis, G. 2019. "Chemical Tanker Accidents and the 2010 HNS Convention." *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece. DOI: https://doi.org/10.1016/j.jhazmat.2014.11.005.

[438] Cunha, I., Moreira, S., & Santos, M. M. (2015). Review on hazardous and noxious substances (HNS) involved in marine spill incidents—An online database. *Journal of hazardous materials*, **285**, 509-516. DOI: https://doi.org/10.1016/j.jhazmat.2014.11.005.

[439] Radović, J. R., Rial, D., Lyons, B. P., Harman, C., Viñas, L., Beiras, R., ... & Bayona, J. M. (2012). Post-incident monitoring to evaluate environmental damage from shipping incidents: Chemical and biological assessments. *Journal of environmental management*, **109**, 136-153. DOI: https://doi.org/10.1016/j.jenvman.2012.04.042.

[440] Zhuo, R. (2020). THE HNS CONVENTION: WILL IT BE A GAME CHANGER FOR CHINA'S MARINE POLLUTION LAW? *Natural Resources Journal*, **60**(2), 207–238. https://www.jstor.org/stable/26975590.

[441] Dong, B., & Zhu, L. (2019). Civil Liability and Compensation for Damage in Connection With the Carriage of Hazardous and Noxious Substances: Chinese Perspective. *Ocean Development & International Law*, **50**(2-3), 209-224. DOI: https://doi.org/10.1080/00908320.2019.1582609.

[442] Häkkinen, J., & Posti, A. (2013). Overview of maritime accidents involving chemicals worldwide and in the Baltic Sea. *Maritime Transport & Shipping-Marine Navigation and Safety at Sea Transportation*, CRC Press, Taylor and Frances Group, Abingdon, Oxford, 15-25.

damage to the environment but how they should be prevented or dealt with, i.e. chemical dispersants used to break the oil slick is more toxic than the oil itself[443].

"The main focus of the HNS Convention should be on installing efficient and effective measures to avoid accidents coupled with reactive measures to minimize the effects of such accidents. It is evident from the accidents presented that even if the HNS Convention were in force in its present state, the potential impact would be minimal, and most likely, the events and the outcome would be the same."[444]

2.5 The U.S. Marine Environment Policy: Oil Pollution Act (OPA '90)

2.5.1 Background aims and scope of OPA '90.

In August 1990, US President Bush signed the Oil Pollution Act 1990 (OPA '90). The occasion was, on the one hand, the sinking of the Exxon Valdez[445], which caused the most significant pollution by petroleum products in American waters (250,000 barrels), and on the other hand, the awareness of public opinion about the destruction of the marine environment coupled with the lack of preparedness on the part of the government and industry to deal with such incidents[446].

The OPA '90 legislation aims explicitly to limit marine pollution by installing severe but, at the same time, efficient systems and extended levels of liability. First, the Act gradually prohibits entry into US maritime zones on tankers that are not double-walled for 25 years. Slowly, this law applied not only to tankers but also to all ships arriving in American waters and ports[447].

Vessels that are excluded are:

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[443] Boviatsis, M., Alexopoulos, A., & Vlachos, G. (2022). Assessing the Potential Impact on Previous Maritime Accidents Had the HNS Convention Been Applied. Journal of Environmental Science and Engineering B, **11**(2), 37-42. Doi:10.17265/2162-5263/2022.02.002.

[444] ibid.

[445] Peterson, C. H., Rice, S. D., Short, J. W., Esler, D., Bodkin, J. L., Ballachey, B. E., & Irons, D. B. (2003). Long-term ecosystem response to the Exxon Valdez oil spill. *Science*, **302**(5653), 2082-2086. DOI: 10.1126/science.10842.

[446] Wolfe, D., Michel, J., Hameedi, M. J., Payne, J. R., Galt, J. A., Watabayashi, G., ... & Rice, S. (1994). The fate of the oil spilled from the Exxon Valdez. *Environmental science & technology*, **28**(13), 560A-568A. DOI: https://doi.org/10.1021/es00062a001.

[447] McCurdy, G. L. (1992). An Overview of OPA 1990 and Its Relationship to Other Laws. *USF Mar. LJ*, **5**, 423.

a) Oil spill response vessels (OSRV).

b) Ships landing oil in a deep port licensed by the Deep-Water Port Act of 1974[448] or transhipment ships landing oil by relief procedures within the limits of a relief zone defined by section 3715(B)- (5) USC, and at a distance of more than 60 nautical miles from the border baseline as defined in 33CFR 2.05-10[449].

c) Ships of less than 5,000 tons fitted with a double containment system that may be as adequate as the double casing to prevent marine pollution.

d) Ships that are not considered tankers, e.g. lifeguards or fishing vessels, but not more than 750 tons.

Since the entry into force of OPA '90, a unilateral policy has been implemented in the USA regarding measures relevant to enhancing environmental protection[450]. This new policy led to the complete restructuring of the aims and scope of the national legislation, setting the prevention of any threat of environmental pollution as paramount. In particular, the OPA'90 explicitly refers to the maritime safety sector[451] and the level of training of seafarers (title IV), establishing regulations for the Vessel Traffic Services system to control illegal discharges of waste into the sea and to identify offenders who cause oil pollution[452].

It also provides for the use of pilots and escort ships (tugboats), the organisation of bridge prisons, the improvement of the means of telecommunication between the ship and the coast, the testing for drugs and alcohol, the setting by the IMO of the minimum acceptable standards for the training of seafarers in conjunction with the exercise of us coast guard control (USCG) [453]for the certificates of competency of a master and crew, as well as the general manning of foreign ships approaching the

[448] Mayhall, M. A. (1975). The Louisiana Offshore Terminal Authority and the Deepwater Port Act of 1974. *Loy. Law.*, **1**, 9.
[449] Wagner, T. J. (1990). The Oil Pollution Act of 1990: An Analysis. *J. Mar. L. & Com.*, **21**, 569.
[450] Swanson, S. R. (2001). OPA 90+ 10: The Oil Pollution Act of 1990 After Ten Years. *J. Mar. L. & Com.*, **32**, 135.
[451] Morgan, J. D. (1994). The Oil Pollution Act of 1990: a look at its impact on the oil industry. *Fordham Envtl. LJ*, **6**, 1.
[452] Vollaard, B. (2017). Temporal displacement of environmental crime: Evidence from marine oil pollution. *Journal of Environmental Economics and Management*, **82**, 168-180. DOI: https://doi.org/10.1016/j.jeem.2016.11.001.
[453] Talley, W. K., Jin, D., & Kite-Powell, H. (2005). Post OPA-90 Vessel oil transfer spill prevention: The Effectiveness of coast guard enforcement. *Environmental and Resource Economics*, **30**(1), 93-114. DOI: https://doi.org/10.1007/s10640-004-2378-2.

American harbours. In addition, concerning the maintenance of vessels, stricter but commonly accepted control and inspection regulations are provided for by classification societies[454].

Regarding loading and unloading procedures, the USCG concluded that off-sized stations on the high seas are the most environmentally painless way compared to direct delivery to either terminals or barges. In addition, these stations are proving to be more effective in protecting the marine environment because they significantly reduce accident rates, e.g., strandings, collisions, explosions due to adverse weather, etc[455].

Oil pipelines make it possible to conduct unloading even if the ship is anchored outside the port. Still, its distance from it is not capable of preventing the chances of pollution in ecologically sensitive areas[456].

However, the new legislation also addresses the issue of the effective response to pollution incidents by establishing immediate intervention plans (sec.4201-4205 and Title VII); that is, we are now at the suppression stage, not prevention. First, merchant ships must report pollution incidents in our jurisdictions (e.g., exclusive economic zone)[457]. Modern management requires the master and crew to be adequately informed, especially during critical moments, for the full activation (at least in the early stages) of the Vessel's Response Plan (VRP)[458] system to better deal with a pollution incident. It is not only tankers carrying oil that are obliged to draw up such plans, but also coastal

[454] Coe, T. J. (1995). Lessons learned outfitting the US Coast Guard with oil pollution equipment. *Spill Science & Technology Bulletin*, **2**(4), 233-239. DOI: https://doi.org/10.1016/S1353-2561(96)00003-5.
[455] Guard, U. C. (2019). Guidelines for the US Coast Guard oil spill removal organisation classification program. *Marine Environmental Response Policy*.
[456] Bryant, D. L. (2017). Exxon Valdez and OPA 90: How congressional reaction to a major oil spill changed the US Coast Guard. *Coast Guard Journal of Safety & Security at Sea, Proceedings of the Marine Safety & Security Council*, **74**(2).
[457] Alarcon, S. J., & Jennings, F. M. (1996). Monitoring Costs under the Oil Pollution Act of 1990: A Blank Check for the Coast Guard. *Tul. Mar. LJ*, **21**, 419.
[458] Corbett, C. R. (1993). Vessel response plan requirements: Observations by intertanko. In *International Oil Spill Conference* (Vol. 1993, No. 1, pp. 259-262). American Petroleum Institute.

installations[459]. The VRP should, on the one hand, comply with the rules of the USCG and, on the other, cover the worst case of oil pollution[460].

In summary, a VRP should cover the following:

a) determination of the qualified individual, i.e. the private body that will undertake the operation to deal with pollution;
b) precise determination of the amount of oil expected to leak in the worst event of an accident.
c) description of education and training processes.
d) securing private funds for immediate response in the event of an accident.
e) notification procedure and
f) equipment for the containment of clothing on board.

With the establishment of VRP, the Act seeks the ongoing training of crews with incentives given to shipping companies for the proper operation of vessels[461]. In addition, the coordinating role of the coastal State aims to draft national contingency plans – here; the time factor is decisive – including emergency ships and auxiliary means (e.g. dams, chemical dispersants) to clean up the contaminated area (decontamination procedures).[462]

However, according to the OPA '90, the most crucial part during a pollution incident is the response plan set to counter this emerging threat with the addition of competent individuals selected by the shipping companies to assist and effectively contribute to the minimisation of any damage. The role of those stakeholders is to implement hastily, efficiently, and compelling the required processes, such as the decontamination, the coordination of efforts for the operation of cleaning crews, the

[459] Bryant, D. L. (2017). Exxon Valdez and OPA 90: How congressional reaction to a major oil spill changed the US Coast Guard. *Coast Guard Journal of Safety & Security at Sea, Proceedings of the Marine Safety & Security Council*, **74**(2).
[460] Smith, D. M. (1995). VESSEL RESPONSE PLANS: A TILE IN THE MOSAIC OF THE NATIONAL RESPONSE SYSTEM. In *International Oil Spill Conference* (Vol. 1995, No. 1, pp. 926-926). American Petroleum Institute.
[461] Lee, T., & Nam, H. (2017). A study on green shipping in major countries: in the view of shipyards, shipping companies, ports, and policies. *The Asian Journal of Shipping and Logistics*, **33**(4), 253-262. DOI: https://doi.org/10.1016/j.ajsl.2017.12.009.
[462] Alarcon, S. J., & Jennings, F. M. (1996). Monitoring Costs under the Oil Pollution Act of 1990: A Blank Check for the Coast Guard. *Tul. Mar. LJ*, **21**, 419.

effective communication with the competent authorities, the shipping company, the master of the ship and the P&I Club[463].

It should be noted that each US state does not always have its personnel and its auxiliary means to clean up an area. This leads to the belief that, until the enactment of the law, the maintenance of a costly state body aimed at carrying out the task of decontamination meant that only the state services were responsible for protecting the marine environment and the active participation of the stakeholder who caused the pollution was not required[464].

The adoption of the OPA '90 was halted many times due to many reasons, such as a) the granting of permission to the federal states to adopt their legislation upon the limitation of liability, b) the incorporation of international conventions relevant to the prevention of marine pollution and the limitation of liability c) the standards of conduct as causes of the establishment of exclusive liability of the one who causes the pollution and d) the instalment of a *"fund"* which will economically support the process of decontamination in an area of pollution[465].

Undoubtedly, OPA '90 has disturbed the international maritime community, not only for the foreign ships entering the US ports, but for the initiation of a new *"mentality",* namely the most impactful changes are a) the installation of the double walls or double bottoms regime on all tankers entering US maritime areas, by implementing a phasing-out schedule of the older tankers, and b) by applying the concept of unlimited liability[466] for the party who causes marine pollution and all the economic consequences arising from it (Title I). However, the most interesting is the execution of this concept and the outflow of the liability, under certain circumstances, to the other contracted stakeholders to the liable party[467].

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[463] Wagner, T. J. (1990). The Oil Pollution Act of 1990: An Analysis. *J. Mar. L. & Com.*, **21**, 569.
[464] Swanson, S. R. (2001). OPA 90+ 10: The Oil Pollution Act of 1990 After Ten Years. *J. Mar. L. & Com.*, **32**, 135.
[465] United States Coast Guard, (2022). Oil Pollution Act of 1990 (OPA). Available at: Oil Pollution Act of 1990 (uscg.mil), last assessed: 30-8-2022.
[466] Nichols, J. E. (2010). *Oil Pollution Act of 1990 (OPA): Liability of Responsible Parties*. Congressional Research Service.
[467] Morgan, J. D. (1994). The Oil Pollution Act of 1990: a look at its impact on the oil industry. *Fordham Envtl. LJ*, **6**, 1.

2.5.2 Liability and Indemnification Regime

The most impactful and at the same time controversial fact about OPA '90 is the establishment of the complete responsibility of the shipping company, of the manager, the leading operator in the context of vessels and the manager of installations, e.g. platforms, drilling rigs, pipelines, in case of an emerging threat leading to oil pollution[468]. This aims to cover the costs of decontamination of an area and the damage resulting from the impact on marine natural resources. Subject to the Act, the word "removal" refers to the containment and removal of oil or some other hazardous substance from water and coasts or procedures to be followed to minimise or avoid the damage that will be caused to public health and well-being and the overall environment of the region, affecting fish, shells, wildlife, public and private property, coasts and banks[469].

The responsible party is not subject to compensation if he proves that the incident resulted from natural disasters (an act of god), hostilities (an act of war), or an illegal act or omission by a third party. At the same time, the polluter cannot invoke the above exceptions if, under the law, he fails or refuses to: i) give information to the competent authorities about the existence of the incident and ii) to provide his assistance and cooperation in the procedures for cleaning the area, if officially requested by the US port authorities[470]. Also[471], there is no liability for damages where the discharges were made with the permission of Federal, State or Local law and in discharges from a ship used for national purposes or from an instrument subject to the Trans-Alaska Pipeline Authorization Act[472].

In particular, federal law for determining fines will not exceed:

a) For ships over 3,000 GRT, $1,200. for each ton, or the 10 million tons. Dol. in total, depending on what amount is greater.

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[468] Edgcomb, J. D. (1992). Responding to an Oil Spill in California--The Impact of OPA 1990 and OSPRA. *USF Mar. LJ*, **5**, 389.
[469] Gauci, G. (1995). Limitation of liability in maritime law: an anachronism?. *Marine Policy*, **19**(1), 65-74. DOI: https://doi.org/10.1016/0308-597X(95)92573-P.
[470] Nichols, J. E. (2010). *Oil Pollution Act of 1990 (OPA): Liability of Responsible Parties*. Congressional Research Service.
[471] Stone, A. G. (1975). The Trans-Alaska Pipeline and Strict Liability for Oil Pollution Damage. *Urb. L. Ann.*, **9**, 179.
[472] Dominick, P. H., & Brody, D. E. (1973). The Alaska Pipeline: Wilderness Society v. Morton and the Trans-Alaska Pipeline Authorization Act. *Am. UL Rev.*, **23**, 337.

b) For ships up to 3,000 GRT, the maximum limit reaches USD 1,200. For each ton or EUR 2 million. Dol. in total, depending on what amount is more significant.
c) For merchant ships other than tankers, USD 600 is not enough for each ton or the $500,000 total, depending on which amount is considered more significant.
d) For offshore installations, the amount of USD 75,000,000. Together with the potential cost of cleaning the area.
e) For onshore facilities under the jurisdiction of the port services, the maximum amount of fines reaches the amount of USD 350,000,000[473].

According to the current legislation, for the above limits of limitation of liability not to apply, it is not necessary to intentionally negligently or intentionally breach (willful negligence) on the part of the owner, but simply to prove that there has been gross negligence. In addition, it should be mentioned that federal law. However, it limits the liability of a facility's owner or manager. It does not precede state law, i.e., local authorities retain their right to impose a regime of unlimited liability on those responsible for causing oil pollution and determine a compensation framework while equipped with certificates of financial responsibility[474].

In particular, 32 states have drafted laws that provide for damages for oil discharges and establish the unlimited liability regime for repairing damage related to the cleaning of the area, and 13 states impose a regime of total liability for damages to third parties (third party damages). In comparison, 29 states impose the unlimited liability of the owner or manager in cases where damage to natural resources is suffered[475].

In other words, the regime of unlimited liability that a U.S. state can impose has received the most significant criticism, along with the mandatory application of DH/DB to tankers arriving in U.S. waters by all the provisions of OPA '90, and this is because

[473] Wagner, T. J. (1992). Recoverable Damages Under the Oil Pollution Act of 1990. *USF Mar. LJ*, **5**, 283.
[474] Gauci, G. (1995). Limitation of liability in maritime law: an anachronism?. *Marine Policy*, **19**(1), 65-74. DOI: https://doi.org/10.1016/0308-597X(95)92573-P.
[475] Kiern, L. I. (2011). Liability, Compensation, and Financial Responsibility Under the Oil Pollution Act of 1990: A Review of the Second Decade. *Tul. Mar LJ*, **36**, 1.

the degree of convenience that characterises the violation of the limits of liability set by federal law, it is almost identical to the regime of unlimited liability[476].

The OPA '90 legislation establishes the right of the US port authorities to impose any limits on fines on those responsible for causing marine pollution. Repairing the damage has helped to minimise accidents. It is one of the main reasons why the US did not ratify the amendments to the IMO's CLC (1969) and FUND (1971) Conventions establishing the Protocols (1984) that significantly increased the financial limits. However, they were involved throughout the negotiations[477].

Specifically, at the time of the adoption of the law, the House of Representatives supported the ratification of the protocols. However, the Senate took a clear position in favour of the new legislation because it considered, on the one hand, that the limits set by the protocols are not sufficient to meet the possible claims of the victims and, on the other hand, that the total capital offered as compensation (especially in the case of decontamination of the affected area) is not sufficient to cover the relatively high costs (e.g. coast guard costs from the use of appropriate cleaning equipment, costs of restoring and repairing the area and natural resources, etc.)[478].

On the other hand, the IMO has made a further amendment to the limits of the protocols to the Conventions (1992), offering more excellent financial assistance to those responsible for causing marine pollution[479].

2.5.3 The Role and Operation of the Oil Spill Liability Trust Fund

In the event of pollution, the entity that has suffered the damage initiates the procedures for claiming compensation against the person responsible or his guarantor. When a shipowner cannot cope with these requests; under the provision of the OPA '90, a 'special fund' (Oil Spill Liability Trust Fund) has been established, managed by

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[476] Wood, P. J. (1995). OPA 90. *Maritime Policy and Management*, **22**(3), 201-208. DOI: https://doi.org/10.1080/03088839500000053.

[477] Mason, M. (2003). Civil liability for oil pollution damage: examining the evolving scope for environmental compensation in the international regime. *Marine Policy*, **27**(1), 1-12. DOI: https://doi.org/10.1016/S0308-597X(02)00051-9.

[478] Brodecki, Z. (1986). Compensation in the Light of the 1984 Protocols to Revise the 1969 CLC and the 1971 Fund Conventions. In *Yearbook Maritime Law* (pp. 99-118). Springer, Dordrecht. DOI: 10.1007/978-94-017-3707-4_4.

[479] Hoel, M. (1992). International environment conventions: the case of uniform reductions of emissions. *Environmental and Resource Economics*, **2**(2), 141-159.DOI: https://doi.org/10.1007/BF00338240.

the USCG, for the immediate financial response to marine pollution from petroleum products in the event of a tanker accident[480].

a) A special fee of 5 cents/barrel of domestic or imported oil concerns the industry and oil importers but reaches the final consumer burdening the product's price.
b) From the absorption of the previous funds that existed before the establishment of the OPA '90 to deal with oil pollution incidents.
c) The various fines and costs/costs of cleaning the area are paid by those responsible for causing marine pollution.
d) From grants of various amounts given by the US Government in cases of extreme necessity and urgency.

The special fund shall finance the following procedures: (a) the cost of decontaminating the area in conjunction with the plans for immediate intervention, (b) the cost of any damage, (c) the payment of actions for non-payable costs, (d) payments of administrative, business and labour measures, including the costs of the Coast Guard. The latter then requires that the amounts allocated by the fund be paid by the shipowners responsible for causing marine pollution and by the Protection and Compensation Groups (P&I clubs) that cover them in insurance[481]. On the other hand, the Fund does not finance decontamination and compensation costs caused by the intentional negligence or misconduct of the person claiming, as well as by damages or decontamination costs in cases where the same accident was caused more than once. According to this, the polluter can only claim compensation costs from the Fund if he can prove that he is entitled to evade the responsibility of the appropriate compensation.

2.5.4 The Implementation of the OPA '90 and its Impact on a tanker's economic Life Circuit

The Act's implementation impacted the shipping market at the start, severely affecting the operational processes, especially for tankers. The DH/DB policy's instalment made the restructuring of many new-built tankers necessary, creating mounting costs and increasing even the price for a new build by at least 15-20%. Also, with the instalment of the "*complete liability regime*", the shipping companies altered

[480] Woods, J. M. (2008). Going on Twenty Years-The Oil Pollution Act of 1990 and Claims Against the Oil Spill Liability Trust Fund. *Tul. L. Rev.*, **83**, 1323.
[481] Amin, A. T. M. N. (2005). Economic and financial considerations in Urban Environmental Management. *UMP-Asia Occasional Paper*, **65**.

their ordinary operations, trying to install effective processes and methods that would prove their "*duty of care*" against any arising threat and, at the same time, made them anxious for any liability arising from their contracting parties[482].

In addition, a study by the US National Research Council certifies that no new ship construction, even double-bottom/shell tankers, will be able to subtract the approximately 2 cents added to the transport cost of oil – estimated at €2 billion. Dol. approximately annually– which will very soon reach the consumer. Since the cost of building a DH/DB tanker rose considerably, it is understood that the cost of importing oil into the USA also increased during that period[483].

Consecutively, the prices in the charter market were doubled in some cases, e.g., a tanker DH/DB with a capacity of 250,000 DWT had 60% higher charter prices than a conventional tanker used on trade routes[484]. Also, a tanker D/H 240,000 DWT cost nearly 150 million Euros for its construction; therefore, its charter price was around USD 95,000[485].

At the same time, it became more difficult to lend for the construction of DH/DB ships, and the same applied to the conversion of large tonnage ships (according to the Japanese classification society, the cost of converting a VLCC to DH/DB was at USD 30 million). In addition, the banks demanded that the insurance groups' mortgages be insured, and as a result, the cost of lending to ships increased. As an outcome, two categories of ships were formed, those that travelled to the USA and those that traded with the rest of the world[486].

Therefore, the increases in the cost of construction and charter also affected the cost of insurance by the P&I Clubs. To protect their interests, but also to deal with possible high demands, P&I Clubs have already imposed an additional charge of 32

[482] Wang, G., Arita, K., & Liu, D. (2000). Behavior of a double hull in a variety of stranding or collision scenarios. *Marine structures*, **13**(3), 147-187. DOI: https://doi.org/10.1016/S0951-8339(00)00036-8.
[483] Alexopoulos, A. B., Katarelos, E. D., Fournarakis, N. G., Sakkas, K., & Avtzigiannis, K. CODES FROM THE TECHNO-ECONOMIC & MANAGERIAL PERSPECTIVES.
[484] Morgan, J. D. (1994). The Oil Pollution Act of 1990: a look at its impact on the oil industry. *Fordham Envtl. LJ*, **6**, 1.
[485] Kim, I. (2004). Opa 90 and the decision to own or charter tank vessels. *J. Mar. L. & Com.*, **35**, 219.
[486] Alexopoulos, A. B., & Mavranezoulis, A. (2002). Oil Spills in the Eastern Mediterranean Region. The Case of Single-Hull Tankers. *Cyprus Journal of Science & Technology*, **2**, 1-11.

cents/per GRT per trip for all tankers transporting oil (persistent oils) to the USA and by 16 cents[487].

To provide complete information on the costs for obtaining the certificate of economic responsibility, prices are included in the table above by two companies providing certificates, First Line and Shore Line[488].

For a company to obtain a certificate for a tanker with a capacity of 280,000 dwt, it was charged with an amount ranging between 200,000 and 300,000 USD if it was covered by the First Line and 150,000-250,000 USD if it was the Shore Line[489]. The discounting was made for large-tonnage ships because each company must have a certificate to cover the largest compensation that will be claimed. If the company possessed more than one ship, it should have coverage for the largest of them[490].

The coverage provided to shipping companies for cases of oil pollution from the other two categories reached the amount of USD 700 million. This amount comprises the range offered by the P&I Clubs, which reached the amount of 500 million USD with coverage of the balance from the London insurance market[491].

In practice, the provision of guarantees by insurance groups didn't seem to work, as required by US law. In particular, P&I Clubs, despite the support of the ICS, were not prepared to issue certificates of financial liability above the applicable international limits set by the protocols (1984) of the CLC and FUND conventions, all the more so when the states of Florida and Texas enacted regulations that required certificates of the shipowner's financial status in addition to federal law[492].

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[487] Garick, J. A. (1993). Crisis in the oil industry: Certificates of Financial Responsibility and the Oil Pollution Act of 1990. *Marine Policy*, **17**(4), 272-293. DOI: https://doi.org/10.1016/0308-597X(93)90083-F.

[488] Kiern, L. I. (1994). The Oil Pollution Act of 1990 and the National Pollution Funds Center. *J. Mar. L. & Com.*, **25**, 487.

[489] Bovet, D. (1995). CERTIFICATES OF FINANCIAL RESPONSIBILITY: CAN THE TRAIN WRECK BE AVERTED?. In *International Oil Spill Conference* (Vol. 1995, No. 1, pp. 245-247). American Petroleum Institute.

[490] Garick, J. A. (1993). Crisis in the oil industry: Certificates of Financial Responsibility and the Oil Pollution Act of 1990. *Marine Policy*, **17**(4), 272-293. DOI: https://doi.org/10.1016/0308-597X(93)90083-F.

[491] Bovet, D. M. (1993). OPA 90 and the Shipowner. In *International Oil Spill Conference* (Vol. 1993, No. 1, pp. 733-738). American Petroleum Institute.

[492] McCurdy, G. L. (1992). An Overview of OPA 1990 and Its Relationship to Other Laws. *USF Mar. LJ*, **5**, 423.

A final point worth mentioning concerns the new OPA '90 bills, namely Clay Bill and Gibbons Bill. According to the first, the sailors of foreign ships entering American territorial waters and ports were bound by the relevant US labour laws for five years. Container ships were excluded, while ships transporting liquid and dry bulk cargoes and cruise ships were subject to the bill's provisions. Unfortunately, the passage of the nose caused several problems since it contradicted the relevant provisions of international maritime law, but also with national legislations that stipulated that only the flag state of the ship is responsible for granting privileges and the conditions of employment of crews for all vessels registered in its register[493].

The House of Representatives passed the second bill by a vote of 339 in favour and 78 against. Regarding this bill, the OECD[494] recently observed that the abolition of subsidies was considered the main reason why the bill gathered many positive votes – its apparent purpose was to protect the American shipbuilding industry from competition from the corresponding subsidised industries of Japan and Korea in the first place but also of Norway and Germany. This can also be a later understanding of the need to create the OPA '90 legislation[495].

According to Gibbons Bill, those ships that were built, converted or repaired with subsidies to foreign shipyards are prohibited from entering U.S. ports; otherwise, the shipowner is obliged to return the amount of the subsidy to the sponsor or pay a corresponding amount to the U.S. Treasury Department[496].

The fact is that both bills meet with several reactions not only internationally but even within the US. For example, a survey (1989-91) by the US ITC (Committee on International Trade) indicated that, since subsidies to shipyards abroad would be eliminated, they would have to reduce shipbuilding costs and national shipbuilding units to become competitive since the most attractive prices offered by American shipyards to shipowners were on average much higher than those of Far Eastern

[493] Racquet, B. E., & Romsdahl, R. J. (1992). Piercing the Corporate Veil Under the Oil Pollution Act of 1990. *USF Mar. LJ*, **5**, 369.
[494] Papavizas, C. G. (1995). The OECD Shipbuilding Agreement and its Effects on US Law. *J. Mar. L. & Com.*, **26**, 385.
[495] Alcock, T. M. (1992). Ecology tankers and the Oil Pollution Act of 1990: A history of efforts to require double hulls on oil tankers. *Ecology LQ*, **19**, 97.
[496] Eubank, S. R. (1994). Patchwork Justice: State Unlimited Liability Laws in the Wake of the Oil Pollution Act of 1990. *Md. J. Int'l L. & Trade*, **18**, 149.

shipyards. However, for some types of ships, US shipyards can afford it due to the increased specialization of the work involved[497].

Let's consider that a tanker accident that causes extensive pollution, among other things, is also related to the product being transported, which means that the ship should not be held solely responsible. Instead, the responsibility may be unfairly placed strictly on the carrier or the manager of the vessel[498].

An American shipping company raised the question of whether a tanker suddenly encounters a fishing vessel on the Mississippi River, should it change course with an obvious risk of delay, or is it the fishing vessel that should change its course? Would the degree of reaction of public opinion and the American authorities to protecting the marine environment be the same[499]?

2.6 International Safety Management Code (ISM Code)

2.6.1 Introduction to the ISM Code

Despite the polyphony in the international legal framework, accidents resulting in marine pollution and loss of life were still emerging, such as the Herald of Free Enterprise[500] and Estonia[501]have led to adopting a new institutional framework for sea transport by utilising a Code that enhances shipping companies' management related to safety processes and environmental awareness[502]. Moreover, following the recognition of the human factor as the main cause of maritime accidents, it is becoming necessary

[497] Rehbein, K., & Lenway, S. (1994). Determining an industry's political effectiveness with the US International Trade Commission. *Business & Society*, **33**(3), 270-292. DOI: https://doi.org/10.1177/000765039403300303.

[498] Keating, G. C. (2001). The theory of enterprise liability and common law strict liability. *Vand. L. Rev.*, **54**, 1285.

[499] Schröder-Hinrichs, J. U., Hollnagel, E., & Baldauf, M. (2012). From Titanic to Costa Concordia—a century of lessons not learned. *WMU journal of maritime affairs*, **11**(2), 151-167. DOI: https://doi.org/10.1007/s13437-012-0032-3.

[500] Goulielmos, A. M., & Goulielmos, M. A. (2005). The accident of m/v Herald of Free Enterprise: A failure of the ship or of the management?. *Disaster Prevention and Management: An International Journal*. DOI: https://doi.org/10.1108/09653560510618320.

[501] The European Union immediately after the adoption by the IMO of the above decisions and on the occasion of the shipwreck of the Ferry "ESTONIA" proceeded to the drafting of a directive where article 10 states that all ferries operating international voyages to or from European ports would have as a deadline of 1-7-1996, while the E / G / G performing domestic voyages would have as a deadline of 1-1-1998.

[502] Chen, L. (2000). Legal and practical consequences of not complying with ISM code. *Maritime Policy & Management*, **27**(3), 219-230. DOI: https://doi.org/10.1080/030888300411077.

to adopt a new system for the quality management of ships and management companies. Thus, on 17-11-1993, the adoption of Decision A 741 (18), "International Safety Management Code for the Safe Operation of Ships and the Protection of the Marine Environment" (ISM Code)[503], was adopted by the International Maritime Organisation[504].

The quintessence of the ISM code lies in the fact that it is a collection of international standards made of a set of operational rules through which the proper management and operation of both the managing company and the ships managed by it are implemented[505]. In essence, with the instalment of the ISM Code, the positive intervention of management in the institutional framework is perceived. As a result, the international conventions on the protection and safety of the sea are now becoming more valid in their effectiveness through a groundbreaking international standard[506].

The adoption of this Code was incorporated within the framework of the Conference of the International Convention for the Safety of Life at Sea – SOLAS took place on 21-6-1994 and formed part of the new Chapter of IX. Accordingly, the mandatory implementation of the code began for passenger ships, including high-speed passenger craft, from 1-7-1998, for oil tankers, chemical tankers, LPG and trucks carrying a bulk cargo of a gross tonnage of more than 500 gross tonnages from 1-7-19982, while for the rest of the cargo ships over 500 and so on, including floating oil extraction platforms from 1-7-2002[507].

The scope for its establishment is i) the prevention of maritime accidents and losses, ii) the safe operation of ships, iii) the protection of property and iv) the minimization of possibilities for environmental pollution. Strengthening compliance with existing international conventions such as SOLAS, MARPOL, and STCW is one of the critical objectives of the Code. The trademark of the ISM Code is characterised

[503] IMO, (2022). The International Safety Management (ISM) Code. Available at: The International Safety Management (ISM) Code (imo.org), last assessed: 30-8-2022.
[504] ibid
[505] Anderson, P. (2015). *ISM Code: A practical guide to the legal and insurance implications*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315720227.
[506] ibid
[507] Theotokas, I., & Alexopoulos, A. (1998). Safety and Quality in the Shipping Industry: A Legal Analysis of the ISM Code's Principles and Applications. *European Research Studies Journal*, **1**(3), 81-98.

by the mandatory written procedures implemented in maritime operational processes focusing on safety and compliance[508].

It should be noted that the ISM Code was not created to change the procedures followed by the ships, but much more it came into force for their written observance through an innovative Safe Management System (SMS)[509].

Specifically, the primary purposes for implementing the Safe Management System can be summarised below[510]:

a) Compliance with other relevant Codes, Directives and Standards is ensured through Classification Societies, International Organisations or competent State Authorities.
b) The compliance of ships is ensured based on international conventions, and the vessel under operation complies with the institutional framework of its flag State.
c) According to the implementation of the SMS[511], it is not implemented as a general reference of the company's procedures for the proper operation of its ships. Still, it is applied, and specific responsibilities are mentioned.

2.6.2 Allocation of responsibilities

The responsibilities promoted by the ISM Code are allocated to all stakeholders involved in the shipping procedures by sea, as this provides for the responsibilities of i) each executive of the company, ii) the designated person ashore for the overall operation of the ship (DPA), iii) the master and the crew onboard. More specifically, the responsibilities are classified into the following categories[512].

[508] Baştuğ, S., Asyali, E., & Battal, T. (2021). Beyond the ISM code: a conceptual proposal for an integrated system within the Seven C's approach. *Maritime Policy & Management*, **48**(3), 354-377. DOI: https://doi.org/10.1080/03088839.2020.1770884.
[509] Karakasnaki, M., Vlachopoulos, P., Pantouvakis, A., & Bouranta, N. (2018). ISM Code implementation: an investigation of safety issues in the shipping industry. *WMU Journal of Maritime Affairs*, **17**(3), 461-474. DOI: https://doi.org/10.1007/s13437-018-0153-4.
[510] Ibid.
[511] Thai, V. V., & Grewal, D. (2006). The Maritime Safety Management System (MSMS): A survey of the international shipping community. *Maritime Economics & Logistics*, **8**(3), 287-310. DOI: https://doi.org/10.1057/palgrave.mel.9100161.
[512] Sollien, K., Jensen, T. E., & Schøyen, H. (2014). Designated person ashore–how do they perceive their role in the organisation and to which extent are they legally exposed in case of an accident?. *Journal of Maritime Research*, **11**(3), 3-12.

2.6.2.1 Company responsibilities and duties

The company's responsibilities include allocating responsibilities per department, i.e., executives who negotiate issues related to protection and safety around the marine environment. Another essential task is maintaining transparency and information between the company and the vessels. The entire structure of the company, as well as the distribution of responsibilities, need to be appropriately recorded, executed and audited as per ISM provisions[513].

2.6.2.2 Responsibilities and duties of Designated Person Ashore (DPA)

The responsibilities of the Designated Person Ashore (DPA) include dealing with environmental protection and safety issues and being closely linked to the greater level of the company administration. In addition, each company must designate an authorized person to be directly connected to the company fleet. Also, the primary responsibilities of the authorized person include[514]:

a) Full supervision around the Safe Management Plan for its more effective operation.
b) The dispatch of the necessary equipment to the ships.
c) The full report to the company's upper management for any weaknesses in the Safe Management System and, in general, the identification of possible problems and their submission of a report.
d) Complete audits of the Safe Management System of the company and the ships and the negotiation for improvement.
e) Report any incident regarding non-compliance with the requirements of the Safe Management System.
f) Complete control for implementing the training programs within the ship and the company.
g) Responsibility for understanding the full range of the Safe Management Plan from the overall operational process and frequent meetings to audit and amend any deficiencies.

[513] IMO, (2022). The International Safety Management (ISM) Code. Available at: The International Safety Management (ISM) Code (imo.org), last assessed: 30-8-2022.
[514] Dalaklis, D. (2017). Safety and security in shipping operations. In *Shipping operations management* (pp. 197-213). Springer, Cham. DOI: 10.1007/978-3-319-62365-8_9.

2.6.2.3 Responsibilities and duties of a master

With the ISM Code, the duties of the master are also affected. Moreover, according to the Code, new principles are installed[515]:

a) The policy of each shipping company applies to any procedure regarding the ship.
b) A complete check is conducted within the ship regarding implementing the Safe Management Plan and its certification[516].
c) References to any accidents and incidents and written reports are made in case of revision of the Safe Management Plan with the contribution of the DPA.
d) The instructions from the company to the ship should ensure that the training programs are properly observed and that the staff operates pursuant to the installed safety processes[517].

2.6.3 ISM Code application procedures

The records and documents regarding the description and content of the Safe Management System are included both in the Company's Safe Management Manual and in the Safe Management Manual of each of its ships. Any case of modification of the content of the manuals will be implemented only with the signature of the Director of the competent department[518].

A necessary process is the certification of compliance with the requirements of the ISM Code, which is conducted through regular internal audits. The results of these audits become decisive for the company and the process of adaptation and revision of the Safe Management System[519].

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[515] Esad Demirci, S. M., & Cicek, K. (2022). Innovative Strategy Development Approach for Enhancing the Effective Implementation of the International Safety Management (ISM) Code. *Transportation Research Record*, **2677**(1), 25-48. DOI: https://doi.org/10.1177/03611981221098394.

[516] Rodriguez, A. J., & Hubbard, M. C. (1998). International Safety Management (ISM) Code: a new level of uniformity. *Tul. L. Rev.*, **73**, 1585.

[517] Dalaklis, D. (2017). Safety and security in shipping operations. In *Shipping operations management* (pp. 197-213). Springer, Cham. DOI: 10.1007/978-3-319-62365-8_9.

[518] Pun, K. F., Yam, R. C., & Lewis, W. G. (2003). Safety management system registration in the shipping industry. *International Journal of Quality & Reliability Management*. **20**(6), 704-721. DOI: https://doi.org/10.1108/02656710310482140.

[519] Batalden, B. M., & Sydnes, A. K. (2015). Auditing in the maritime industry: A case study of the offshore support vessel segment. *Safety Science Monitor*, **19**(1), 3.

After completing the above procedure and recognising that the company complies with the Safe Management Plan as well as the regulations of the ISM code, it will be provided with the Certificate of Conformity (Document of Compliance – DOC). The issue of the DOC is given by the competent authority of the country where the company has its registered office. Moreover, although the DOC covers specific categories of ships based on the Safe Management System of each shipping company, there is the possibility of extending to new categories. For example, this type of ship and after relevant checks. In addition, there is the possibility of issuing a temporary DOC certificate in case of a change of management company or flag within twelve months[520].

Annual inspections will be conducted throughout the DOC, and a new audit is needed to renew it. In cases where the statutory audits are not performed or the Code's requirements are not complied with, the validity of the DOC will be lost[521].

It is essential to mention that if the stage of the initial inspection has passed while at the same time, it is certified that the Safe Management Plan is applied within the ship for an elementary period, the issuance of the Safety Management Certificate (SMC)[522] occurs on board. It should be emphasized that for the issuance of the SMC, a necessary condition is the issuance of the DOC Certificate of Conformity regarding the specific ship category. At the same time, if the copy of it inside the ship is also intact. The duration of SMC as well as of DOC corresponds to five years[523].

As long as the SMC is in force, at least one inspection and a new audit follow its renewal. However, its validity ceases to exist in the event of non-performance of the mandatory direct inspection or non-observance of the code.

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[520] In the event of a flag change or a change of the managing company, provision is made for the issuance of a provisional DOC Compliance Certificate valid for a maximum period of twelve months. In addition, new ships constructed or delivered after the date of application of the Code or ships the operation or management of which the company undertakes after the date of application of the Code, may be provided with a temporary S.M.C. for a period of six months. In specific cases, an extension of this certificate may be granted up to a total of twelve months.

[521] Akyuz, E., & Celik, M. (2014). A hybrid decision-making approach to measure effectiveness of safety management system implementations on-board ships. *Safety Science*, **68**, 169-179. DOI: https://doi.org/10.1016/j.ssci.2014.04.003.

[522] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).

[523] Pun, K. F., Yam, R. C., & Lewis, W. G. (2003). Safety management system registration in the shipping industry. *International Journal of Quality & Reliability Management*. **20**(6), 704-721. DOI: https://doi.org/10.1108/02656710310482140.

It should be noted that ships that do not comply with the regulations of the ISM Code, having the required certificates, will be detained[524]. However, the ship will be refused entry to any port until it is equipped with the necessary certifications from the operator in charge of the vessel or the owner.

2.6.4 Installation of operational processes

The implementation of the ISM Code installed specific operational processes for the shipping companies, the utilization, effective execution and audit of which can prove that the company complies with the ISM instructions. These operational processes can be summarized in the above categories[525]:

2.6.4.1Crew Competency and Certifications

a) For members to join the workforce of each shipping company, it is necessary to make available evidence of their required qualifications. At the same time, the procedures of this certification are implemented through relevant checks by a candidate executive within the crew (Certificates of Competency).
b) Before informing their responsibilities, the workforce members must submit an update in writing about the content of the Safe Management Plan[526].
c) Continuous information on international Conventions such as SOLAS, MARPOL, etc., is necessary for the company's staff.

2.6.4.2 Ship operation plans

a) All shipping companies are obliged to have written instructions regarding the operation of ships, such as engine room operation procedures, maintenance plans, bridge operations instructions, preventive procedures in case of pollution, etc.

[524] After July 1, 1998, ships without certificates are prohibited from entering ports in the United States of America. Ships bearing certificates will be subject to the usual annual check. If it is found that they have valid certificates, but the SMC is not properly applied, the ships will be detained. The Coast Guard will then ask the Authority of their flag or the authorized classification society to ensure the settlement of the ship before departure. It is noted that in any case of an obligated ship without ISM certificates after July 1, 1998, very strict penalties will be imposed by the U.S. Coast Guard on any person connected in any way with the ship that is not certified.
[525] Dalaklis, D. (2017). Safety and security in shipping operations. In Shipping operations management (pp. 197-213). Springer, Cham. DOI: DOI: 10.1007/978-3-319-62365-8_9.
[526] Theotokas, I. (2018). *Management of shipping companies*. Routledge.

b) The content of those instructions shall be adopted by persons with full knowledge of the ship's operation[527].

2.6.4.3 Contingency plans

a) Based on the ISM Code, all shipping companies must establish, within the framework of the operational processes, plans for responding to emergencies. The content of these plans and the duties of the competent authorities shall be classified according to the category of the ship, its geographical location, its cargo, its general condition, and the weather conditions.
b) Emergency plans are mainly applied in cases of fire, collision, damage to machinery and other systems, leakage, pollution, and piracy.
c) The continuous training of the staff for emergency actions is necessary on land and sea. It is implemented by established constant training processes, while relevant inspection evaluations will conduct their certification.
d) Reporting non-compliance or accidents is necessary for the highest levels of pollution prevention and safety enhancement[528].

2.6.4.4 Maintenance

a) Based on the ISM Code, the maintenance of the ship and the equipment is implemented through a Planned Maintenance System – PMS, from which the necessary procedures for maintaining and updating the ship's condition are established[529].
b) Each company should establish procedures to inspect and maintain each ship and equipment. Inspections should be performed regularly by the ship's competent officers and the company's Technical Director.
c) In addition, each company must define the systems and equipment considered "critical" for each ship and operation. As such, we mention indicatively: the fire

[527] Batalden, B. M., & Sydnes, A. K. (2014). Maritime safety and the ISM code: a study of investigated casualties and incidents. *WMU Journal of Maritime Affairs*, **13**(1), 3-25. DOI: https://doi.org/10.1007/s13437-013-0051-8.
[528] Celik, M. (2008, October). Setting the Concept of Integrated Contingency Management Execution Plan (ICMEP) for Shipping Business. In Issues in Global Business and Management Research: *Proceedings of the 2008 International Online Conference on Business and Management* (IOCBM 2008) (p. 345). Universal-Publishers.
[529] Rødseth, H., & Mo, B. (2016). Integrated planning in autonomous shipping—application of maintenance management and KPIs. *In Proceedings of the 10th world congress on engineering asset management (WCEAM 2015)* (pp. 497-504). Springer, Cham.

pump, the steering system, the alarm systems, the fire extinguishing systems, the rescue equipment, etc.

2.6.5 Preparing for an emergency response

According to the ISM Code, each company will have to establish Emergency Response Plans[530], which will be used by both land and vessel personnel. These plans, as well as the obligations of each competent person, should be differentiated according to[531]:

a) the type of ship,

b) the prevailing weather conditions,

c) the location of the ship (at sea, in port, anchorage, etc.),

d) the geographical location of the ship (near or far from the coast),

e) the condition of the ship (e.g., loaded or unladen), as well as

f) the type of cargo.

Emergency response plans should concern at least: i) failure of the main engines and propulsion systems, ii) collision, iii) stranding, iv) fire, v) flooding/leakage, vi) pollution by harmful substances or oil, vii) abandonment of the ship, viii) piracy or terrorist attack, ix) damage to the ship's hull, x) cargo displacement, xi) severe injury or illness[532].

However, to deal with emergencies effectively, it is not enough just to plan all those actions that should be implemented when required, but also to train the personnel continuously who will be involved in dealing with the incident, whether they are on board (crew-passengers) or the company's staff.

This training is conducted through constant training, in which the parties involved are called upon to act as they would, under natural conditions of dealing with the incident, to familiarise themselves with the means provided for coping with various

[530] Celik, M. (2009). Designing of integrated quality and safety management system (IQSMS) for shipping operations. *Safety Science*, **47**(5), 569-577. DOI: https://doi.org/10.1016/j.ssci.2008.07.002.
[531] Alexopoulos, A. B., & Theotokas, I. N. (1998). Shipping Management in the post-ISM Code period. The case of dry bulk shipping companies. In *4th International Symposium in Quantitative Analysis, University of the Aegean* (pp. 7-9).
[532] Smith, H. D. (1995). The environmental management of shipping. *Marine Policy*, **19**(6), 503-508. DOI: https://doi.org/10.1016/0308-597X(95)00033-3.

emerging incidents, as well as to improve their ability and efficiency (on-board training). In addition, a logbook of inspections and drills on the ship should be kept. At the same time, their effectiveness will be evaluated with relevant reports to highlight the system's shortcomings with a view to its improvement[533].

The International Safety Management Code also requires establishing procedures for reporting and analysing non-compliances, accidents and dangerous situations to improve safety levels and prevent pollution[534].

2.6.6 Internal Audits

The corporate process of self-control is the only effective method, with long-standing accredited results[535], to control the quality of the shipping products and comply with international shipping standards. In addition, internal audits are also demonstrated by studies from which enlightening statistics have been extracted[536].

2.6.6.1 The scope of Internal Audits

The high impact of the maritime industry on the world economy forces the entities concerned to adhere to a demanding code of conduct and quality consisting of strict regulations. Over time, the key to their observance is the operation of an internal control system. They allow the identification of operational gaps. The increase in the general perception of the importance of internal audits and the change in mentality in this regard is evidenced by the fact that in the Koutoupis research[537], the percentage in favour of internal audits comes from Generation Y.

Unfortunately, their conduct to date is distinguished by short-term goal setting[538]. It lies in the simple control of the existence of the necessary certifications

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[533] Abaei, M. M., Arzaghi, E., Abbassi, R., & Garaniya, V. (2017). Human error risk assessment for shipping maintenance procedures in harsh environments. *In Proceedings of the 3rd Workshop and Symposium on Safety and Integrity Management of Operations in Harsh Environments (C-RISE3)* (pp. 1-6). Memorial University Newfoundland.

[534] Eldelman, P. S. (1999). The Maritime Industry and the ISM Code. Currents: *Int'l Trade LJ*, **8**, 43.

[535] Theotokas, I. (2018). *Management of shipping companies*. Routledge.

[536] Popa, L., & Dragomir, C. (2014, November). Performance Assessment of Ship Manning Service in Crewing Companies. In *5th International Conference LUMEN Transdisciplinarity and Communicative Action* (pp. 21-22).

[537] Koutoupis A., Kyriakogkonas P., Ploumpis I., Leontis D., (2020). «Risk based internal audit at Greek listed shipping companies of New York stock exchange». *Journal of Accounting and Taxation*, **12**(4), p.p. 135-144. DOI: https://doi.org/10.5897/JAT2020.0418.

[538] Jarah, B., Jarrah, M., & Al-Zaqeba, M. (2022). The role of internal audit in improving supply chain management in shipping companies. *Uncertain Supply Chain Management*, **10**(3), 1023-1028. DOI: *10.5267/j.uscm.2022.2.011*.

and the completion of the program of audits by third parties (external audits). Those companies that have based the effectiveness of their systems on the long term have even secured part of their profitability[539].

2.6.6.2 The scope of Internal Audits

Internal controls ensure a safe working environment, mainly on-board ships, as required by Article IV par.1 of the MLC 2006. Unfortunately, however, only 10% of seafarers believe that they had received adequate preventive training that had prepared them for the requirements of a health crisis scenario. And here is the long-standing value of internal controls, when seafarers recognised that they should be on the front line in something extraordinary[540].

The operational processes would have to adapt quickly to new methods and restrictions such as those caused by Covid-19[541]. Seafarers would have assimilated the coronavirus case management plan on board issued by the WHO if they had been pre-trained[542]. Furthermore, they stabilize and optimise the connectivity of the ship's personnel with that of the land force. Thirdly, the conduct of drills and the visits of company executives to this ship cultivates the belief among seafarers that the company cares about their progress and professional development. Thus, seamanship employees become loyal and dedicated to the company, acquiring valuable assets[543].

Cutting down the crew management department, to whose budget the organisation of internal audits belongs, is outdated. Especially, for young seafarers, with a different code of ethics and conduct, such as Generation Z, it is not enough to indicate remote commands to which the autocratic leadership style refers[544].

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[539] Sahatjian, L. C. (1998). The ISM Code: A brief overview. *J. Mar. L. & Com.*, **29**, 405.

[540] Boviatsis, M., & Daniil, G. (2022). Legal Analysis of Impact of Revised BIMCO Clauses on Crew Health and Safety During COVID-19 Era. *Transactions on Maritime Science*, **11**(1), 270-277. DOI: https://doi.org/10.7225/toms.v11.n01.020.

[541] Boviatsis, M. (2022). Implementation of Aggregated Response Plan to Effectively Protect Crew Health and Safety and Prevent Spread of Covid-19 Pandemic Aboard Ships. *Transactions on Maritime Science*, **11**(2). DOI: https://doi.org/10.7225/toms.v11.n02.020.

[542] Boviatsis, M., & Daniil, G. (2022). Legal Analysis of Impact of Revised BIMCO Clauses on Crew Health and Safety During COVID-19 Era . Transactions on Maritime Science, **11**(1), 270–277. DOI: https://doi.org/10.7225/toms.v11.n01.020.

[543] Yu, Y., Lorenc, M., & Shao, Y. (2022). Legal Challenges in Protecting the Rights of Cruise Ship Crew at the Post COVID-19 Pandemic Era. *Sustainability*, **14**(16), 9875. DOI: https://doi.org/10.3390/su14169875.

[544] Bako M., (2018). «DIFFERENT LEADERSHIP STYLE CHOICES, DIFFERENT GENERATIONS». *Prizren Social Science Journal*, **2**(2), p.p. 127-143.

The manager or SQE will pass on his experience to seafarers through the conduct of gymnasiums, not punitive but constructive. Identifying risks and the level of risk must be assessed before corrective action is taken. Developing a risk management model without a well-structured internal control process is inconceivable. Even risk assessment plans for autonomous ships have an internal auditing program[545]. It has also been observed that almost 50% of shipping companies believe that internal audits are the primary preventive tool of risk assessment[546].

Maritime safety is safeguarded through creating a safety culture, where the resumption of education establishes culture through high schools. Furthermore, the excellent knowledge, not only theoretical, of the handling of the ship's systems creates automated reactions, which save valuable time for preventing disasters in cases of danger[547].

For example, Chapter II-2 of SOLAS provides for the existence of an appropriate fire protection system. The learning of the details of how it operates is ensured through the conduct of internal audits through constant training to determine the level of readiness of the staff, the completeness/functionality of the materials and the need for any corrective actions through the dispatch of spares to replace pathogens[548].

More so when STCW introduced the term refresher training, namely refresher training, which is a crucial raison d'être of internal audits. An introductory offer of internal audits is to maintain a high level of qualification and competence of naval personnelAn untrained and unattended crew falls within the concept of the ship's unseaworthiness[549].

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[545] Boviatsis, M. & Georgios Vlachos (2021) The Implementation of Risk Management processes as a contributing factor to the minimization of shipping disasters through the study of previous shipping accidents - *Proceedings of the 17th International Conference on Environmental Science and Technology*. 1-4 September 2021. DOI: https://doi.org/10.30955/gnc2021.00541.

[546] Nagi, A., & Kersten, W. (2022). A Process Model for Cooperative Risk Management in Seaports. *Sustainability*, **14**(3), 1662. DOI: https://doi.org/10.3390/su14031662.

[547] Naji, G. M. A., Isha, A. S. N., Alazzani, A., Saleem, M. S., & Alzoraiki, M. (2022). Assessing the Mediating Role of Safety Communication Between Safety Culture and Employees Safety Performance. *Frontiers in Public Health*, **10.** DOI: 10.3389/fpubh.2022.840281.

[548] Pfaff, M. (2022). Occupational Safety and Ship Safety, Fire Protection. In *Ship Operation Technology* (pp. 347-403). Springer, Wiesbaden. DOI: 10.1007/978-3-658-32729-3_7.

[549] Le Gac, J. M., & Texier, S. (2022). Training in the detection of psychological distress on board ships through health simulation during the COVID-19 epidemic. *International Maritime Health*, **73**(2), 89-94.

2.6.6.3 The impact of non-compliance

Non- compliance with internal audits automatically renders the vessel unseaworthy unless specific measures are taken. Nevertheless, there is not usually a process of enforcement when a ship is found unseaworthy during an internal audit, as it is with Port State Control[550]. Therefore, it is up to the company's discretion whether to amend the issues that caused the unseaworthiness or continue to operate the ship, risking severe consequences, should they be caught during other inspections. In any case, an unseaworthy vessel cannot be chartered or insured[551].

Most insurance policies involve a warranty for the existence of thoroughly trained personnel. A safe method of ensuring the permanent observance of this condition is internal audits. Otherwise, and in the event of a maritime accident, if the insurer finds that no checks or training were performed on board, then the insurance policy is invalid[552].

However, during the examination of the "*Cendor Mopu"*[553] case, auditors investigated the causa proxima, namely the direct cause of the accident, and they found that in most cases, causa proxima lies in an error of a crew member, which would not have happened if internal audits had been made beforehand[554]. Therefore, affirmative of the predetermined rule are the judgments in the *Versloot*[555] case and the *Vergina No.2* case[556], where the marine casualties were caused by damage to the ship attributed to an error by a crew member(s).

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[550] Chuah, L. F., Mokhtar, K., Bakar, A. A., Othman, M. R., Osman, N. H., Bokhari, A., ... & Hasan, M. (2022). Marine environment and maritime safety assessment using Port State Control database. *Chemosphere*, **304**, 135245. DOI: https://doi.org/10.1016/j.chemosphere.2022.135245.

[551] Boviatsis, M., & Daniil, G. (2022). Legal Analysis of Impact of Revised BIMCO Clauses on Crew Health and Safety During COVID-19 Era. *Transactions on Maritime Science*, **11**(1), 270–277. DOI: https://doi.org/10.7225/toms.v11.n01.020.

[552] Mišković, D., Ivče, R., Hess, M., & Đurđević-Tomaš, I. (2022). The influence of organisational safety resource-related activities and other exploratory variables on seafarers' safety behaviours. *The Journal of Navigation*, **75**(2), 319-332. DOI: 10.1017/S0373463322000054.

[553] Asgarian, H. (2022). Inherent Vice as All-Risk Exclusion and its Clarification from Common Law point of view. *Trento Student Law Review*, **4**(1), 71–93. Retrieved from: https://teseo.unitn.it/tslr/article/view/2215.

[554] Sahu, M. K. (2014). The Rule of Causa Proxima as a Principle of Insurance. *Kathmandu Sch. L. Rev.*, **4**, 154.

[555] Jing, Z. (2022). Fabricating insurance subject matter and defrauding insurance money: a civil wrong or a criminal offence?. *Asia Pacific Law Review*, **30**(1), 145-166. DOI: https://doi.org/10.1080/10192557.2022.2045710.

[556] Loots, P., & Charrett, D. (2022). *Contracts for Infrastructure Projects: An International Guide to Application*. Taylor & Francis.

Internal audits significantly impact the treatment of mandatory external audits, of which port state controls are also part. These checks by third parties may result in certification, registration, recognition, award, license approval, reporting, fine or penalty of shipping companies. The positive or negative sign in the results of port state controls has a corresponding impact on the smooth operation and profitability of the company. An adequate system of internal controls can stabilize the company's ships without penalties, and without delays in the ports, thus increasing the corporate reputation and attracting top-class clientele[557].

The assessment of the validity of the operationality of internal controls has taken on increased importance due to the exponentially growing diversity of maritime legislation, making them the only sure way to ascertain the harmonization of the ship with the requirements of the law. Without internal controls, the company's ships will endure continuous non-conformities and detentions, with this having an indirect negative impact on the ship's flag registry. In addition, the flag will be harsh towards the company, which reduces the flag's reputation by putting it at risk of entering the grey or black list[558].

The flag can withdraw the company's documents and certifications. Also, internal audits ensure compliance with the ISPS Code, for observing the provisions of which Port State Controls are interested, because it also concerns the security of ports: This Code aims at special measures to strengthen maritime safety according to chapter XI of SOLAS, regulation XI-1 /3. In particular, regulation XI-1/5 of the ISPS Code obliges ships to have the Continuous Synopsis Record (CSR)[559] up-to-date to record the onboard history of the vessel. With any consequences, it can be established through internal controls and, if the result is negative, correct the situation through training. In addition, the increasing risks to shipping (piracy, terrorism, warfare) have made proper adherence to the Ship Security Alert System imperative[560].

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[557] Jarah, B., Jarrah, M., & Al-Zaqeba, M. (2022). The role of internal audit in improving supply chain management in shipping companies. *Uncertain Supply Chain Management*, **10**(3), 1023-1028. DOI: *10.5267/j.uscm.2022.2.011*.

[558] Bicen, S., & Celik, M. (2022). A bibliometric review on maritime inspection analysis: Current and future insights. *Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment*, DOI: https://doi.org/10.1177/1475090222111934.

[559] Beckman, R. (2008). Singapore Strives to Enhance Safety, Security, and Environmental Protection in Its Ports and in the Straits of Malacca and Singapore. *Ocean & Coastal LJ*, **14**, 167.

[560] Park, K. O. (2003). Ship Security Alert System. In *Proceedings of KOSOMES biannual meeting* (pp. 109-122). The Korean Society of Marine Environment and safety.

2.6.6.4 The outcomes of effectively implementing internal audits

Internal audit strengthens the ship security assessment, which directly impacts port security. The ship's security assessment should be documented and maintained by the ship's company, which is helped by the reporting part of the internal audits. A ship security assessment is a mandatory and essential process for developing a ship security plan. The CSO can achieve all these objectives by adequately conducting internal audits[561].

Within the framework of the ISPS Code and the SSP for the protection of ports and ships, the Company's Security Officer (CSO) handles the settlement of internal communications and the review of activities and the maritime safety officer (SSO). The SSO is also responsible for proposing an amendment to the ship security plan and providing adequate onboard training (exercises). The conduct of internal audits will improve the cooperation between CSO and SSO and the communication of these two executives with the Port Facility Security Officer (PFSO), who will also conduct the external audit on behalf of the port[562].

The ISM Code made this process the primary evaluation tool in the shipping industry. The culture established is that each company should periodically conduct management evaluations and internal audits on its staff, company, and vessel to ensure that the safety management system continues to act in accordance with the ISM Code. The company will also periodically verify whether all those who undertake the assignment of tasks related to ISM are acting following the company's principlesInternal controls are the safety valve for the smooth operation and effectiveness of the Safety Management System[563].

The transmutation of the importance of internal audits from the theoretical to the practical spectrum is reflected in the following data: i) A 12.2% decrease in anthropogenic maritime accidents has been observed after ISM, and ii) Finnish shipping companies are among the best maritime operators. In matters of safety and quality

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[561] Hesse, H., & Charalambous, N. L. (2004). New security measures for the international shipping community. *WMU Journal of Maritime Affairs*, **3**(2), 123-138. DOI: https://doi.org/10.1007/BF03195055.

[562] Heathcote, P. (2004). An Explanation of the New Measures for Maritime Security Aboard Ships and in Port Facilities. *Maritime Studies*, *2004*(137), 13-21. DOI: https://doi.org/10.1080/07266472.2004.10878749.

[563] Mukherjee, P. K. (2007). The ISM Code and the ISPS Code: A critical legal analysis of two SOLAS regimes. *WMU Journal of Maritime affairs*, **6**(2), 147-166. DOI: https://doi.org/10.1007/BF03195110.

compared to other European shipping companies. Paris MoU statistics showed Finnish ships had very few shortages and detentions. This is due to the companies' close cooperation with the Finnish Maritime Authority (FMA) for the conduct of ISM audits and to the cultivated culture of the shipping sector for the effective conduct of internal audits that results in reporting and follow-up[564].

The company should ensure that the master is fully trained on the security management system and the procedures and regulations of the company because only in this way will his training and familiarization with the company's mechanisms be strengthened. The accident rate will remain high if the master remains sidelined by such procedures[565].

2.6.6.5 The present trends

The vital importance of internal audits for a shipping company can also be seen in the following mentioned trends[566]:

a) Nowadays, all shipping companies have established professional audit committees in charge of monitoring the company's management systems (ISM Code), including the department in charge of the internal audit process,

b) Internal audits, organized through the company's SMS, are treated as a risk management tool and business risk mitigation. Through its content function as a regulator of internal audits, it becomes a comparable tactic to the other way of reducing risk, namely portfolio diversification and

c) a final added value of establishing the internal audits through the ISM is its impact on the issue of fraud. The ISM Code itself, through its system of internal audits, has a positive effect on the company's prevention and detection of fraud, and the promotion of ethical culture in organisations is also part of this added value.

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[564] Lappalainen, F. J., Kuronen, J., & Tapaninen, U. (2012). Evaluation of the ISM Code in the Finnish shipping companies. *Journal of Maritime Research*, **9**(1), 23-32.

[565] Yang, H. S., & Noh, C. K. (2010). A study on the Change of Domestic Marine Accidents and Insurance Rates according to Enforcement of ISM Code. *Journal of the Korean Society of Marine Environment & Safety*, **16**(1), 65-69.

[566] Yorulmaz, M., & Karabulut, K. (2022). Analyzing the factors determining the effectiveness of the international safety management code applied on ships through the fuzzy DEMATEL method. *Safety science*, **155**. DOI: https://doi.org/10.1016/j.ssci.2022.105872.

Conclusively, the importance of internal controls for the smooth operation and profitability of shipping companies will be reflected to a greater extent by implementing the innovations of the Fourth Industrial Revolution. Therefore, companies with a functional and practical internal control system integrated into the management systems of their ISM Code have a commercial advantage over those that have not been given the required weight, despite the technological and legislative changes introduced[567].

2.6.7 The overall benefits of the ISM Code

The Code has been heavily criticised mainly because it increases operating costs inversely depending on the size of shipping companies, with the result that small businesses are primarily affected. Moreover, even though its effectiveness has not yet been firmly ascertained, several insurance companies have already announced that non-compliance with the Code is a reason for the loss of the shipowner's coverage[568].

Nevertheless, after many years of implementation, the shipping community seems to have recognised the Code's impact on the enhancement of safety, creating more complex, transparent, and demanding versions of the Code, such as Tanker Management and Self-Assessment (TMSA), some of which will be assessed above[569].

In general, the positive impact of ISM on the shipping sector can be summarized in the points below[570]:

- Improved levels of maritime transport safety and protection of the marine environment.
- Improved compliance with international regulations and conventions (mainly with SOLAS, MARPOL, and STCW).
- Taking more robust measures to avoid accidents of the crew and the general staff of the company and to limit losses through damage to the ships, their cargo and equipment.

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[567] Esad Demirci, S. M., & Cicek, K. (2022). Innovative Strategy Development Approach for Enhancing the Effective Implementation of the International Safety Management (ISM) Code. *Transportation Research Record*. **2677**(1), 25-48. DOI: https://doi.org/10.1177/03611981221098394.

[568] Choi, J., Lim, S., Park, S., Roh, H., Jin, H., & Lee, C. (2022). The Serious Accidents Punishment Act of South Korea and its impact on the shipping industry: toward sustainability. *Sustainability*, *14*(14), 8936. DOI: https://doi.org/10.3390/su14148936.

[569] Boviatsis, M., & Vlachos, G. (2022). Correlation of the Concepts of Proactiveness and Due Diligence to Achieve Sustainability in the Maritime Sector. *Journal of Shipping and Ocean Engineering*, **12**, 33-42. DOI: 10.17265/2159-5879/2022.02.001.

[570] Theotokas, I. (2018). *Management of shipping companies*. Routledge.

- The efficiency and effectiveness of the company's frameworks are increased[571].
- The company's competitiveness is maximised through high levels of transport safety and, consequently, the satisfaction of customer requirements.
- The higher performance of total quality management prevents any incorrect actions within the ships and the company[572].

2.7 International Ship and Port Facility Security (ISPS) Code

2.7.1 The concept of security in ports

The concept of *"security"* has a twofold meaning. Initially, it refers to the safe conduct of work (safety) in the port's area, which includes a specific operational and natural environment and measures to be taken against illegal acts or omissions that may cause damage to human life, property and the environment[573].

2.7.1.1 The safety of the operational environment

Port operations require an appropriate institutional framework that protects the safety and health of those with it. In this direction, i.e., for the protection of the port employees, the International Labour Organisation (ILO), through International Treaties and other texts, established specific Codes of Conduct[574].

Based on Treaty no. 152 and Recommendation no. 160, the ILO established a Code covering all aspects of ports' operations relevant to cargo and passenger handling[575].

Safety in ports is achieved through measures[576] in operation (e.g. fire protection and firefighting) and health (prevention of occupational threats such as noise and

[571] Tzannatos, E., & Kokotos, D. (2009). Analysis of accidents in Greek shipping during the pre-and post-ISM period. *Marine Policy*, **33**(4), 679-684. DOI: https://doi.org/10.1016/j.marpol.2009.01.006.
[572] Pantouvakis, A., & Karakasnaki, M. (2018). The human talent and its role in ISM Code effectiveness and competitiveness in the shipping industry. *Maritime Policy & Management*, **45**(5), 649-664. DOI: https://doi.org/10.1080/03088839.2018.1454989.
[573] Mensah, T. A. (2004). The place of the ISPS Code in the legal international regime. *WMU Journal of Maritime Affairs*, **3**(1), 17-30. DOI: https://doi.org/10.1007/BF03195047.
[574] Hesse, H. (2003). Maritime security in a multilateral context: IMO activities to enhance maritime security. *The International Journal of Marine and Coastal Law*, **18**(3), 327-340. DOI: https://doi.org/10.1163/092735203770223567.
[575] ILO, (1979). R160 - Occupational Safety and Health (Dock Work) Recommendation, 1979 (No. 160). Available at: Recommendation R160 - Occupational Safety and Health (Dock Work) Recommendation, 1979 (No. 160) (ilo.org), last assessed: 29-8-2022.
[576] Directives 89/391/EEC and 91/383/EEC

dangerous substances). Accidents usually cause such incidents: as falling into the sea, fires and leakage of liquid cargo, and natural disasters caused by stormy winds, tsunamis, hurricanes, floods, ice, snow, earthquakes, volcanic eruptions, etc[577].

Effective management of the safety and health of port operators and personnel affected by port operations requires a risk assessment to be performed. Therefore, a safety management system should be designed with risk in mind to identify the actions to address it more effectively[578].

Additionally, the complexity of port work requires continuous and systematic training so that the employee utilises the necessary protection measures and observes the basic rules in performing specific works and handling the specialized port equipment. Therefore, lifelong education and training are the best ways for port operators to cope effectively with the ever-increasing demands[579].

2.7.1.2 The safety of natural phenomena

Natural phenomena are a significant threat to port security. According to the ILO, these include[580]:

a) stormy winds and powerful storms,
b) earthquakes,
c) floods from tides, from river waters, from soil waters or a combination of both;
d) snow and ice pose a risk due to the slipperiness they cause on surfaces,
e) volcanic eruptions,
f) extreme temperatures[581].

Some ports pose high risks due to the storage of hazardous substances or the proximity to such dangerous facilities. The ILO Code for preventing Major Industrial Accidents shall apply in such cases. In each port, an emergency plan focusing on four factors is required, these are: i) the risk and nature of an event and its possible extent,

[577] Akten, N. (2006). Shipping accidents: a serious threat for marineenvironment. *Journal of Black Sea/Mediterranean Environment*, **12**(3), 269-304.
[578] Bichou, K. (2014). *Port operations, planning and logistics*. CRC Press.
[579] dos Santos, M. C., & Pereira, F. H. (2022). ESG performance scoring method to support responsible investments in port operations. *Case Studies on Transport Policy*, **10**(1), 664-673. DOI: https://doi.org/10.1016/j.cstp.2022.01.027.
[580] Citaristi, I. (2022). International Labour Organisation—ILO. In *The Europa Directory of International Organisations 2022* (pp. 343-349). Routledge.
[581] Exposure to extremely high or low temperatures may have an adverse effect on the health of workers.

ii) the risk and likelihood of its occurrence, iii) the consequences and possible impact on people and the environment and iv) the means and actions are taken to minimise the consequences of the event[582].

For this plan to be operational, it is necessary to adapt it subject to the port's characteristics, thus considering: i) its geographical location, ii) the number of workers employed, iii) its possible proximity to schools, residences and hospitals. In addition, provisions should also be made for control procedures, including draft plans for each specific type of emergency that could occur in the port and the actions to be taken to deal with the event's seriousness[583].

The purpose of this plan is to form a system of an effective response to catastrophic phenomena for the protection of life, health and property of citizens, as well as the protection of the natural environment. This plan identifies the bodies involved while planning directions are given to ministries, regional authorities, prefectural administrations, municipalities and communities. Based on this general plan, essential data are provided for the assessment of risks, the identification of vulnerable areas, the elaboration of specific objectives for each risk and guidelines for the formulation of strategies and tactics for the effective treatment of risks. Within the framework of its responsibilities and based on this plan, measures shall be taken to deal with natural, technological and other disasters affecting ports[584].

2.7.2 The creation of the ISPS CODE

After the tragic events of 11 September 2001, it was unanimously decided by the IMO General Assembly in November 2001 that new measures and safety systems should be adopted regarding the security of vessels and port facilities. Accordingly, the preparation of the Diplomatic Conference was entrusted to the IMO Security

[582] Bakker, C., & Montanaro, F. (2022). Response and Recovery in the Event of CBRN Industrial Accidents. In *International Law and Chemical, Biological, Radio-Nuclear (CBRN) Events* (pp. 219-231). Brill Nijhoff.

[583] Venier, S. (2022). Rising from the Ashes, Once Again?: The Beirut Port Explosion and International Disaster Law. *Yearbook of International Disaster Law Online*, **3**(1), 325-351. DOI: https://doi.org/10.1163/26662531_00301_013.

[584] Verschuur, J., Pant, R., Koks, E., & Hall, J. (2022). A systemic risk framework to improve the resilience of port and supply-chain networks to natural hazards. *Maritime Economics & Logistics*, 1-18. DOI: https://doi.org/10.1057/s41278-021-00204-8.

Committee (MSC) on the basis that the views expressed by the Member States should not only be advisory[585].

At its initial meeting in November 2001, to accelerate developments and adopt appropriate security measures, the IMO MSC established a particular intra-conference working group on maritime security issues. In March 2002, an ad hoc Working Group was established to develop the proposals further. The seventy-fifth session of the Agency's Safety Committee took into account the report of the Working Group and suggested that additional work should be taken out through another session of the Inter-Conference Working Group, which took place in September 2002[586].

This was followed by a series of meetings of the Organisation's Security Committee, which culminated in the Diplomatic Conference (9-13 December 2002) and was assigned to the Maritime Security Committee based on proposals submitted by member states, intergovernmental organisations and non-governmental organisations. As a result, the Diplomatic Conference adopted on 12 December 2002 amendments to the 1974 SOLAS International Convention[587], accelerating the creation of decisions to comply with the requirements for its implementation. Automatic Identification System (AIS) and new regulations in chapter XI-1 of SOLAS 74, covering the marking of the Ship's Distinctive Number and the maintenance of a Continuous Summary Record[588].

The Diplomatic Conference also adopted several decisions, including technical support and cooperation with the ILO (International Labor Organisation) and the World Customs Organisation. Furthermore, it also adopted an International Ship and Port Facility Security (ISPS Code) by an official decision. The code was incorporated into

[585] IMO, (2022). SOLAS XI-2 and the ISPS Code. Available at: SOLAS XI-2 and the ISPS Code (imo.org), last assessed: 29-8-2022.
[586] Pegum, T. (2004). The ISPS Code: The Mutual Dependency of Shipping and Cargo Interests. *Australian and New Zealand Maritime Law Journal*.
[587] IMO, (2002). Resolution 1 - *Adoption of Amendments to the Annex to the International Convention for the Safety of Life at Sea, 1974 – (Adopted on 12 December 2002)*. Available at: Resolution 1 - Adoption of Amendments to the Annex to the International Convention for the Safety of Life at Sea, 1974 – (Adopted on 12 December 2002) (imorules.com), last assessed: 28-8-2022.
[588] Linder, A. (2018). Explaining shipping company participation in voluntary vessel emission reduction programs. *Transportation Research Part D: Transport and Environment*, **61**, 234-245. DOI: https://doi.org/10.1016/j.trd.2017.07.004.

the body of SOLAS 74, specifically as an accompanying one, in chapter XI-2 "Special measures to enhance maritime security, " which entered into force on July 1, 2004[589].

Chapter XI-2 of SOLAS 74 and ISPS shall apply to ships and port facilities. In this case, the point of concern is the ship and the company that manages it. Therefore, continuous and practical cooperation is considered a vital element for the success of the Code and the compliance of Contracting Governments, ships, companies, and all those involved in or using vessels and port facilities, including the ship's crew, port personnel, passengers, cargo stakeholders, vessel and port administration and national and local authorities competent for security issues[590].

According to the new code, existing techniques and procedures must be reviewed and changed if they do not provide adequate security. Finally, as stated in the preamble to the Code, everything that is defined by it and by the provisions of chapter XI-2 of SOLAS will be in accordance with the "*Convention on the Facilitation of Maritime Traffic, 1965*", as amended and provides that foreign crew members have the right to disembark ashore while the ship is in port, providing that the formalities on the arrival of the vessels have been completed[591]. The authorities have no reason to refuse permission to disembark on public health, safety and order, recognizing that he is working on board the ship and needs access to the land for various facilities and medical care.

2.7.3 Objectives of the ISPS CODE

The principal purpose of the ISPS Code is to establish and implement measures to improve the safety of the vessels invested in international trade and related port facilities against emerging threats. Specifically, the objectives of ISPS can be summarised above[592]:

[589] IMO, (2022). SOLAS XI-2 and the ISPS Code. Available at: SOLAS XI-2 and the ISPS Code (imo.org), last assessed: 27-8-2022.
[590] IMO, (2002). Resolution 1 - *Adoption of Amendments to the Annex to the International Convention for the Safety of Life at Sea, 1974 – (Adopted on 12 December 2002)*. Available at: Resolution 1 - Adoption of Amendments to the Annex to the International Convention for the Safety of Life at Sea, 1974 – (Adopted on 12 December 2002) (imorules.com), last assessed: 28-8-2022
[591] Alexandrowicz, C. H. (1966). Convention on Facilitation of International Maritime Traffic and International Technical Regulation. *Int'l & Comp. LQ*, **15**, 621.
[592] Mensah, T. A. (2004). The place of the ISPS Code in the legal international regime. *WMU Journal of Maritime Affairs*, **3**(1), 17-30. DOI: https://doi.org/10.1007/BF03195047.

a) The establishment of an international framework for cooperation between Contracting Governments, agencies and administrations in detecting security threats and installing safety processes to counter any emerging threats against ports invested in international trade effectively.
b) identification of the role and responsibilities of the competent stakeholders to ensure the smooth running of maritime transport;
c) installation of methods for the rapid and efficient transfer and exchange of information on security matters;
d) creation of a process for performing safety assessments to implement adaptation plans and procedures for different security levels and
e) confirmation that the implementation of adequate maritime security measures will be established;

The Code consists of two parts. The first part, which is the mandatory part and is also the subject of the control of the ship, to certify its implementation, and the optional second part, contains instructions for applying the Code. Regarding the second part, it may become mandatory in terms of its implementation by some countries (EU, USA), even though the IMO is trying to make it optional[593].

The standard set by the IMO through the ISPS requires the ship and the company to meet the following basic requirements[594]:

a) The vessel to carry a Security Plan
b) Set the Ship Security Officer
c) The company must also have appointed a Company Security Officer
d) To carry specific equipment on board (e.g.AIS, Ship Security Alert System).

The IMO aims to reduce the exposure of ships and ports to risk and to ensure, as far as possible, a safe commercial activity[595].

[593] Ng, A. K., & Vaggelas, G. K. (2012). Port security: the ISPS Code. *The Blackwell companion to maritime economics*, 674-700. DOI: 10.1002/9781444345667.
[594] Mukherjee, P. K. (2007). The ISM Code and the ISPS Code: A critical legal analysis of two SOLAS regimes. *WMU Journal of Maritime affairs*, **6**(2), 147-166. DOI: https://doi.org/10.1007/BF03195110.
[595] Katarelos, E. D., & Alexopoulos, A. B. (2007). The master's role in relation to the safety of the port, particularly under the concept of the ISM and the ISPS codes. In *International Symposium on Maritime Safety, Security and Environmental Protection, Athens (Greece), 20th September*.

2.7.4 Scope of the ISPS CODE

The scope of the Code extends to the following[596]:

a) Passenger ships, including high-speed passenger craft
b) Cargo ships, including "high speed" ships of 500 gross tonnages and above
c) Offshore drilling rigs
d) Port facilities serve such ships involved in international voyages.

This code does not apply to:

a) warships;
b) auxiliary shipyards,
c) other vessels owned or operated by a State and used by the Government for non-commercial purposes.

2.7.5 The company's obligations

Each company should adopt and confirm that the ship security plan (SSP) adequately and unambiguously defines the authority of the master as well as the fact that only the master is in control of processes regarding the safety of the ship and seek the support of the company or some coastal state, if necessary[597].

Each company is responsible for supplying its ships with an International Ship Security Certificate (ISSC), ensuring they are always available for use on board. To obtain the required certificate, a vessel must[598]:

a) appoint a Security Officer to the Company initially;
b) perform a security assessment on the vessel, including an on-site inspection;
c) establish a ship security plan, following the requirements of SOLAS 74 and the new ISPS Code, which is approved by the flag of the ship, is always available to the vessel and finally, the measures described apply to it;
d) appoint a Ship Security Officer;

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[596] Goulielmos, A. M., & Anastasakos, A. A. (2005). Worldwide security measures for shipping, seafarers and ports: An impact assessment of ISPS code. *Disaster Prevention and Management: An International Journal*. DOI: https://doi.org/10.1108/09653560510618311.

[597] Othman, E., & Halawa, A. (2005, October). Towards effective implementation of the ISPS Code onboard ships. In *International Association of Maritime Universities (IAMU) 6th Annual General Assembly and ConferenceWorld Maritime University*.

[598] Hesse, H., & Charalambous, N. L. (2004). New security measures for the international shipping community. *WMU Journal of Maritime Affairs*, **3**(2), 123-138. DOI: https://doi.org/10.1007/BF03195055.

e) ensure that the prescribed drills and safety drills are performed.

The enterprise must ensure the constant flow of information to the master to achieve compliance with the requirements of the company, such as[599]:

a) the person(s) responsible for the selection of personnel, such as Company Management, Manning Agents, etc.,
b) the parties responsible for decisions relating to the operation of the ship, including time-charterers or bareboat charterers or anyone else involved in similar matters;
c) where the vessel operates under the conditions of a charter agreement, it must inform the master of the details of the charterers. This information must be updated in accordance with the changes made and in English, French or Spanish.

2.7.6 The company's safety officer (CSO)

The company should appoint a Security Officer to act as a security officer for several vessels, which depends on the size and type of ships operated by the company, provided, however, that it is expressly defined who is responsible for each ship. The company may designate more than one person as a Security Officer depending on the number and type of vessels it manages, but under the same condition applied above[600].

The duties and obligations of the Company's Security Officer, but not limited to them, are as follows[601]:

a) Reporting the types of threats that may be addressed by the vessel, utilising adequate security measures and controls.
b) Ensuring that vessels' security measures have been taken.
c) Ensuring the creation, instalment and implementation of a ship security plan.

[599] Zec, D., Frančić, V., & Rudan, I. (2008). An Analysis of the Security Issues in Croatian Ports in Relation to the Port State Control Inspections. *Promet-Traffic&Transportation*, **20**(1), 31-36. Available at: http://traffic.fpz.hr/index.php/PROMTT/article/view/983.

[600] Qiao, W., Liu, Y., Ma, X., & Lan, H. (2021). Cognitive gap and correlation of safety-I and safety-II: A case of maritime shipping safety management. *Sustainability*, **13**(10), 5509. DOI: https://doi.org/10.3390/su13105509.

[601] Hetherington, C., Flin, R., & Mearns, K. (2006). Safety in shipping: The human element. *Journal of safety research*, **37**(4), 401-411. DOI: https://doi.org/10.1016/j.jsr.2006.04.007.

d) Incorporating amendments as appropriate to the ship security plan to correct deficiencies and achieve the security requirements of a specific vessel.
e) Arrangements for internal audits, and continuous testing of the installed security processes.
f) Regularisation of continuous inspections of the vessel by the Steering Authority or by an approved Safety Agency.
g) Ensuring that any deficiency or non-conformity identified during an internal audit, a periodic review, a safety inspection and verification of compliance is promptly examined and processed.
h) Improving safety awareness of the personnel.
i) Enhancing proper training for the competent stakeholders for vessel safety.
j) Establishing efficient communication and cooperation between the Ship Security Officer and the qualified Port Facility Security Officers.
k) Increasing compatibility between regulatory requirements and applied processes.
l) Ensuring that, upon utilising ship security plans, those plans reflect in detail the required information of a vessel.
m) confirming that an alteration upon the existing arrangements will be approved for a particular ship or several ships

2.7.7 Vessel Security

The vessel must act based on the actions determined by the Contracting Governments according to security levels[602].

At safety level 1, considering the instructions in the second part of the ISPS Code and verifying and exercising proactive measures against an emerging threat, the following steps must be followed, which include[603]:

a) Ensure that all safety-related tasks are performed
b) Control of access to the vessel
c) Control of the areas of the ship and the areas surrounding it

[602] Goulielmos, A. M., & Anastasakos, A. A. (2005). Worldwide security measures for shipping, seafarers and ports: An impact assessment of ISPS code. *Disaster Prevention and Management: An International Journal*. DOI: https://doi.org/10.1108/09653560510618311.
[603] Ng, A. K., & Vaggelas, G. K. (2012). Port security: the ISPS Code. *The Blackwell companion to maritime economics*, 674-700. DOI: 10.1002/9781444345667.

d) Control of boarding of persons and their personal belongings
e) Checking the so-called restricted areas of the ship and ensuring that only authorized personnel can access them.
f) Supervision of cargo management and delivery of supplies to the ship and
g) Ensure that the vessel's communication, information and safety equipment are easily accessed.

At security level 2, more preventive measures, determined by the SSP of the vessel, will be taken as appropriate, as detailed in the above and by the instructions given in Part B of the ISPS Code[604].

At security level 3, specific protection measures must be taken, as defined in the SSP and always depending on the situation. The moment the flag state sets security level 2 or 3, the vessel should confirm receipt of the governmental instructions for a change in the security level[605].

Before the entrance or while inside port facilities under the control of a Contracting Government which has set security level 2 or 3, the ship must confirm receipt of the instructions of the Contracting Government as well as to the Port Security Officer, the fact that it is taking all necessary measures and procedures described in its security plan[606].

During the initiation of security level 3, the vessel shall comply with the instructions set by the Contracting Government, which has installed security level 3. Furthermore, the ship must report any incident arising from the above instructions. Under those circumstances, the port security officer and the ship security officer must come in contact and cooperate to take adequate measures[607].

When the flag of a ship requires an increase to the security level or the security level is already at the highest level than the level imposed for the port in which the vessel intends to enter or has just entered, the ship must inform the competent services of the Contracting State in whose authority the port facility is situated without delay, as

[604] Ibid.
[605] Bichou, K. (2015). The ISPS code and the cost of port compliance: an initial logistics and supply chain framework for port security assessment and management. In *Port Management* (pp. 109-137). Palgrave Macmillan, London. DOI: 10.1057/9781137475770_6.
[606] Jeong, J. (2013). Progress and challenges: ten years after the ISPS code.
[607] Mensah, T. A. (2004). The place of the ISPS Code in the legal international regime. *WMU Journal of Maritime Affairs*, **3**(1), 17-30. DOI: https://doi.org/10.1007/BF03195047.

well as the port security officer. In those cases, the ship security officer should contact the port security officer and cooperate to take the most appropriate measures based on the incident[608].

2.7.8 Implementation of a ship security plan

Subject to the ISPS Code, evaluating the ship's security is integral to creating the Ship Security Plan (SSP). A Recognised Security Organisation may implement this assessment[609].

For its part, the CSO must verify the port's security status by trained and experienced personnel capable of assessing the ship's safety[610]. The CSO is also responsible for conducting the Ship Security Assessment (SSA) for every vessel in the company's fleet to comply with Chapter XI-2 and Part A of the ISPS[611].

While the CSO does not necessarily have to take on all the tasks personally to check the port's security status, the ultimate responsibility for being properly conducted remains with him[612].

Before the start of the SSA, the CSO must ensure that it benefits from all the information available for the efficient assessment of the ports that the ship will approach or in which passengers are boarding or disembarking. Undoubtedly, the most vital aspect of a Ship Security Assessment (SSA) is the transparency of information utilised to execute the assessment[613].

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[608] Mazaheri, A., & Ekwall, D. (2009). Impacts of the ISPS code on port activities: a case study on Swedish ports. *World Review of Intermodal Transportation Research*, **2**(4), 326-342.

[609] Lazarus, I. O., & Wilfred, I. U. (2011). The effectiveness of the International Ship and Port Facility Security Code (ISPS) in Nigeria. *African Journal of Business Management*, **5**(4), 1426-1430. DOI: 10.5897/AJBM10.1474.

[610] Kismantoro, T., & Sari, D. K. (2020). *Ship Security Officer (SSO)*. PIP Semarang.

[611] Othman, E., & Halawa, A. (2005, October). Towards effective implementation of the ISPS Code onboard ships. In *International Association of Maritime Universities (IAMU) 6th Annual General Assembly and Conference, World Maritime University*.

[612] Prill, K., & Szymczak, M. (2016). Methodology for identification of potential threats and ship operations as a part of ship security assessment. *Zeszyty Naukowe Akademii Morskiej w Szczecinie*. DOI: 10.17402/192.

[613] Liwång, H., Ringsberg, J. W., & Norsell, M. (2013). Quantitative risk analysis–Ship security analysis for effective risk control options. *Safety science*, **58**, 98-112. DOI: https://doi.org/10.1016/j.ssci.2013.04.003.

2.8 The current developments of Safety & Compliance Codes and evaluation of all systems.

2.8.1 Tanker Management and Self-Assessment (TMSA)

2.8.1.1 The TMSA concept and background

The Tanker Management and Self-Assessment (TMSA) program can well be characterized as a method of self-evaluation of each company, as through specific indicators and performance meters (KPIs), the possibility of self-criticism of implementing the Secure Management System (SMS) within shipping companies is given[614]. Furthermore, the content of TMSA includes critical levels of the company's expectations, which gradually lead existing businesses to the highest practices. The aim of this "self-criticism" is the constant evolution of shipping companies' security systems and the improvement in internal systems[615].

Specifically, the purposes of the program can be summarised below:

a) Evaluation in the management of operations within a plan.
b) Clarification of the policy of shipping companies.
c) Establishment of organisational procedures and systems.
d) Commentary on the process at the end of the self-criticism.
e) Clarification of the objectives within the company for its profitability.
f) To minimise any risk arising from an accident or damage that may harm crew, ship, cargo, the environment and equipment.

Oil companies benefit significantly from the TMSA's programme regarding internal control procedures and shipowners[616]. The adoption of TMSA took place in 2004 during an Oil Companies International Maritime Forum (OCIMF)[617], aiming to evaluate and improve safety management systems by incorporating the feedback of the tanker industry. Three versions of this programme have been developed so far. The

[614] OCIMF, (2022). Management Self-Assessment. Available at: Management Self Assessment (ocimf.org), last assessed: 28-9-2022.
[615] Lyridis, D. V., & Papaleonidas, C. (2019). Organisation and management of tanker shipping companies. In *The Routledge Handbook of Maritime Management* (pp. 58-79). Routledge.
[616] Turker, F., & Er, I. D. (2008). Enhancing quality and safety management in shipping: tanker management and self assessment. *Lex ET Scientia Int'l J.*, **15**, 128.
[617] OCIMF, (2022). Management Self-Assessment. Available at: Management Self Assessment (ocimf.org), last assessed: 28-9-2022.

implementation of the first version was aimed at tankers of 500 GT and above based on the requirements of the international conventions of ISM and SOLAS[618].

2.8.1.2 The versions of TMSA

According to the first editions of the program, the outcomes were unsatisfactory, and the version was surrounded by issues based on some inspectors from management companies. One of the most important problems that had to be solved was the subjective results of the self-evaluation process. The above issues were eliminated with the following versions, especially the last of the TMSA, which now includes more detailed requirements with a new wave of highly trained inspectors[619].

The outcome of the third edition led to an entirely revamped TMSA model, which took place in 2018. One of the essential elements of its development is that the program is implemented in all sizes and categories of ships. The existing practices for the 12KPI are based on in-depth descriptions, updated instructions in procedures for cleaning the holds, loading etc. and in all aspects of security, as well as the addition of 85 new KPIs[620].

An essential piece of information to be reported is that in 1993 the Ship Inspection Report Exchange (SIRE) system was established by the International Petroleum Maritime Forum - OCIMF to develop certain inspection levels. The contribution of the SIRE programme has been significant in minimising accidents, reducing on-board inspections that have been repeated and improving crew training[621]. Currently, SIRE acts supportively to the practices of TMSA, mainly providing the element of enforcement that sometimes is missing from TMSA[622].

2.8.1.3 The TMSA third edition

The third edition of the TMSA program took place in April 2017, while management companies could use its previous version (TMSA 2) until the end of December 2017. It should be noted that when the third version of TMSA was available,

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[618] Tselentis V. (2008), *Marine Environment and Shipping Management*, Stamoulis Publications S.A.
[619] Pettit S. 2017, *Port Management* 1st Edition, Publisher Kogan Page.
[620] Valdez Banda, O. A., Hänninen, M., Lappalainen, J., Kujala, P., & Goerlandt, F. (2016). A method for extracting key performance indicators from maritime safety management norms. *WMU Journal of maritime affairs*, **15**(2), 237-265. DOI: https://doi.org/10.1007/s13437-015-0095-z.
[621] Burns M.G, 2014, *Port Management and Operations*, Routledge Taylor & Francis Group.
[622] Bicen, S., & Celik, M. (2022). A RAM extension to enhance ship planned maintenance system. *Australian Journal of Maritime & Ocean Affairs*, 1-20. DOI: https://doi.org/10.1080/18366503.2022.2075575.

the transfer from the second version to the third was smooth. For example, until January 2018, the common questions of the two editions in the questionnaire for access to TMSA 3 were automatically filled in to facilitate them in the new content of the new program version[623].

A book and its corresponding electronic form for the completion of company evaluations and an automatic basis are the tools of operation of the TMSA program. Each managing company has the opportunity to be selected by its members for the publication of its self-assessment data. The data of the TMSA have been combined with the data of SIRE[624] to achieve easy access for users to information on inspections of the company's ships as well as relevant reports of similar accidents and their evaluation[625].

As one can see, the TMSA programme is a relatively crucial administrative management tool. It should be emphasized that the TMSA contributes positively to establishing the International Maritime Organisation – IMO and strengthens its Legislative Codes, treaties and the enrichment of circulars based on the highest levels of improvement in terms of safety and the minimal chances of losses. The above regulations of the IMO are successfully implemented by the management companies based on a correct Safety Management System-SMS, with which the on-shore and off-shore duties are performed. Besides, the validity of the SMS[626] shows compliance with the health, safety and environmental protection regulations[627].

Through TMSA 3[628], the self-criticism-evaluation of companies' SMS is strengthened. In addition to the first stage, the program includes three new stages in implementing best practices. The continuous improvement of the management systems of the companies is achieved based on the conclusion of the self-evaluation. At the same time, the company's management department facilitated the continuous examination of

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[623] Buckley J. (2008) , *The Business of Shipping*, Cornell Maritime Pr/Tidewater.
[624] OCIMF, (2022). SIRE. Available at: SIRE (ocimf.org), last assessed: 29-8-2022.
[625] Brooks M.R, 2017, *Classics in Port Policy and Management*, Publisher Edward Elgar Publishing.
[626] Anderson, P. (2015). *ISM Code: A practical guide to the legal and insurance implications*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315720227
[627] Valdez Banda, O. A., Hänninen, M., Lappalainen, J., Kujala, P., & Goerlandt, F. (2016). A method for extracting key performance indicators from maritime safety management norms. *WMU Journal of maritime affairs*, **15**(2), 237-265. DOI: https://doi.org/10.1007/s13437-015-0095-z.
[628] OCIMF, (2017). TMSA 3 Fast Facts. Available at: eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.eyJzdWIiOiJ0bXNhMy1mYXN0LWZhY3RzIiwiaWF0IjoxNjMwNjc2Mjg4LCJleHAiOjE2MzA3NjI2ODh9.bbPAzTlk_hK9DQ1wxKpdTKIY6E0dZ9OvvPC7GYemCVM (ocimf.org), last assessed: 30-8-2022.

self-evaluation more methodically based on schedules and the creation of primary goals. Furthermore, the effective contribution of the program to the operation of the ships and the management of the company is based on the definition of thirteen "Principles"[629].

The role of the process of controlling a company, for the effectiveness of the SMS regarding the performance indicators (KPI) and the performance based on compliance with each authority, is essential. In addition, the TMSA has preventive factors available for each management company to conduct only specific processes that focus on self-improvement[630]. The methods of continuous improvement of the SMS depend on the leadership, as this is where the proper communication between the departments comes from, but where also the appropriate tactics of the company are created. Through TMSA, the continuous improvement of SMS becomes possible, systematically and methodically, while the constant improvement procedures are as follows[631]:

a) ***Plan:*** Developed strategies to understand the managing company's responsibilities, policy, and fundamental objectives. Pre-planned methodical actions.

b) ***Action:*** *In* essence, it is the act of the above plans and the achievement of the goals through the proper communication of the staff and the reporting of results.

c) **Assessment:** In-depth supervision of all actions in the previous stages, control, and evaluation.

d) **Improvement:** Creation of new objectives for the upgrades set. Focus on long-term gains based on coordinated movements and regularly updating each process.

e) **Key Performance Indicators:** The valuation of indices in four stages, from the lowest to the highest. They implement objective measurements and

[629] Chalmers B. (2020). *A Guide to Port and Terminal Management*. Brown Son and Ferguson.
[630] Lorance P. (2009). *Shipping Strategy Innovating for Success*. Cambridge University Press.
[631] Kacmaz, E., Kara, G., & Yıldız, M. (2016). Evaluation of marine pollution caused by tanker ships and preventing under focus of the international regulations. *Proceedings book*, 318.

focus on the observance and implementation of HSSE. In addition, they contain instructions on all best practices and specific directions[632].

The evaluations of companies based on their levels must be objective to avoid erroneous conclusions and leading companies to the authorities and the standards that lag in their observance. Therefore, the re-inspection by the managing companies for any change (with fleet size, SMS, etc.) in the TMSA report is necessary[633].

In addition, the new version has considered all the amendments and revisions to the content of the current institutional framework and technology development. Finally, even though its composition was the tankers, its use can now be performed for other categories of ships[634].

2.8.1.4 Benefits of TMSA 3 and advantages

The TMSA's contribution to the evaluation of the Security Management System of each ship is essential, as it is a program characterised by systematicity and proper structure. The third version of TMSA has multiple advantages for the operation of tankers in terms of quality and duration of safety. The most important of these are listed below[635]:

a) More sophisticated calculation performance indicators (KPIs) based on explicit instructions.
b) The foundation of key objectives for best practice results.
c) The positive contribution of quality standards to shipping management processes.
d) Enforcement to the management of the company to report and evaluate necessary activities.
e) Proper guidance and collection of information with quantitative methods.
f) All OCIMF members are allowed to conduct charters in accordance with managers of high safety and environmental practices.

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[632] Manivannan, S., & Ab Saman, A. K. (2016). A Safety Assurance Assessment Model for an Liquefied Natural Gas (LNG) Tanker Fleet. In *Human Resources and Crew Resource Management* (pp. 179-186). CRC Press.

[633] Turker, F., & Er, I. D. (2008). Enhancing quality and safety management in shipping: tanker management and self assessment. *Lex ET Scientia Int'l J.*, **15**, 128.

[634] Boviatsis, M., & Vlachos, G. (2022). Correlation of the Concepts of Proactiveness and Due Diligence to Achieve Sustainability in the Maritime Sector. *Journal of Shipping and Ocean Engineering*, **12**, 33-42. DOI: 10.17265/2159-5879/2022.02.001.

[635] OCIMF, (2022). Management Self Assessment. Available at: Management Self Assessment (ocimf.org), last assessed: 30-8-2022.

g) Clearer and more in-depth guidance on requirements resulting in successful inspections.
h) High levels of training of inspectors capable of completing any kind of inspection.

2.8.2 International Oil Tanker and Terminal Safety Guide (ISGOTT)

2.8.2.1 Definition and background

In essence, International Oil Tanker and Terminal Safety Guide (ISGOTT)[636] is a safety guide to the operation of tankers and oil terminals, according to which the safe loading and unloading of oil, their transport and the storage process by personnel capable of these operations are enhanced. In addition, operational content instructions are provided regarding procedures within terminals[637]. The potential dangers posed by the tanker industry are enough and have catastrophic environmental impacts[638].

According to the arrival of the ISGOTT guide, it is the coupling of the "Tanker Safety Guide" from the International Chamber of Shipping – ICS and the "International Safety Guide for Oil Tankers and Terminals" from the International Maritime Forum of Oil Companies – OCIMF, dated 1998[639].

Various maritime organisations have recognized the ISGOTT as the primary handbook for the coordination of safety in the management of oil tankers with the best practices in improving safety and dealing with risks. With the predominance of the human factor in causing maritime accidents, the guide has been re-developed year after year by setting more capable executives to manage all unwanted conditions at sea and maintaining a strong safety culture among seafarers[640].

It is also essential that in 2006, the fifth edition of the ISGOTT guide was successfully released. However, in 2017, shipping organisations such as ICS, OCIMF,

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[636] OCIMF, (2022). International Safety Guide for Oil Tankers and Terminals (ISGOTT 6). Available at: International Safety Guide for Oil Tankers and Terminals (ISGOTT 6) (ocimf.org), last assessed: 27-8-2022.

[637] Sezer, S. I., Akyuz, E., & Arslan, O. (2022). An extended HEART Dempster–Shafer evidence theory approach to assess human reliability for the gas freeing process on chemical tankers. *Reliability Engineering & System Safety*, **220**, 108275. DOI: https://doi.org/10.1016/j.ress.2021.108275.

[638] Boviatsis, M., Georgios Vlachos & Georgios Daniil (2021) Evaluation of environmental impact assessment factors in maritime industry - *Proceedings of the 17th International Conference on Environmental Science and Technology*. 1-4 September 2021. Athens, Greece.

[639] OCIMF, (2022). Management Self-Assessment. Available at: Management Self Assessment (ocimf.org), last assessed: 28-9-2022.

[640] Chalmers B, 2020, *A Guide to Port and Terminal Management*. Brown Son and Ferguson.

etc., identified possible modifications to the guide's content. Thus, ISGOTT was reworded after a review by scholars and writers in a sixth edition released in mid-2020. The adaptation of the new version was a necessary basis for changes in legislative regulations, the evolution of emerging technology, the focus on unique factors such as the human factor and the issues of today's industry[641].

Of course, despite the modifications, changes and markings the guide has undergone, the new version is the most successful so far. At the same time, it is essential that with the modifications, in no case is the ethos minimized regarding safeguarding human health, protecting the environment and safety in general. Still, on the contrary, they are thoroughly addressed. Also, within the content of the sixth edition of ISGOTT, issues such as gas detection procedures, reduction of toxicity derived from petroleum products (benzene, hydrogen sulfide, etc.), the provocation of stray currents and course fire protection issues are covered[642].

2.8.2.2 Application of ISGOTT

As mentioned above, the instalment of OCIMF and ICS guides led to the current direction of enhancing safety between oil tankers and ISGOTT terminals. What is the main reason for adopting the guide and his updated composition? Of course, the leading cause of its adoption is based on maritime accidents caused in previous years, which were an example of the future of global shipping[643].

Quite a notable accident can be called the *Torrey Canyon*[644] accident, according to which in 1967, a tanker named "Torrey Canyon" suffered aground on a reef in Cornwall, England. This tanker transported about 120,000 tons of crude oil, resulting in the diffusion of 920,000 barrels into the waters of the sea. Thus, one of the largest oil spills and environmental disasters in history was caused. The vast, contaminated area reached 270 square miles, and to avoid further oil leakage, the Government of England implemented an order to bomb the ship[645].

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[641] OCIMF, (2022). International Safety Guide for Oil Tankers and Terminals (ISGOTT 6). Available at: International Safety Guide for Oil Tankers and Terminals (ISGOTT 6) (ocimf.org), last assessed: 27-8-2022.
[642] Ibid.
[643] Almeida, Maria Fatima Ludovico de, Mueller, Gabriela, & Garcia, Luciano Maldonado. (2009) *Evaluation model applied to TRANSPETRO's Marine Terminals Standardization Program.* Brazil.
[644] Nanda, V. P. (1967). The Torrey Canyon disaster: some legal aspects. *Denv. LJ*, **44**, 400.
[645] Smith, J. E. (1968). *'Torrey Canyon'pollution and marine life. A report by the Plymouth Laboratory of the Marine Biological Association of the United Kingdom*. Cambridge University Press.

This accident led to the destruction of the regional environment but also resulted in losses in property in the surrounding areas. According to scholars, the procedures and cleaning costs correspond to about $ 16 million for the English and French governments[646].

Finally, it should be emphasized that according to studies, this environmental disaster was caused by human error. The Torrey Canyon accident, and other catastrophic maritime accidents, caused the development of many conventions and legislations such as MARPOL and subsequently were studied and led to the creation of systems, codes and guides to eliminate any chance of them happening in the future[647].

2.8.3 Evaluation of all systems

As mentioned above, the ISM code can be characterized as the basis for SMS systems, contributing to the detailed description of the responsibilities of each shipping executive on land and at sea. The Code is also demanding security measures. The *'good practices* in the content of the ISM, such as maintenance, continuous inspection and preparation in extreme conditions, consist of general information as the detailed instructions need further improvement[648].

The main aim of ISM is to reduce errors from the human factor, which is why the code is dominated by persistence to the requirements of internal procedures, levels of education and certification. Also, an essential requirement of the ISM code for SMS is that each shipping company should be adequately prepared to deal with all possible incidents. Cases of non-compliance and non-observance of the code must result in the cancellation of the issuance of the DOC by the port authorities. The development of TMSA and ISGOTT is based on the ISM code, as it is the basis for strengthening security requirements[649].

It is commonly accepted that the TMSA system is an adequate basis for readjustment functions due to the detailed procedures in the office and ship. Based on the self-assessment procedures, efficiency within the framework of the shipping

[646] Cooper, T., & Green, A. (2017). The Torrey Canyon disaster, everyday life, and the "greening" of Britain. *Environmental History*, ***22*(**1), 101-126. DOI: https://doi.org/10.1093/envhis/emw068.
[647] Utton, A. E. (1967). Protective Measures and the Torrey Canyon. *BC Indus. & Com. L. Rev.*, **9**, 613.
[648] IMO, (2022). The International Safety Management (ISM) Code. Available at: The International Safety Management (ISM) Code (imo.org), last assessed; 27-8-2022.
[649] OCIMF, (2022). Management Self-Assessment. Available at: Management Self Assessment (ocimf.org), last assessed: 28-9-2022.

company's operations is a crucial objective of this system. With this one, TMSA cannot be implemented without SMS. Its content is based on procedures of four main stages and twelve KPIs from which the standards and all the objectives are defined methodically. The TMSA is characterized by gradual processes of continuous improvement and not as a code of compliance, with the main task of constant evaluation to make the companies' internal operations more functional[650].

It should be noted that the TMSA system follows a principle according to which all possibilities of marine casualties should be extinct, establishing this principle as the '*primary tool for prevention*. Furthermore, with this system, great emphasis is placed on the result of impeccable business processes, as one of its primary responsibilities is the management of all levels of risk based on a plan regarding emergency response. Therefore, the TMSA is not recommended as a mandatory application. Still, its interaction with the companies' SMS imposes significant penalties in cases of non-compliance, such as the non-issuance of the DOC. Therefore, it should be emphasized that despite its non-mandatory nature, it is a requirement, especially for experienced charterers of the oil industry. As a result, it has become mandatory in practice.

On the other hand, ISGOTT aims to monitor the potential for risks that can be caused and, of course, to promote solutions to deal with any problem. Therefore, ISGOTT is nothing more than a guide with an advisory character for the proper use of terminals and the safer operation of tankers through the best safety practices resulting from studies of the circumstances of accidents of the past. Furthermore, since it is not mandatory to determine responsibilities regarding settling business procedures, it does not directly contribute to correcting the SMS of companies. Still, it enhances its development based on the regulations of the ISM Code[651].

It is essential to mention that the content of the ISGOTT guide examines issues by deepening the maintenance procedures and the implementation of inspections, resulting in the development of several audit lists. The guide, as mentioned above, is simply helpful in dealing with any risk, as it cannot be described as the ultimate risk management and general preparedness solution. In essence, a shipping company is

[650] Valdez Banda, O. A., Hänninen, M., Lappalainen, J., Kujala, P., & Goerlandt, F. (2016). A method for extracting key performance indicators from maritime safety management norms. *WMU Journal of maritime affairs*, **15**(2), 237-265. DOI: https://doi.org/10.1007/s13437-015-0095-z.
[651] Theotokas, I. (2018). Management of shipping companies. Routledge.

guided by ISGOTT regarding applications based on the descriptions of SMS, and the purpose is their more effective implementation. The effectiveness and high levels of prevention provided by the guide are based on case studies of other companies that have been conducted[652].

The main difference between ISGOTT and ISM Code is the lack of mandatory factors and adherence to regulations. On the other hand, the main difference between ISGOTT and TMSA is that TMSA focuses on SMS within each company and ISGOTT in the study on the business actions of companies. Therefore, by comparing the three systems, we conclude that their interaction is supportive and, in this way, the best possible result is given to the functionality of shipping companies.

It should be emphasized that ISM established the basic framework regarding security measures within companies. In turn, the TMSA system strengthens the efficiency of the operating procedures through revisions, and systematic comparisons, significantly reducing the wrong movements.

With the contribution of ISGOTT and the regular use of case studies of the past of other companies, a relatively significant range of support is created around the company through internal control procedures reducing the cause of an accident[653].

Of course, the desired results of ISGOTT's secure management are confused with using the systems mentioned above. However, presently, with the focus of the maritime industry being on sustainable shipping, a strong renewal occurs within the framework of safety standards in the maritime field as well as compliance based on all regulations.

In addition, while the number of regulations becomes increasingly more comprehensive, the proper operation of shipping companies is achieved through codes, systems and guidelines. It should be noted that there is no objective answer to the question of which is the best method to achieve safety and compliance. Therefore, each company may elect a different or a combination of systems as the optimal for managing their internal processes and maintaining their SMS.

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[652] OCIMF, (2022). International Safety Guide for Oil Tankers and Terminals (ISGOTT 6). Available at: International Safety Guide for Oil Tankers and Terminals (ISGOTT 6) (ocimf.org), last assessed: 27-8-2022.

[653] Talley W.K, 2017, *Port Economics*, Routledge Taylor & Francis Group.

Nevertheless, it is unquestionable that the utilisation of systems incorporating past and present practices and experiences to be self-improved and constantly enhance the quality of their processes and operations, will constantly upgrade at the same time maritime safety. Ultimately, those systems will be principal for the profound technological advancements of our era and goals, such as emission neutrality and sustainable shipping[654]. A sound proposal would be the adoption of such policies and processes from the present legal framework, which is constantly found reactive and, most times, inefficient.

2.9 Research Outcomes

While the reflexes of IMOs and ILOs' leading maritime Conventions are being tested, other environmental legislations can prove **impactful** to shipping. One of those legislations is the **Civil Liability Convention (CLC)**, a convention that established the **measurement of the liability** for the shipowners concerning tanker vessels; while it offers the shipowners, the option to limit liability, at the same time, the **penalties** in case of **gross negligence** or **willful misconduct** are **severe**. Furthermore, this Convention and the Fund 1992 and LLMC Convention practically install the concept of **due diligence**. Under this concept, when a shipowner executes his duties **pursuant to all the imposed legislation**, in case of an occurrence, he will be compensated for his diligence by **limiting his liability** by the competent conventions. In contrast, the rest of his liability will **be indemnified by the P&I Club**.

Adopting this stance from the rest of maritime legislation might be proved **very efficient**. While the shipping industry is **battling the enactment** of similar Conventions, such as HNS, their stance will change in view of the long-term results of such measures. Regarding other legislation, OPA 1990 is distinguished from the rest in terms of **mentality** and **severity**. Specifically, OPA 1990 is famous for practically installing two impactful changes to vessels sailing on U.S. waters, namely a) the installation of the **double walls** or **double bottoms** regime on all tankers and b) the application of the concept of **unlimited liability** for the party who causes marine pollution. The first change, while it was received by the shipping community with

[654] Boviatsis, M., & Vlachos, G. Title: Proactive steps towards sustainable shipping: Assessing maritime accidents of the past to prevent similar incidents in the future. *International Journal of Transport Development and Integration*, **7**(1).

skepticism, mainly due to the **enormous costs** that the shipping companies were **forced to pay**, has proved **efficient in practice**, having many instances of "near miss accidents" instead of occurrences leading to mass pollution, due to implementing the double hull/bottom policy. As for the second, which was heavily criticised even in many U.S. States, it has evolved into an excellent **concept tool for sustainable shipping**. The ultimate transfer of liability from the shipping company, which is usually veiled behind offshores, to even the initial producer, has generated tremendous pressure from the charterers to the shipowners to implement the stringiest measures to eliminate the chance of accidents or otherwise to be able to prove their "duty of care" and be even perhaps excluded from liability. This concept of "unlimited liability" is practically utilised in **unmanned vessels**, the so-called ships-of-the-future, where the **liability for malfunctions is transferred to the competent manufacturer**, thus making him an **active stakeholder in the vessel's safety**.

While many regulations are capable of installing and enhancing safety, the managing/executing methods are often **lacking**. To this end, after yet another series of accidents, **ISM Code** was established under, yet again, heavy criticism from the shipping community due to the increase in operating expenses. Nevertheless, after nearly thirty years, **the impact** of the ISM Code on the shipping industry is **eventually recognised**. Namely, the ISM Code effectively **improved maritime transport safety** while offering enhanced compliance measures with the international marine framework and **accident avoidance**. Additionally, ISM Code maximised **the performance and competitiveness of the shipping companies** that adopted the Code most effectively.

While all the above are important, the most important of the ISM's implementation was **the installation of the concept of safety**. Upon this foundation, present systems, such as **TMSA**, were developed and are currently **moving to "dominate" the market**. The most successful outcome of the TMSA is **the concept of self-assessment**. Namely, the system evaluates the impact of its actions and assesses system malfunctions **to re-calibrate itself** and avoid those issues during future activities. The system is practically built upon its own experience and is constantly evolving. While TMSA will rapidly become **the dominant stakeholder** in a company's operations, it is suggested that **other shipping tools**, namely studies of experiences and accidents to avoid similar incidents in the future, can benefit the process of TMSA. While such tools operate exactly like TMSA, **those tools execute the only thing that**

the TMSA does not, namely, the study of the past. While TMSA uses systems like SIRE to build its environment, the lack of past knowledge before the initiation of TMSA might prove beneficial and resolve and counter threats **before they even emerge**. An active occurrence will be incorporated by TMSA and become a system experience; **the utilisation of guidebooks, such as ISGOTT**, which include enormous experience along with methods of avoidance, may further benefit the utilisation of TMSA and provide it with a **notion of proactiveness**, which is currently missing from the system. So far, it has been established that one of the fundamental aspects of sustainable shipping is safety. Evidently, TSMA now maximises the safety processes to such an extent that similar systems will be initiated for other vessel types. The proposal of the utilisation of tools, such as ISGOTT, **enhances** system experience, **proactively including events of the past to effectively avoid similar occurrences in the future.**

Chapter 3

Emerging Maritime Legislation: The road to sustainable shipping

In the third chapter the most prominent legislation, aiming to minimise and ultimately eliminate the environmental footprint of shipping, are assessed. Specifically, analysis of i) the ballast water management, ii) the ship recycling process, iii) the utilisation of LNG as a fuel, iv) the installation of new low sulfur cap and monitoring systems, and v) the new measures to eliminate air pollutants and vi) the development of unmanned vessels is evaluated, and valuable outcomes upon the adoption of a system-pattern are proposed. Finally, a "system" is proposed to achieve efficiency and continuity in the incorporation and development of the concept of maritime sustainability, with the integration of the concepts of proactiveness and due diligence.

Research Layout

Chapter 3: Elimination of Pollution & Maritime Sustainability

Made by author.

3.1 The concept of Sustainable Shipping

The concept of sustainable shipping is an emerging trend, introduced recently to the shipping industry[655]. The concept incorporates: i) all safety practices and management that were installed with the adoption of maritime codes and safety systems, along with ii) the established principle of environmental protection from the perspective of minimisation of emerging environmental hazards coupled with iii) the elimination of all sources of pollution during an ordinary operation process and lastly iv) the application of Corporate Social Responsibility to the shipping industry[656].

Graph 1: The four aspects of sustainability

Made by author: 23-8-022.

According to IMO, the concept of sustainability includes three fundamental pillars, namely i) the environment, ii) the society and iii) the economy[657]. The enhancement of those pillars can expand the concept of sustainability. Additionally, sustainability is influenced by factors closely related to the three pillars: market-related conditions, socio-economic development, the human element, etc. Another critical

[655] EMSA, (2022). Mission Statements. Available at: About - Mission Statements - EMSA - European Maritime Safety Agency (europa.eu), last assessed: 30-8-2022.
[656] Psaraftis, H. N., Amboy, P., & Psaraftis. (2019). *Sustainable shipping*. Berlin: Springer International Publishing.
[657] IMO, (2022). IMO and the Sustainable Development Goals. Available at: IMO and the Sustainable Development Goals, last assessed: 30-8-2022.

factor is the stakeholders that are involved in the adoption and execution of sustainable practices[658].

Principally, sustainability is introduced by international organisations and intergovernmental bodies, aiming toward the protection of the human race and the preservation of the quality of life, evidently distant objectives from our reality[659]. However, the issue arises during the execution of those concepts by the companies or other stakeholders, having a more business-oriented mentality, mainly when the costs of implementing those concepts burden them[660]. To this end, the international community has installed processes and bodies that aim to '*close the gap*' [661]between the changes the international organisations try to install, which in many cases need time, preparation, and incentives to enter force and the cost-oriented mentality of the companies, which often seek the "short-term' profit without taking into consideration the long-term consequences, which will ultimately result to the viability of the company[662].

In this chapter, policies and legislation that lead to eliminating pollution will be examined as one of the newest aspects of ocean sustainability. Specifically, the analysis will include[663]:

a) The implementation of ballast water management processes and the raising issues.
b) Reduction of air pollution from shipping and specifically the sulfur emissions (SOx and SO_2), nitrogen emissions (NOx) and particulate matter (PM).

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[658] United Nations, (2022). The Sustainable Development Agenda. Available at: The Sustainable Development Agenda - United Nations Sustainable Development, last assessed: 29-8-2022.
[659] Schwartz, H., Solakivi, T., & Gustafsson, M. (2022). Is There Business Potential for Sustainable Shipping? Price Premiums Needed to Cover Decarbonized Transportation. *Sustainability*, **14**(10), 5888. DOI: https://doi.org/10.3390/su14105888.
[660] Tran, T. M. T., Yuen, K. F., Li, K. X., Balci, G., & Ma, F. (2020). A theory-driven identification and ranking of the critical success factors of sustainable shipping management. *Journal of Cleaner Production*, **243**, 118401. DOI: https://doi.org/10.1016/j.jclepro.2019.118401.
[661] Yuen, K. F., Li, K. X., Xu, G., Wang, X., & Wong, Y. D. (2019). A taxonomy of resources for sustainable shipping management: Their interrelationships and effects on business performance. *Transportation Research Part E: Logistics and Transportation Review*, **128**, 316-332. DOI: https://doi.org/10.1016/j.tre.2019.06.014.
[662] Spaniol, M. J. (2022). The Road (map) Not Taken: Navigating Sustainable Shipping Transitions. *In 7th World Maritime Technology Conference*.
[663] Papandreou, A., Koundouri, P., & Papadaki, L. (2021). *Sustainable shipping: levers of change. In The Ocean of Tomorrow* (pp. 153-171). Springer, Cham. DOI: 10.1007/978-3-030-56847-4_10.

c) An assessment of the utilization of alternative types of fuels, with the inclusion of ammonia as a new alternative.
d) The implementation and comparative analysis of the European and International Institutional Framework to limit carbon dioxide (CO2) emissions.
e) The issues related to the enforcement of the legislative framework pertaining to shipping dismantling
f) The sustainable operation of unmanned vessels, considering the present legal framework.

Finally, at the conclusion of this chapter, an attempt will be made to combine the concepts of proactiveness and due diligence with the concept of sustainability[664], as to how these concepts could create a continuous process where each step will add to the efficiency and effectiveness of the next phase of the process[665].

3.2 Emerging issues with the Ballast Water Management Convention

3.2.1 The reasoning for implementing the Ballast Water Management process and emerging threats.

One of the most critical issues during navigation is the vessel's stability[666]. The ship, when appropriately loaded, has relatively high stability and can withstand even the most severe weather. However, this is not the case when the ship is without cargo, and the vessel stability levels drop as an outcome. This is important when the vessel sails without cargo and the weather conditions become severe. To this end, the utilisation of ballast water was initiated to prevent the destabilisation of the vessel when absent cargo is under extreme weather conditions[667].

While the ballast water minimises the chances of a significant accident by providing stability to the ship when needed, at the same time, the unloading of ballast after its utilisation can

[664] Boviatsis, M., & Vlachos, G. (2022). Correlation of the Concepts of Proactiveness and Due Diligence to Achieve Sustainability in the Maritime Sector. Journal of Shipping and Ocean Engineering, **12**, 33-42. DOI: 10.17265/2159-5879/2022.02.001.
[665] Psaraftis, H. N. (2002). Maritime safety: to be or not to be proactive. *WMU Journal of Maritime Affairs*, **1**(1), 3-16. DOI: https://doi.org/10.1007/BF03195022.
[666] Boviatsis M., Polemis D., Tselentis V. (2022). Implementing the Ballast Water Management Convention in Shipping Practice: Emerging Threats, Operational Issues and Solutions, *Journal of Shipping and Ocean Engineering* **12** (2022) 53-60. DOI: 10.17265/2159-5879/2022.02.003.
[667] Lakshmi, E., Priya, M., & Achari, V. S. (2021). An overview on the treatment of ballast water in ships. *Ocean & Coastal Management*, **199**, 105296. DOI: https://doi.org/10.1016/j.ocecoaman.2020.105296.

cause severe environmental implications[668]. The issues arise during the loading of ballast when invasive species are loaded along with water and are unloaded on areas where the regional species are less aggressive; thus, the newly introduced species '*invade and conquer*' the new environment[669].

To avoid these issues and tackle the transport of IAS (infiltrating aquatic species)[670] , the international community, with MEPC res. 50(31) and the Rio Conference of 1992 by the UNCED (United Nations Conference on Environment and Development) installed guidelines that were made mandatory in 1993 (Resolution A.774(18)) and were expanded to a ballast water management plan in 1997 (Resolution A. 868(20))[671]. After many years, in 2004, the IMO enacted the process of installing a Ballast Water Management Convention (BWM Convention), which entered into force in 2017[672]. Subject to the new Convention, all ships should carry a ballast water logbook, and according to Regulation D-3, an efficient management process should be installed during unloading (procedures G8 and G9)[673].

To summarise, the outcomes of the utilization of ballast water before the creation of the BMW process can be summarized below:

a) The extermination of species populating local environments by IAS (infiltrating aquatic species).
b) Destruction of entire ecosystems by the denaturalisation of local and regional biodiversity.

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[668] Bax, N., Williamson, A., Aguero, M., Gonzalez, E., and Geeves, W. (2003). Marine Invasive Alien Species: A Threat to Global Biodiversity. *Mar. Policy* **27**: 313-23. DOI: https://doi.org/10.1016/S0308-597X(03)00041-1.

[669] Çinar, M. E., Arianoutsou, M., Zenetos, A., & Golani, D. (2014). Impacts of invasive alien marine species on ecosystem services and biodiversity: a pan-European review. *Aquatic Invasions*, **9**(4), 391-423. DOI: http://dx.doi.org/10.3391/ai.2014.9.4.01.

[670] Bax, N., Williamson, A., Aguero, M., Gonzalez, E., & Geeves, W. (2003). Marine invasive alien species: a threat to global biodiversity. *Marine policy*, **27**(4), 313-323. DOI: https://doi.org/10.1016/S0308-597X(03)00041-1.

[671] Rak, G., Zec, D., Kostelac, M. M., Joksimović, D., Gollasch, S., & David, M. (2019). The implementation of the ballast water management convention in the Adriatic Sea through States' cooperation: The contribution of environmental law and institutions. *Marine pollution bulletin*, **147**, 245-253. DOI: https://doi.org/10.1016/j.marpolbul.2018.06.012.

[672] Lakshmi, E., Priya, M., & Achari, V. S. (2021). *Systems and Operation of Ballast Water in Ships with the Changing Ballast Water Management Policy*. Modern Ship Engineering, Design and Operations, p. 17.

[673] Boviatsis M., Tselentis V., Polemis D., Practical impediments to the effective utilisation of Ballast Water Management Plan from Port facilities and Shipping practice, *17th International Conference on Environmental Science and Technology*, Athens, Greece, 1 to 4 September 2021.

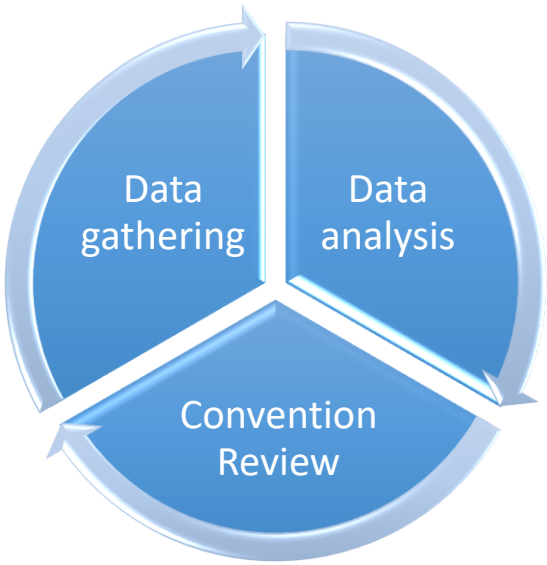
c) Impact on the public health of the populace habiting the regions IAS invades[674].

d) Damage to the economy of the affected region.

e) Impact on local industries that use the region's water for industrial or other business purposes.

Currently, with the adoption of MEPC 71, the BWM plan has further evolved, incorporating an *experience-building phase* where a three-stage approach is followed to develop the convention further[675], namely:

Graph 2: The experience-building phase of BWM



Made by author: 23-8-2022.

This process resembles the operational process of self-assessment systems[676], such as TMSA. The outcome of its implementation is the constant renewal and update of the system without adopting new resolutions and amendments[677].

[674] Hess-Erga, O. K., Moreno-Andrés, J., Enger, Ø., & Vadstein, O. (2019). Microorganisms in ballast water: disinfection, community dynamics, and implications for management. *Science of the Total Environment*, **657**, 704-716. DOI: https://doi.org/10.1016/j.scitotenv.2018.12.004.

[675] David, M., Gollasch, S., Leppäkoski, E., & Hewitt, C. (2015). Risk assessment in ballast water management. *In Global Maritime Transport and Ballast Water Management* (pp. 133-169). Springer, Dordrecht. DOI: https://doi.org/10.1007/978-94-017-9367-4_7.

[676] David, M., & Gollasch, S. (2015). Ballast Water Management Decision Support System. *In Global Maritime Transport and Ballast Water Management* (pp. 225-260). Springer, Dordrecht.

[677] Chen, N., Yang, Z., & Luo, W. (2021). The working principle of ballast water management system. *In Development and Implementation of Ship BWMS* (pp. 15-25). Springer, Singapore.

3.2.2 Issues with the operational processes of BWM and proposed solutions

The operation of the ballast water management process, while effective, simultaneously increases the operational costs for the shipping companies and renders the ship off-employment during the execution. Specifically, the main point of the process is for the loaded ballast water to be unloaded to a tank or a delegated place for this water to be cleaned and returned to the sea[678]. The issue with this process is the cost of utilities and the time the ship spends to unload the ballast. In most cases, tugs are used to avoid the time spent waiting to be serviced by port facilities, but thus the costs are further increased[679]. To this end, some individuals in the shipping community unloaded the ballast off the coast in remote areas to avoid the port authorities' inspections of their logbook while collaborating with regional tug companies to be provided with face certificates (for substantially lesser costs) to be presented during inspections[680].

This process of unloading the ballast of shore renders the BWM Convention ineffective[681]. Thus, a proposal on this issue is for an aquatic map to be drafted, incorporating information regarding local biodiversity's aggressiveness and monitoring any alterations in the habiting species[682]. By the utilization of this map, in case the aggressiveness status of the area of ballast unloading area is higher than the region where the ballast is loaded, the ballasting process can be avoided, subject to the hypothesis that the species of the ballast unloading area will exterminate the species from the area of loading[683].

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[678] Simberloff, D., Martin, J. L., Genovesi, P., Maris, V., Wardle, D. A., Aronson, J., ... & Vilà, M. (2013). Impacts of biological invasions: what's what and the way forward. *Trends in ecology & evolution*, **28**(1), 58-66. DOI: https://doi.org/10.1016/j.tree.2012.07.013.

[679] Tsimplis, M. (2020). Regulatory systems supporting innovation: Lessons from the development of the 2004 Ballast Water Management Convention. *The International Journal of Marine and Coastal Law*, **36**(1), 59-87. DOI: https://doi.org/10.1163/15718085-BJA10039.

[680] Endresen, Ø., Behrens, H. L., Brynestad, S., Andersen, A. B., & Skjong, R. (2004). Challenges in global ballast water management. *Marine pollution bulletin*, **48**(7-8), 615-623. DOI: https://doi.org/10.1016/j.marpolbul.2004.01.016.

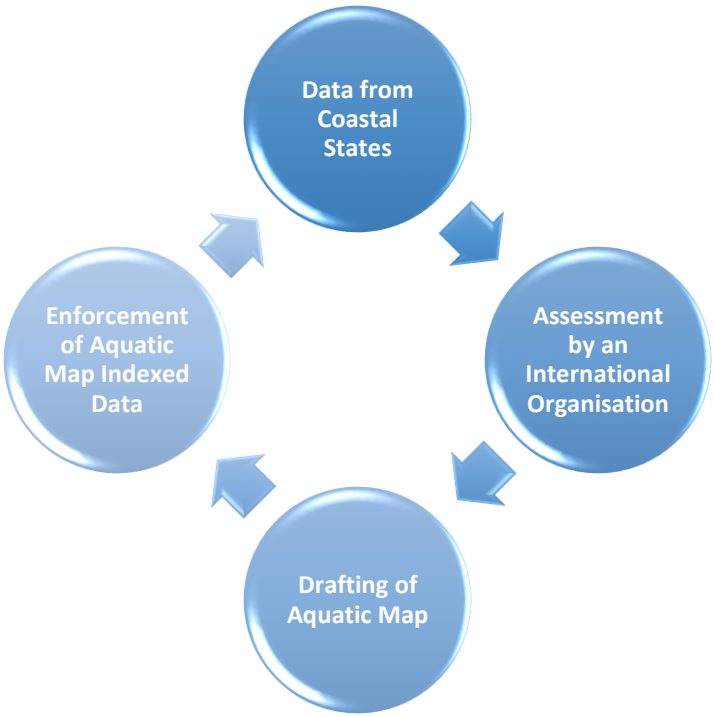
[681] Gollasch, S., David, M., Broeg, K., Heitmüller, S., Karjalainen, M., Lehtiniemi, M., ... & Strake, S. (2020). Target species selection criteria for risk assessment based exemptions of ballast water management requirements. *Ocean & Coastal Management*, **183**, 105021. DOI: https://doi.org/10.1016/j.ocecoaman.2019.105021.

[682] Magaletti, E., Garaventa, F., David, M., Castriota, L., Kraus, R., Luna, G. M., ... & Gollasch, S. (2018). Developing and testing an early warning system for non-indigenous species and ballast water management. *Journal of sea research*, **133**, 100-111. DOI: https://doi.org/10.1016/j.seares.2017.03.016.

[683] Wang, Z., Nong, D., Countryman, A. M., Corbett, J. J., & Warziniack, T. (2020). Potential impacts of ballast water regulations on international trade, shipping patterns, and the global economy: An integrated transportation and economic modeling assessment. *Journal of Environmental Management*, **275**, 110892. DOI: https://doi.org/10.1016/j.jenvman.2020.110892.

In this way, the utilization of the ballasting process will be decreased, decreasing at the same time the costs and giving incentives to the shipping companies for the proper utilization of the process[684]. At the same time, the creation of this map will help the coastal areas monitor an area's aggressiveness and intervene when there is an evident alteration to the local species[685]. In the graph below, the subjectively ideal process for the creation of an aquatic bio-map is presented[686]:

Graph 3: The concept of the process of creating and implementing the aquatic bio map.



Made by author: 16-11-2022.

For the creation of this map, the methodology that can be utilised is based upon the Ocean Health Index (OHI), which contains relevant data by taking samples from regional waters and

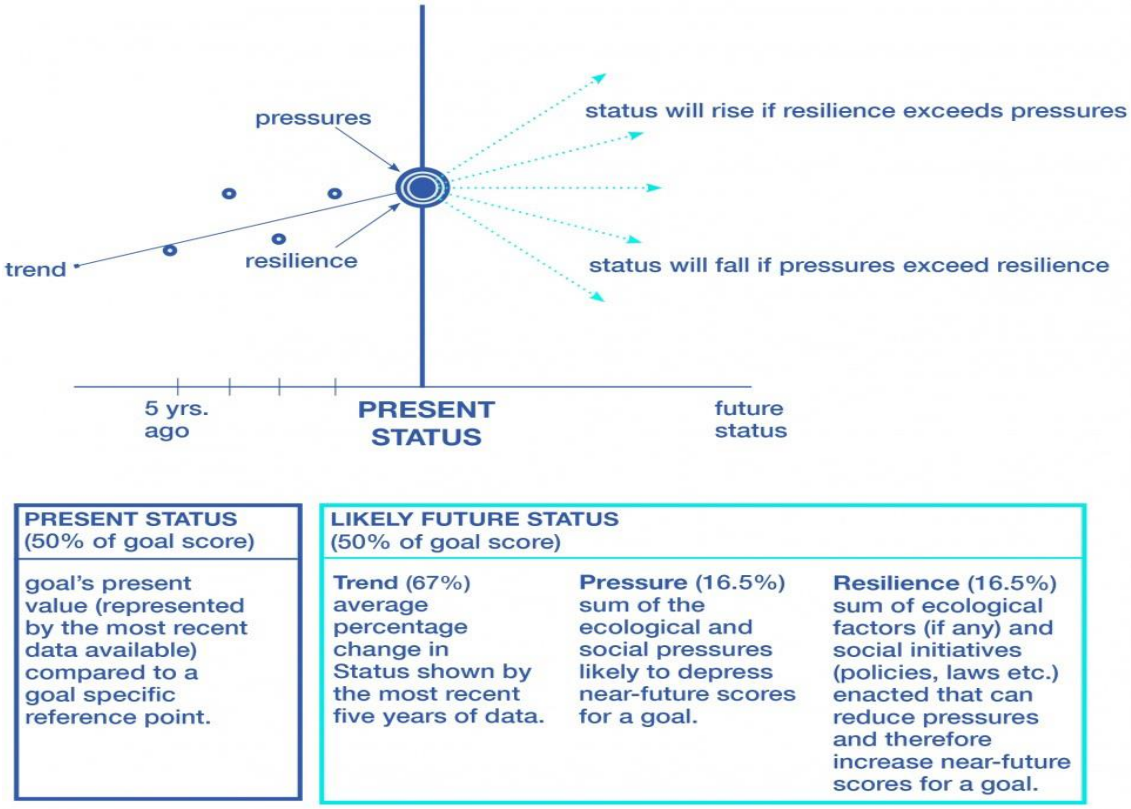
[684] Olenin, S., Ojaveer, H., Minchin, D., & Boelens, R. (2016). Assessing exemptions under the ballast water management convention: preclude the Trojan horse. *Marine pollution bulletin*, **103**(1-2), 84-92. DOI: https://doi.org/10.1016/j.marpolbul.2015.12.043.

[685] Outinen, O., Bailey, S. A., Broeg, K., Chasse, J., Clarke, S., Daigle, R. M., ... & Viard, F. (2021). Exceptions and exemptions under the ballast water management convention–Sustainable alternatives for ballast water management?. *Journal of Environmental Management*, **293**, 112823. DOI: https://doi.org/10.1016/j.jenvman.2021.112823.

[686] David, M., Gollasch, S., & Hewitt, C. (2015). Global maritime transport and ballast water management. Issues and Solutions (Invading Nature: *Springer Series in Invasion Ecology*; Springer: Berlin/Heidelberg, Germany, **10**, 978-994.

accessing their quality based on the goals set[687]. In the figure below, the methodology utilised for the creation of OHI is briefly presented[688]:

Figure 1: OHI Methodology, 2022



Ocean Health Index Science, 2022. Available at: https://ohi-science.org/data/

Collecting the data upon which this (bio) map will be created would provide some initial conclusions and outcomes[689]. However, the efficiency and effectiveness of this (bio)map can only be achieved by the constant collection of data[690], evaluation and implementation of resilience measures as corrective actions and execution of those measures[691].

[687] Ocean Health Index Science, 2022. Available at: https://ohi-science.org/data/, last accessed: 16-11-2021.

[688] Gazioğlu, C. (2018). Biodiversity, coastal protection, promotion and applicability investigation of the ocean health index for Turkish seas. *International Journal of Environment and Geoinformatics*, **5**(3), 353-367. DOI: https://doi.org/10.30897/ijegeo.484067.

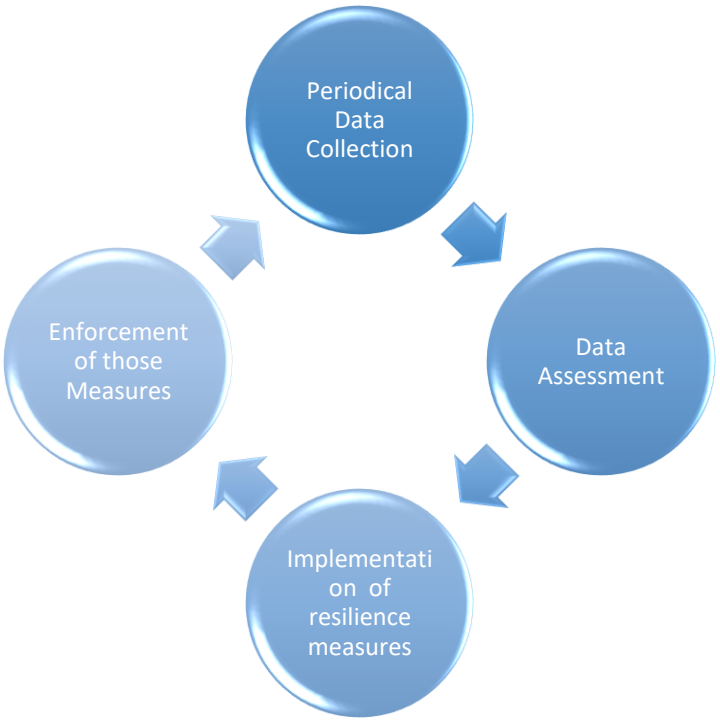
[689] Wu, Z., Chen, R., Meadows, M. E., & Liu, X. (2021). Application of the Ocean Health Index to assess ecosystem health for the coastal areas of Shanghai, *China. Ecological Indicators*, **126**, 107650. DOI: https://doi.org/10.1016/j.ecolind.2021.107650.

[690] Gollasch, S., & David, M. (2011). Sampling methodologies and approaches for ballast water management compliance monitoring. *Promet-Traffic & Transportation*, **23**(5), 397-405. DOI: https://doi.org/10.7307/ptt.v23i5.158.

[691] Frazier, M., Longo, C., & Halpern, B. S. (2016). Mapping uncertainty due to missing data in the global ocean health index. *PloS one*, **11**(8), e0160377. DOI: https://doi.org/10.1371/journal.pone.0160377.

The implementation of the process for the effective utilisation of OHI data can be summarised below:

Graph 4: Utilisation of OHI data to adopt a sustainable process.



Made by author: 16-11-2022.

Should the development of an aquatic (bio) may be implemented, the enforcement [692]and monitoring of this map's evolution can be supported by IMO's GloBallast Partnerships Programme (GBP) for the enforcement of the BWM Convention's procedures and the installation of corrective actions[693].

Undoubtedly, the ballast water management process is very impactful and effective in handling the unloaded ballast, eliminating all potential environmental hazards[694]. On the other hand, the negative outcome of this process is the mounting

[692] Gerhard, W. A., Lundgreen, K., Drillet, G., Baumler, R., Holbech, H., & Gunsch, C. K. (2019). Installation and use of ballast water treatment systems–Implications for compliance and enforcement. *Ocean & Coastal Management*, **181**, 104907. DOI: https://doi.org/10.1016/j.ocecoaman.2019.104907.
[693] Wang, Z., Saebi, M., Grey, E. K., Corbett, J. J., Chen, D., Yang, D., & Wan, Z. (2022). Ballast water-mediated species spread risk dynamics and policy implications to reduce the invasion risk to the Mediterranean Sea. *Marine Pollution Bulletin*, **174**, 113285. DOI: https://doi.org/10.1016/j.marpolbul.2021.113285.
[694] Werschkun, B., Banerji, S., Basurko, O. C., David, M., Fuhr, F., Gollasch, S., ... & Höfer, T. (2014). Emerging risks from ballast water treatment: The run-up to the International Ballast Water

costs for the vessels and the possible delays in utilising the ballast handling facilities of port authorities[695]. Furthermore, from the vessel's perspective, the ballast helps stabilise the ship during navigation, minimizing vibrations and other emerging incidents caused by the lack of stability. Thus, the vessel's life cycle is effectively increased while its environmental footprint is declining[696].

3.3 The emerging threat of air pollution from the shipping industry (VOC, SOX, NOx, PM)

3.3.1 The status of air pollutants

Shipping is the most robust method of transportation in international trade and is considered the most efficient and environmentally and energy-friendly globally, compared to all other transportation methods[697]. Nevertheless, with the constant increase in transport volume, maritime transport activities continue to cause concern as far as the environment is concerned. Emissions of gaseous pollutants from vessels, such as ozone, nitrogen and sulphur oxides, VOCs and greenhouse gases, contribute to global climate change and air pollution[698].

In particular, the emissions generated by nitrogen and sulfur oxides are the main factors due to which the acidity of water and soil increases because there is a possibility of conversion to active acids[699]. Thus, the air pollutants from shipping emissions constitute a large part of the international emissions of contaminants from humans participating in the year 2007 by approximately 4% to 9% in SO_2, 2.7% in CO_2

Management Convention. *Chemosphere*, **112**, 256-266. DOI: https://doi.org/10.1016/j.chemosphere.2014.03.135.

[695] Wang, Z., Countryman, A. M., Corbett, J. J., & Saebi, M. (2022). Economic and environmental impacts of ballast water management on Small Island Developing States and Least Developed Countries. *Journal of Environmental Management*, **301**, 113779. DOI: https://doi.org/10.1016/j.jenvman.2021.113779.

[696] Song, W., Guo, J., Wang, Y., & Li, L. (2021). An evaluation of the development of the Ocean Economy in China using an Ocean Economic Development Index. *Marine Policy*, **132**, 104691. DOI: https://doi.org/10.1016/j.marpol.2021.104691.

[697] Boviatsis, M., Alexopoulos, A. B., & Vlachos, G. P. (2022). Evaluation of the response to emerging environmental threats, focusing on carbon dioxide (CO2), volatile organic compounds (VOCs), and scrubber wash water (SOx). *Euro-Mediterranean Journal for Environmental Integration*, **7**(3), 391-398. DOI: https://doi.org/10.1007/s41207-022-00325-3.

[698] Alexopoulos A.B., (1998). Tanker Accidents as a Modern Factor in configuring the Chartering Market, *Proceedings: Safety of Maritime Transport*, University of Piraeus, 320-333 (in Greek).

[699] Alexopoulos, A. B. (2001). Environmental Impact of the Maritime Transportation of Crude Oil. An Analysis of Tanker Routine Operations and Serious Casualties with Particular Reference to the Mediterranean Basin. *Revue Hellenique De Droit International*, **1**, 283-298.

and 15% in NOx. Notably, there was an increase in greenhouse gas emissions and pollutants from nitrogen and sulphur dioxides from international shipping from 1990 to 2007, from 585 to 1096 million tons[700]. However, from 2007 to 2012, there was a slight drop in pollutant emissions from international shipping, approaching an average of 1036 million tons[701].

In the Mediterranean, it was estimated that in 2005 emissions from ships of carbon dioxide gases left by the greenhouse were approaching the rate of 90 million tons. The Mediterranean Sea is burdened with more than 50% of total ship emissions compared to other European seas[702]. In Greece, in 2008, the pollutants from ships, carbon dioxide, sulphur dioxide, nitrogen dioxide and PM, reached approximately 13 million tons. In contrast, compared to 1984, there was an increase of 400%, which amounted to almost 3.5 million tons[703]. That is, the estimated carbon dioxide (CO2) emissions were around 12.5 million tons, while the other 0.5 million tons of emissions were due to GHGs. The emissions of ships recorded in the Greek seas were estimated at 7.4 million tons. It is noteworthy that Greece in the same year contributed to the European recording of pollutant emissions from shipping with a percentage of 7.3% and the Mediterranean with a percentage of 14.1%[704].

The impact on the environment that comes from shipping, according to the Clean Shipping Project, is divided into four sections[705]:

a) Carbon dioxide (CO_2) emissions

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[700] Boviatsis, M., Alexopoulos, A. B., & Theodosiou, M. (2019). A Proactive International Regulation System Based on Technological Innovations against Emerging Environmental Threats. *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.

[701] Agrawal, H., Welch, W. A., Miller, J. W., & Cocker, D. R. (2008). Emission measurements from a crude oil tanker at sea. *Environmental science & technology*, **42**(19), 7098-7103. DOI: https://doi.org/10.1021/es703102y.

[702] Endresen, Ø., Eide, M., Dalsøren, S., Sørgård, I. S. I. E., Corbett, J. J., & Winebrake, J. (2010). International maritime shipping: environmental impacts of increased activity levels. *Globalisation, Transport and the Environment*, 161-184.

[703] Russo, M. A., Leitão, J., Gama, C., Ferreira, J., & Monteiro, A. (2018). Shipping emissions over Europe: A state-of-the-art and comparative analysis. *Atmospheric environment*, **177**, 187-194. DOI: https://doi.org/10.1016/j.atmosenv.2018.01.025.

[704] Al Baroudi, H., Awoyomi, A., Patchigolla, K., Jonnalagadda, K., & Anthony, E. J. (2021). A review of large-scale CO2 shipping and marine emissions management for carbon capture, utilisation and storage. *Applied Energy*, **287**, 116510. DOI: https://doi.org/10.1016/j.apenergy.2021.116510.

[705] Kim, A. R., & Seo, Y. J. (2019). The reduction of SOx emissions in the shipping industry: The case of Korean companies. *Marine Policy*, **100**, 98-106. DOI: https://doi.org/10.1016/j.marpol.2018.11.024.

b) Emissions of nitrogen oxides (NOx) and volatile organic compounds (VOC)
c) Emissions of sulphur oxides (SOx) and particulate matter (PM)
d) Generation of waste (liquids and solids)

Environmental pollution in recent years has attracted attention on a local and international scale, combined with the damage caused by corrosion in shipping, thus leading to the adoption of new regulations on a local and global scale[706]. Shipping energy has always been the main focus of the various environmental issues that are responsible for air pollution, in particular locally related pollutants, such as emissions of nitrogen oxides, sulphur and PM. With the international integration of ECAs, an attempt is being made to address this issue and minimize the negative impact on the environment exerted by the shipping sector[707].

At a global level and on a regional basis, meetings and agreements are held, as well as some organisations in various ways are active in shipping. The IMO, headquartered in London, is one of the oldest and most important global organisations that control shipping. The IMO is responsible for taking appropriate measures for maritime safety and environmental protection, the protection of vessels and crew on board, and the creation of new regulations on shipping according to which maritime states should comply with them[708]. Thus, IMO is the principal stakeholder in adopting necessary measures to counter air pollutants and eliminate any source of pollution[709].

Based on MARPOL 73/78, the primary Convention for countering any pollution, appropriate measures to prevent ships from polluting the atmosphere should be installed. Specifically, the relevant regulations regarding air pollution have been incorporated in Annex VI, which has been in force since 2005. In addition, more

[706] Tromiadis, R., & Stanca, C. (2014). Comparative analysis of tanker ships incidents and their environment impacts. *In Advanced Materials Research* (Vol. 837, pp. 775-779). Trans Tech Publications Ltd. DOI: https://doi.org/10.4028/www.scientific.net/AMR.837.775.
[707] Ostad-Ali-Askari, K. (2022). Management of risks substances and sustainable development. *Applied Water Science*, **12**(4), 1-23. DOI: https://doi.org/10.1007/s13201-021-01562-7.
[708] Zhang, S., Chen, J., Wan, Z., Yu, M., Shu, Y., Tan, Z., & Liu, J. (2021). Challenges and countermeasures for international ship waste management: IMO, China, United States, and EU. *Ocean & Coastal Management,* **213**, 105836. DOI: https://doi.org/10.1016/j.ocecoaman.2021.105836.
[709] IMO, (2019). Air Pollution, Energy Efficiency and Greenhouse Gas Emissions. Available at: Air Pollution, Energy Efficiency and Greenhouse Gas Emissions (imo.org), last assessed: 30-8-2022.

stringent measures are being introduced from the revised MARPOL Annex VI, which have been submitted by the IMO and concern sulphur and nitrogen oxides[710].

Subject to sustainable shipping, the European Union aims to reduce greenhouse gases from maritime transport by at least 40%. With the introduction of ammonia as a sustainable solution as a maritime fuel in a few decades, discussions are being made to set the aim at 70%. It is also stated that shipping should offer assistance to reduce pollutant emissions locally and internationally[711].

European Union legislation has been regulated in accordance with the IMO rules based on the formal order in written form 2012/33/EU, which changed the official order 1999/32/EC concerning the sulphur quantity of marine fuels[712]. There are no arrangements in this directive that adapt nitrogen dioxide emissions or PM from ships. In addition, more stringent sulphur content limits in marine fuels have been established from 1.00% until 31-12-2014, descended on 1-1-2015 to the rate of 0.10%. In comparison, in maritime locations outside the limits of SECAs, from 3.50% in force under the regulation fell from 1-1-2020 to 0.50%. The limitations of quantity in sulphur with the corresponding margins in SECAs and on an international scale are assessed in detail below[713].

In order to minimise the maritime sector's negative impact on the environment and the new regulations introduced by the IMO on sulphur emissions, other rules, systems, and indexes are in place. Some of them are the following[714]:

a) Tier I, Tier II and Tier III regulations concerning emissions of nitrogen oxides from marine engines.

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[710] IMO, (2019). Prevention of Air Pollution from Ships. Available at: Prevention of Air Pollution from Ships (imo.org), last assessed: 30-8-2022.

[711] Awoyomi, A., Patchigolla, K., & Anthony, E. J. (2019). CO2/SO2 emission reduction in CO2 shipping infrastructure. International *Journal of Greenhouse Gas Control*, **88**, 57-70. DOI: https://doi.org/10.1016/j.ijggc.2019.05.011.

[712] Donner, P., & Johansson, T. (2018). Sulphur directive, short sea shipping and corporate social responsibility in a EU Context. *In corporate social responsibility in the maritime industry* (pp. 149-166). Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-69143-5_9.

[713] Kelektsoglou, K. (2018). Carbon capture and storage: A review of mineral storage of CO2 in Greece. *Sustainability*, **10**(12), 4400. DOI: https://doi.org/10.3390/su10124400.

[714] Yusuf, A. A., Inambao, F. L., & Ampah, J. D. (2022). Evaluation of biodiesel on speciated PM2. 5, organic compound, ultrafine particle and gaseous emissions from a low-speed EPA Tier II marine diesel engine coupled with DPF, DEP and SCR filter at various loads. *Energy*, **239**, 121837. DOI: https://doi.org/10.1016/j.energy.2021.121837.

b) Energy Efficiency Design Index (EEDI) is a universal official order in written form that determines the energy efficiency of new ships and monitors the number of harmful emissions.
c) The Ship Energy Efficiency Management Plan (SEEMP) measures and controls GHG emissions from the existing shipping fleet[715].

3.3.2 Emission Control Areas (ECAs)

Compared with those imposed internationally, more stringent regulations are being imposed on emissions to specific geographical locations. Those locations, namely Emission Control Areas (ECAs), are defined for sulphur oxides and nitrogen emissions generated by ships or even for both emission categories[716].

In North America, ECAs began implementing the regulations in August 2012, which owns the most significant part of the coasts of the United States of America and Canada, plus the coasts of Hawaii[717]. The area of ECAs from the shore is 200 nautical miles. Caribbean ECAs have been implementing the regulations since January 2014, encompassing the U.S. Virgin Islands and Puerto Rico[718]. The North Sea, the Baltic Sea and the Channel have been selected as ECAs to reduce emissions of sulphur oxides and for this reason, they have been named Sulphur Emission Control Areas (SECAs). Since 2006 the Baltic Sea has been implementing the regulations and since 2007 the North Sea and the Channel[719].

The Mediterranean is an immense European sea that has not been selected as a SECA region. However, the increased travel of ships in the Mediterranean has resulted in an increase in emissions, which is the main reason it is selected and defined in SECAs regulations. The SAFEMED programme, which the European Union funds,

[715] Hansen, E. K., Rasmussen, H. B., & Lützen, M. (2020). Making shipping more carbon-friendly? Exploring ship energy efficiency management plans in legislation and practice. *Energy Research & Social Science*, **65**, 101459. DOI: https://doi.org/10.1016/j.erss.2020.101459.
[716] IMO. (2019). IMO 2020 – cutting sulphur oxide emissions. Available at: IMO 2020 – cutting sulphur oxide emissions, last assessed: 30-8-2022.
[717] Chen, J., Wan, Z., Zhang, H., Liu, X., Zhu, Y., & Zheng, A. (2018). Governance of shipping emission of SO x in China's coastal waters: the SECA policy, challenges, and directions. *Coastal Management*, **46**(3), 191-209. DOI: https://doi.org/10.1080/08920753.2018.1451727.
[718] Dulebenets, M. A. (2018). The green vessel scheduling problem with transit time requirements in a liner shipping route with Emission Control Areas. *Alexandria Engineering Journal*, **57**(1), 331-342. DOI: https://doi.org/10.1016/j.aej.2016.11.008.
[719] Cullinane, K., & Bergqvist, R. (2014). Emission control areas and their impact on maritime transport. *Transportation Research Part D: Transport and Environment*, **28**, 1-5. DOI: https://doi.org/10.1016/j.trd.2013.12.004.

is responsible for the preparations required for submitting the application to the IMO to integrate the Mediterranean as an ECA region[720].

3.3.3 Evaluation of the legislative framework covering the pollutants

Undoubtedly, during the last years, IMO and other international bodies have adopted a successful set of measures to counter the emerging threat from air pollutants. Specifically, regarding CO2 emissions, new sets of rules based on MEPC 76 and SEEMP have been installed, which, in conjunction with the CCS method, lead to an unprecedented reduction of the majority of emissions[721]. Furthermore, regarding VOCs, the mandatory utilisation of vapour lines in port facilities has been internationally introduced, subject to Regulation 15 of MARPOL Annex VI[722]. Additionally, regarding Sox scrubber wash waters[723], IMO 2020 directed the shipping community towards the utilisation of scrubber systems and fuels of high quality as an alternate factor for countering emerging environmental threats[724].

Additionally, another critical factor is the role of technology in the implementation and enforcement of the adopted regulatory framework. Specifically, including technology in the shipping industry has been substantial over the last few years. After the spread of Covid-19, various sections of the maritime industry rely solely on technology, abolishing the human element[725]. Technology has also been of significant help to the shipbuilding industry and in developing new materials to increase the quality and performance of newly built vessels. That said, the massive reliance on technology leads to the development and processes which rely on recently introduced

[720] EMSA, (2022). SAFEMED IV - C1 Flag State Implementation. Available at: Tag: SAFEMED IV - C1 Flag State Implementation - EMSA - European Maritime Safety Agency (europa.eu), last assessed: 30-8-2022.

[721] del Río González, P. (2008). Policy implications of potential conflicts between short-term and long-term efficiency in CO2 emissions abatement. *Ecological economics*, **65**(2), 292-303. DOI: https://doi.org/10.1016/j.ecolecon.2007.06.013.

[722] Herkenrath S., (2019). Development of SOx Emissions about MARPOL Annex VI, Degree Thesis: Marine Technology, *Programme in Maritime Management*, Turku, https://urn.fi/URN:NBN:fi:amk-2019120925454.

[723] Henriksson, T. (2007). SOx scrubbing of marine exhaust gases. *Wärtsilä Technical Journal*, **2**, 55-58.

[724] Boviatsis, M., & Tselentis, B. (2019). A comparative analysis between EU MRV and IMO DCS—the need to adopt a harmonised regulatory system. *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.

[725] Kumaravel, S. K., Subramani, R. K., Jayaraj Sivakumar, T. K., Madurai Elavarasan, R., Manavalanagar Vetrichelvan, A., Annam, A., & Subramaniam, U. (2020). Investigation on the impacts of COVID-19 quarantine on society and environment: Preventive measures and supportive technologies. *3 Biotech*, **10**(9), 1-24. DOI: https://doi.org/10.1007/s13205-020-02382-3.

materials, which initially help on issues such as navigation but can be the leading cause of other kinds of pollution[726].

A typical example is the above-assessed case of ballast water, which was utilised to help the vessel's stability but ultimately led to the destruction of regional maritime environments. Another example is the utilization of anti-fouling systems, which increase a vessel's speed and life cycle but, simultaneously, cause pollution to regional environments. Thus, the utilisation of technology and new processes should be coupled with the instalment of proactive measures to access and prevent the creation of emerging pollutants[727].

3.4 Election of the most Sustainable Marine Fuel

With the adoption of the new regulatory framework and the enforcement of sufficient legislations, such as the IMO low sulphur cap, currently, there are three fuel options for shipping companies, namely[728]:

a) Use of H.F.O. with the installation of emission reduction technologies on the vessels.
b) Use of M.G.O. or ULSFO as compatible fuels.
c) Use of LNG as fuel.

Specifically, the first option is to install an exhaust gas desulphurisation system on the vessel, the so-called Scrubber, which reduces sulphur oxide emissions from Heavy Fuel Oil (H.F.O.), and the second option is to use Marine Gas Oil (M.G.O.), which has a minimum sulphur oxide content but, as a consequence, these alternatives will create a financial burden on shipowners[729]. Thus, the fluctuation of marine fuel prices is a crucial factor to consider in selecting an ideal alternative in the coming

[726] Javadinejad, S., Ostad-Ali-Askari, K., & Jafary, F. (2019). Using simulation model to determine the regulation and to optimize the quantity of chlorine injection in water distribution networks. *Modeling Earth Systems and Environment*, **5**(3), 1015-1023. DOI: https://doi.org/10.1007/s40808-019-00587-x.
[727] Boviatsis, M., Alexopoulos, A. B., & Theodosiou, M. (2019). A Proactive International Regulation System Based on Technological Innovations against Emerging Environmental Threats. *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.
[728] Boviatsis, M., Polemis, D., & Alexopoulos, A. (2022). An Assessment of the Most Sustainable Marine Fuel based on the Present Regulatory Framework and Future Trends. *Journal of Shipping and Ocean Engineering,* **12**, 43-52. DOI: 10.17265/2159-5879/2022.02.002.
[729] Bilgili, L. (2021). Life cycle comparison of marine fuels for IMO 2020 Sulphur Cap. *Science of the total Environment*, **774**, 145719. DOI: https://doi.org/10.1016/j.scitotenv.2021.145719.

years[730]. However, many factors such as the required investments, the operating costs and the availability of the fuel have a significant impact on the final choice. It should be stated that presently, the shipping industry has led its attention toward utilising ammonia as a viable marine fuel. Still, the assessment of this option is currently in a preliminary stage, and this option is not yet available[731].

3.4.1. Use H. F. O. with Scrubber

The scrubber is the most viable option to remove sulfur oxides and PM by incorporating an SCR or EGR system to reduce nitrogen oxide emissions. This implies from the event that this combination meets the requirements of SECA areas and the requirements of the Tier III regulation in ECAs locations[732].

An essential advantage of using the scrubber is that there is no need to upgrade, develop, or install new machinery on the vessel. The shipowner may continue to use H.F.O. as fuel, thus keeping the operating costs down while taking advantage of the already installed fuel supply network of H.F.O. Nevertheless, the sulphur content of this fuel is high. Therefore, the utilization of a scrubber is paramount since it contributes to the reduction of sulfur oxides and even more so of PM, which is confirmed after appropriate measurements[733].

The inadequacy of appropriate infrastructure in ports for managing waste generated during its use is a major disadvantage in scrubber technology. The inadequacy of the infrastructure, combined with the lack of regulations concerning the port's obligation to collect and then destroy the waste, in July 2011 forced the IMO to adopt a resolution giving appropriate instructions for waste collection infrastructure in Annex VI to MARPOL[734]. To avoid creating discouragement so that waste is not safely

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[730] Zis, T. P., Cullinane, K., & Ricci, S. (2022). Economic and environmental impacts of scrubbers investments in shipping: a multi-sectoral analysis. *Maritime Policy & Management*, **49**(8), 1097-1115. DOI: https://doi.org/10.1080/03088839.2021.1937742.

[731] Li, K., Wu, M., Gu, X., Yuen, K. F., & Xiao, Y. (2020). Determinants of ship operators' options for compliance with IMO 2020. *Transportation Research Part D: Transport and Environment*, **86**, 102459. DOI: https://doi.org/10.1016/j.trd.2020.102459.

[732] Chen, L., Yip, T. L., & Mou, J. (2018). Provision of Emission Control Area and the impact on shipping route choice and ship emissions. *Transportation Research Part D: Transport and Environment*, **58**, 280-291. DOI: https://doi.org/10.1016/j.trd.2017.07.003.

[733] Abadie, L. M., Goicoechea, N., & Galarraga, I. (2017). Adapting the shipping sector to stricter emissions regulations: Fuel switching or installing a scrubber?. *Transportation Research Part D: Transport and Environment*, **57**, 237-250. DOI: https://doi.org/10.1016/j.trd.2017.09.017.

[734] Zis, T. P., & Cullinane, K. (2020). The desulphurisation of shipping: Past, present and the future under a global cap. *Transportation Research Part D: Transport and Environment*, **82**, 102316. DOI: https://doi.org/10.1016/j.trd.2020.102316.

delivered ashore due to unjustified delay or high costs, developing a new system is the most appropriate way to obtain waste[735].

Although the utilization of scrubbers helps to reduce emissions of sulfur and PM, it does not reduce the percentage of carbon dioxide emissions, which is practically the main disadvantage plus, to meet the requirements of the IMO, the use of each version of scrubbers should be first certified by the same competent body[736]. In addition, the scrubber as an equipment machine is very large, resulting in some ships being unable to carry it. Therefore, it is necessary to have a large availability of space for utilising this equipment[737].

3.4.2 Use of MGO or ULSFO

The fuels that the merchant ships burn are divided into two parts, the remnants of distillation and the fractional distillation derivatives. From distillation residues, HFO, because of the high viscosity and high sulfur content, is heavier than the others. The fuels of the second category are subdivided into two categories, MGO and MDO[738].

If the remnants of the distillation are mixed with fuels resulting from fractional distillation, the new fuel that will be created is called the intermediate fuel (IFO)[739]. It is possible to use the HFO and reduce its sulphur content to 0.1% after processing in the refineries, or it can be processed on board the ship via a scrubber. The most feasible oil fuel option is MGO, for adhering to SECAs regulations. If there is a

[735] Wood Mackenzie, (2018). Global Fuel Costs to Surge from 2020. Available at: Wood Mackenzie: Global Fuel Costs to Surge from 2020 - Offshore Energy (offshore-energy.biz), last assessed: 30-8-2022.
[736] Watanabe, Y., & Koyanagi, S. (2016). Development and installation of marine-use hybrid SOx scrubber system that complies with IMO SOx emission regulations. *Mitsubishi Heavy Ind. Tech. Rev*, **53**, 48.
[737] Lehtoranta, K., Aakko-Saksa, P., Murtonen, T., Vesala, H., Ntziachristos, L., Rönkkö, T., ... & Timonen, H. (2019). Particulate mass and nonvolatile particle number emissions from marine engines using low-sulfur fuels, natural gas, or scrubbers. *Environmental science & technology*, **53**(6), 3315-3322. DOI: https://doi.org/10.1021/acs.est.8b05555.
[738] Van, T. C., Ramirez, J., Rainey, T., Ristovski, Z., & Brown, R. J. (2019). Global impacts of recent IMO regulations on marine fuel oil refining processes and ship emissions. *Transportation Research Part D: Transport and Environment*, **70**, 123-134. DOI: https://doi.org/10.1016/j.trd.2019.04.001.
[739] Vedachalam, S., Baquerizo, N., & Dalai, A. K. (2022). Review on impacts of low sulfur regulations on marine fuels and compliance options. *Fuel*, **310**, 122243. DOI: https://doi.org/10.1016/j.fuel.2021.122243.

surplus of HFO in the refineries through processes, for example, pyrolysis, MGO can be produced[740].

MGO, whose sulphur content is less than 0.1% and whose properties are almost identical to diesel fuel, is used for high-speed diesel engines and is readily available. Compared to HFO and MDO, the viscosity of MGO, which is at a low level, is required several times to be cooled to keep it low in viscosity and to be in absolute proportion to the benchmarks of the two-stroke diesel engine. This method prevents damage to fuel pumps and any other equipment[741]. The viscosity should not be below 2cSt, while the viscosity of the water is at 1cSt at 20^{o}C, entering the engine and should typically be above 3cSt. The difference of HFO preheated (80 – 150^{o}C) in cooled MGO (maximum temperature 35^{o}C) when entering SECA should be made with great care to the standard fuel viscosity, especially in common engines with a Common Rail System. Modifying lubricating oil to oil of different quality will probably help the use of MGO in the long term[742].

Thus, the drastic reduction of sulphur oxides and PM emissions with the use of MGO is viable. Also, during the utilization of HFO, the emissions of GHG and nitrogen oxides remain constant[743]. To comply with the emissions of nitrogen oxides based on Tier III, as in the scrubber case, it is necessary to use the SCR and EGR systems[744].

Although the MGO is more expensive than the HFO, it is superior to the other alternatives since it is no need to convert to an engine or replace a tank. At the same time, the capital needed to adopt this alternative is minimal to even zero[745].

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[740] Serra, P., & Fancello, G. (2020). Towards the IMO's GHG goals: A critical overview of the perspectives and challenges of the main options for decarbonizing international shipping. *Sustainability*, **12**(8), 3220. DOI: https://doi.org/10.3390/su12083220.

[741] Krantz, G., Brandao, M., Hedenqvist, M., & Nilsson, F. (2022). Indirect CO2 emissions caused by the fuel demand switch in international shipping. *Transportation Research Part D: Transport and Environment*, **102**, 103164. DOI: https://doi.org/10.1016/j.trd.2021.103164.

[742] Bertau, M., Kraft, M., Plass, L., & Wernicke, H. J. (2021). *Methanol. Handbook of Fuels: Energy Sources for Transportation*, 245-306. DOI: https://doi.org/10.1002/9783527813490.ch10.

[743] Inal, O. B., Charpentier, J. F., & Deniz, C. (2022). Hybrid power and propulsion systems for ships: Current status and future challenges. *Renewable and Sustainable Energy Reviews*, **156**, 111965. DOI: https://doi.org/10.1016/j.rser.2021.111965.

[744] Watanabe, M. D. B., Cherubini, F., & Cavalett, O. (2022). Climate change mitigation of drop-in biofuels for deep-sea shipping under a prospective life-cycle assessment. *Journal of Cleaner Production*, **364**, 132662. DOI: https://doi.org/10.1016/j.jclepro.2022.132662.

[745] Livaniou, S., Chatzistelios, G., Lyridis, D. V., & Bellos, E. (2022). LNG vs. MDO in Marine Fuel Emissions Tracking. *Sustainability*, **14**(7), 3860. DOI: https://doi.org/10.3390/su14073860.

3.4.3 Liquefied Natural Gas (LNG)

It has been proved that machines that burn LNG are a reliable option because it does not pollute the environment and their sulfur content is negligible. From the combustion of LNG, the exhaust emissions generated by sulfur oxides[746] and PM are insignificant. In the four-stroke Otto engines, emissions of nitrogen oxides can be reduced from 80% to 90%, while in two-stroke engines, from 10% to 20%. Compared to other fuels, LNG has a lower carbon content, thus reducing carbon dioxide emissions by around 20%[747].

The LNG storage is done in cryogenic tanks due to its shallow temperature (-162^{o}C). Its fundamental element is methane and other hydrocarbons (such as butane, ethane, and propane), as well as other substances in minimal quantity (such as carbon dioxide, nitrogen, hydrogen sulfide, etc.). Its exact component fluctuates according to the location[748]. It is necessary to have an additional ignition source because the self-ignition temperature of LNG is high. On the other hand, natural gas is lighter than air, and the extent of its flammability is small and can also be fired by two-stroke gas engines or four-stroke Otto engines.

However, methane negatively impacts the environment due to the *"methane slip"* phenomenon that results exclusively from the four-stroke Otto engines that burn double combustion[749]. In this sector, the development of technology is developing rapidly, and regarding the issue of *"methane slip"*, the engine manufacturers believe that it will be significantly reduced in the future. Therefore, LNG is considered a marine fuel and the most viable alternative with prospects for the present and future, if nothing

[746] Thaler, B., Kanchiralla, F. M., Posch, S., Pirker, G., Wimmer, A., Brynolf, S., & Wermuth, N. (2022). Optimal design and operation of maritime energy systems based on renewable methanol and closed carbon cycles. *Energy Conversion and Management*, **269**, 116064. DOI: https://doi.org/10.1016/j.enconman.2022.116064.

[747] Tian, M., Cai, H., and Zou, H. 2018. "Reducing the Carbon Emission in Shipping Industry—Application and Development of LNG Fueled Ships in China." *In Proceedings of the 7th International Conference on Energy, Environment and Sustainable Development (ICEESD 2018)*, pp. 271-5. Amsterdam: Atlantis Press.

[748] Aneziris, O., Koromila, I., Gerbec, M., Nivolianitou, Z., & Salzano, E. (2022). Ship-to-ship Lng Bunkering: Risk Assessment and Safety Zones. *Chemical Engineering Transactions*, **91**, 535-540. DOI: https://doi.org/10.3303/CET2291090.

[749] Dev, S., Yousefi, A., Lafrance, S., Missaghian, R., & Guo, H. (2022). A Study on the Use of Intake Flow Path Modification to Reduce Methane Slip of a Natural Gas-Diesel Dual-Fuel Engine, *SAE Technical Paper* (No. 2022-01-0467). DOI: https://doi.org/10.4271/2022-01-0467.

else, for making short voyages and overseas trade when proper facilities have been installed[750].

3.4.4 The option of ammonia and predictions for the future

Based on the research of DNV-GL[751], the three available options for marine fuels will have equal shares in the fuel market, but after 2028 the landscape will change gradually in favour of LNG[752]. Specifically, with the installation of port facilities and further development of safety management processes, LNG will be progressively chosen as the most cost, safe and energy-efficient option for marine fuel[753].

From figure 2 below, it can be evidenced that the utilization of ULSFO and M.G.O. will gradually decrease, faster than the utilization of H.F.O., until the domination of the market from the utilization of ammonia in the 2040s[754]. The trend of H.F.O. will be similar but from his outright replacement from the advanced biodiesels near 2035[755].

The LNG is installed as the emerging giant of the market, gradually dominating the market until the 2040s up until its demise from the utilization of ammonia in 2042-2043[756]. Thus, according to the forecast of DNV-GL and other

[750] Balcombe, P., Heggo, D. A., & Harrison, M. (2022). Total Methane and CO2 Emissions from Liquefied Natural Gas Carrier Ships: The First Primary Measurements. *Environmental science & technology*, **56**(13), 9632-9640. DOI: https://doi.org/10.1021/acs.est.2c01383.

[751] DNV-GL, (2019). Forecasting the effects of world fleet decarbonization options. Available at: Forecasting the effects of world fleet decarbonization options - DNV, last assessed: 30-8-2022.

[752] Boviatsis, M., Polemis, D., & Alexopoulos, A. (2022). An Assessment of the Most Sustainable Marine Fuel Based on the Present Regulatory Framework and Future Trends. *Journal of Shipping and Ocean Engineering*, **12**, 43-52. DOI: doi: 10.17265/2159-5879/2022.02.002.

[753] Global Maritime Forum. (2022). The Scale of Investment Needed to Decarbonize International Shipping. Available at: The scale of investment needed to decarbonize international shipping (globalmaritimeforum.org), last assessed: 30-8-2022.

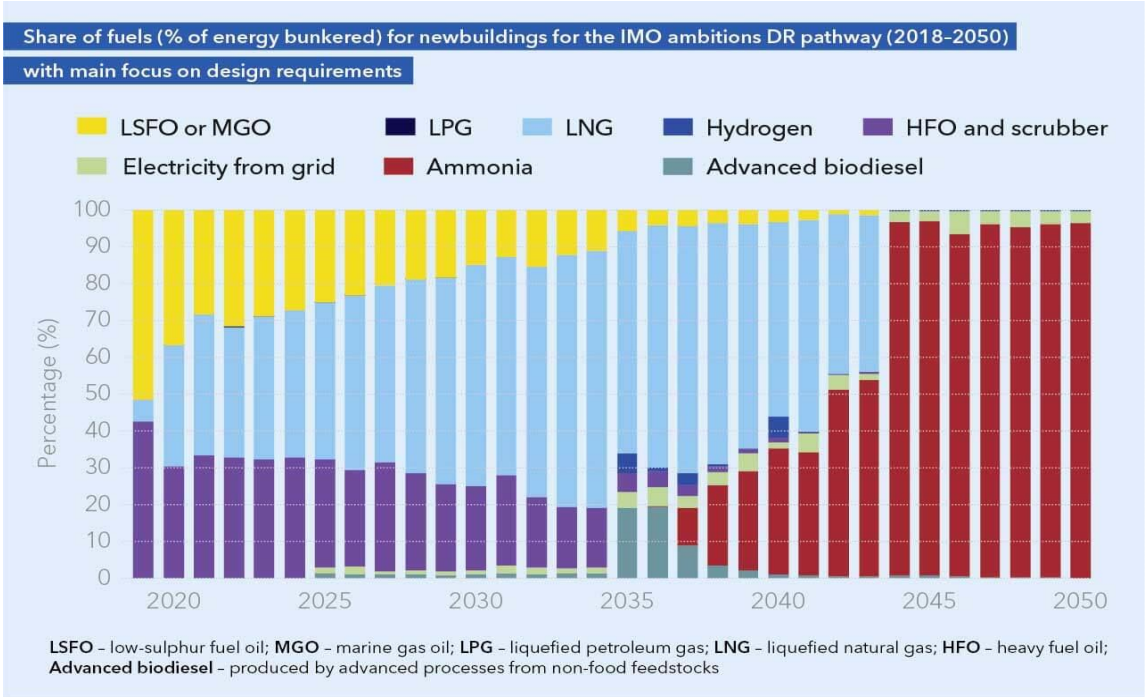
[754] Seckinger, N., & Radgen, P. (2021). Dynamic Prospective Average and Marginal GHG Emission Factors—Scenario-Based Method for the German Power System until 2050. *Energies*, **14**(9), 2527. DOI: https://doi.org/10.3390/en14092527.

[755] Boviatsis, M. 2021. "A Comparative Analysis upon the Utilization of Exhaust Gas Cleaning Systems, LNG Fuels or Conventional Fuels as the Most Viable Options to Comply with the New IMO Low Sulfur Cap Regulations." In Proceedings of the *17th International Conference on Environmental Science and Technology*, Athens, Greece, 1 to 4 September 2021.

[756] Lehtoranta, K., Aakko-Saksa, P., Murtonen, T., Vesala, H., Ntziachristos, L., Rönkkö, T., ... & Timonen, H. (2019). Particulate mass and nonvolatile particle number emissions from marine engines using low-sulfur fuels, natural gas, or scrubbers. *Environmental science & technology*, **53**(6), 3315-3322. DOI: https://doi.org/10.1021/acs.est.8b05555.

researchers, ammonia will be the dominant force in the marine fuel market in the 2050s[757].

Figure 2: Forecast on the fuel share.



DNV-GL, 2019. Forecasting the effects of world fleet decarbonization options. Available at: Forecasting the effects of world fleet decarbonization options - DNV.

Undoubtedly, the dominion of the maritime fuel market from a fuel that has not yet been developed or utilised might be found odd, but the case of ammonia is not the first to be evidenced. Similarly, LNG was used as fuel initially in LNG vessels, and currently, its expansion is proportionate to the instalment of LNG facilities in ports, such as FSRUs. Evidently, ammonia will have the same course, from its initiation in 2037 until its complete acceptance in 2043[758].

Ammonia is a compound of nitrogen and hydrogen with the formula NH3. Its energy density is about half that compared to bunker fuels and is kept in a liquid form at -33oC, so the high-pressure or cryogenic tanks utilised in LNG are not required for

[757] DNV-GL, (2019). Forecasting the effects of world fleet decarbonization options. Available at: Forecasting the effects of world fleet decarbonization options - DNV, last assessed: 30-8-2022.
[758] Boviatsis, M., Polemis, D., & Alexopoulos, A. (2022). An Assessment of the Most Sustainable Marine Fuel based on the Present Regulatory Framework and Future Trends. *Journal of Shipping and Ocean Engineering* (**12**), 43-52. DOI: 10.17265/2159-5879/2022.02.002.

ammonia[759]. Also, ammonia needs specialised internal combustion engines, which will be available in the late 2024s[760]. The loading and unloading of ammonia as a fuel will be similar to the handling of ammonia as a commodity; thus, special training will have to be executed for the port employees to be able to execute the process of ammonia bunkering safely[761].

Another issue is the installation of safety processes to avoid or adequately counter such incidents[762]. Ammonia is highly toxic compared to other fuels; thus, special considerations should be made[763]. Additionally, special facilities should be installed[764]. The transition from fossil fuel ammonia to scalable green or blue ammonia, synthesized from renewable hydrogen or fossil fuels and CCS, must first be initiated to achieve emission neutrality[765].

But until the adoption of ammonia as an option for marine fuel, the utilization of LNG is undoubtedly the best option, especially from an environmental perspective, especially when considering the continuously increasing economic benefits[766].

3.4.5 Economic benefits of the utilization of LNG as fuel

The economic efficiency of using LNG as a marine fuel is essential. Most researchers are concentrated on logistics and the safe utilization of LNG. In the shipping sector, the most prominent candidates for adopting LNG as a fuel are initially the LNG,

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[759] Zincir, B. (2020, November). A short review of ammonia as an alternative marine fuel for decarbonised maritime transportation. *In Proceedings of international conference on energy, environment and storage of energy* (ICEESEN2020) (pp. 19-21).

[760] Dolan, R. H., Anderson, J. E., & Wallington, T. J. (2021). Outlook for ammonia as a sustainable transportation fuel. *Sustainable Energy & Fuels*, **5**(19), 4830-4841. DOI: https://doi.org/10.1039/D1SE00979F.

[761] Cheliotis, M., Boulougouris, E., Trivyza, N. L., Theotokatos, G., Livanos, G., Mantalos, G., ... & Venetsanos, A. (2021). Review on the safe use of ammonia fuel cells in the maritime industry. *Energies*, **14**(11), 3023. DOI: https://doi.org/10.3390/en14113023.

[762] Dimitriou, P., & Javaid, R. (2020). A review of ammonia as a compression ignition engine fuel. *International Journal of Hydrogen Energy*, **45**(11), 7098-7118. DOI: https://doi.org/10.1016/j.ijhydene.2019.12.209.

[763] Kim, H., Koo, K. Y., & Joung, T. H. (2020). A study on the necessity of integrated evaluation of alternative marine fuels. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **4**(2), 26-31. DOI: https://doi.org/10.1080/25725084.2020.1779426.

[764] Kim, K., Roh, G., Kim, W., & Chun, K. (2020). A preliminary study on an alternative ship propulsion system fueled by ammonia: Environmental and economic assessments. *Journal of marine science and engineering*, **8**(3), 183. DOI: https://doi.org/10.3390/jmse8030183.

[765] Global Maritime Forum, (2022). Ammonia as a shipping fuel. Available at: Ammonia as a shipping fuel (globalmaritimeforum.org), last assessed: 30-8-2022.

[766] MacFarlane, D. R., Cherepanov, P. V., Choi, J., Suryanto, B. H., Hodgetts, R. Y., Bakker, J. M., ... & Simonov, A. N. (2020). A roadmap to the ammonia economy. *Joule*, **4**(6), 1186-1205. DOI: https://doi.org/10.1016/j.joule.2020.04.004.

followed by other tankers, dry bulks and container ships. Cruise ships, passenger ships, ferries, and ships operated by a dynamic positioning system in the use of dual-fuel engines, need more adaptations for the LNG machinery to be installed. It would be interesting in the category of ships using the dynamic positioning system to examine whether it is possible to use LNG as a fuel in drilling ships. An essential reason for using LNG is the competitive prices compared to other liquid fuels[767].

Regarding the utilization of LNG, this rests on the delay in installing the required facilities. Only the most economically strong regions, such as Europe and America, can readily install the necessary facilities. Nevertheless, since 2015, most developed shipping companies have built merchant ships that use LNG as fuel, and others aim to follow the same plan. The market information from the order books of the shipyards proves that the orders of new vessels utilizing LNG as fuel are doubled each year[768].

Although there has been an increase in the price of natural gas in recent years globally, LNG continues to be economically competitive compared to the already existing prices of liquid fuels. In addition, a brief review and presentation of the evolution of prices for peripheral regions indicate that the price of LNG varies according to the area[769]. In many regions, the global trend remains stable, but the OECD America region is an exception; as in North America, the increase in gas production has resulted in lower prices since 2004. The prices mentioned above are at levels lower than the percentage of 50% compared to the global price of natural gas. In general, the prices of peripheral regions are lower than the average world price (e.g. Asia except for China); according to the statistics, these regions export only natural gas. In areas where domestic supply is higher than regional demand, it brings about price fluctuations, thus

[767] Merkouris-Stylopoulos J. and Alexopoulos A.B., (2017). The Commercial and Economic Effects of Fuel Additives in the Maritime Industry in a heavily environmentally Regulated Market, *in 5th IC-SIM Conference Proceedings on Strategic Innovative Marketing*, (eds.)

[768] Lee, H. J., Yoo, S. H., & Huh, S. Y. (2020). Economic benefits of introducing LNG-fuelled ships for imported flour in South Korea. *Transportation Research Part D: Transport and Environment*, **78**, 102220. DOI: https://doi.org/10.1016/j.trd.2019.102220.

[769] Boviatsis, M. 2021. "A Comparative Analysis upon the Utilization of Exhaust Gas Cleaning Systems, LNG Fuels or Conventional Fuels as the Most Viable Options to Comply with the New IMO Low Sulfur Cap Regulations." In Proceedings of the *17th International Conference on Environmental Science and Technology*, Athens, Greece, 1 to 4 September 2021.

creating opportunities for shipping companies to invest in technologies to use LNG in dual-fuel engines[770].

The closest price trends to the world averages are those of OECD Europe countries, in line with the European continent, which is a net importer from other regions[771]. The Middle East and China spend less than a quarter of the quantities consumed by OECD American countries. Although there has been no mention of the data used for these areas in the last ten years, they show the highest overall growth in the amount of fuel transported in their ports[772]. Asia, except for China, is a region with developed ports strongly linked to the average global price of LNG, especially in recent years. On the other hand, since the 80s, Europe has been a net exporter and domestic use in recent years has had a steady upward trend[773].

Globally, in the last 40 years, there has been an increase in the use of natural gas, especially in some areas; there is a more significant increase compared to others. The rise in consumption is linked to the evolution of natural gas production and distribution facilities, as well as to the technical knowledge gathered, facilitating the development of the utilization of natural gas in the shipping industry. Generally, the use made in the OECD Americas areas is more significant than in other areas, including the transport sector, which reduces the potential risk of shipping companies that gain access to the LNG segment[774].

The countries of Europe and Eurasia are on the increase in the consumption of natural gas, as far as Europe is concerned, with maritime applications also included, having many ships involved in the field which use only natural gas for their propulsion. In addition, European companies that design ship engines (e.g., Wartsila and Rolls-Royce) are responsible for promoting new gas exploitation technologies, including

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[770] Xu, H., & Yang, D. (2020). LNG-fuelled container ship sailing on the Arctic Sea: Economic and emission assessment. *Transportation Research Part D: Transport and Environment*, **87**, 102556. DOI: https://doi.org/10.1016/j.trd.2020.102556.

[771] Balcombe, P., Staffell, I., Kerdan, I. G., Speirs, J. F., Brandon, N. P., & Hawkes, A. D. (2021). How can LNG-fuelled ships meet decarbonisation targets? An environmental and economic analysis. *Energy*, **227**, 120462. DOI: https://doi.org/10.1016/j.energy.2021.120462.

[772] OECD, (2019). LNG Market Trends and Their Implications. Available at: LNG Market Trends and Their Implications: Structures, drivers and developments of major Asian importers | READ online (oecd-ilibrary.org), last assessed: 30-8-2022.

[773] Varahrami, V., & Haghighat, M. S. (2018). The assessment of liquefied natural gas (LNG) demand reversibility in selected OECD countries. *Energy Reports*, **4**, 370-375. DOI: https://doi.org/10.1016/j.egyr.2018.05.006.

[774] Ibid.

many ships that are operated by dual-fuel engines or built to work based on the defined operation[775]. In the Middle East, there is an increase in domestic use and, at the same time, in a large amount of natural gas coming out of the country. Given the importance of shipping in transporting raw fuels for their proper processing, the Middle East may be enabling new investments in the shipping industry in the use of natural gas[776].

Presently, the supply of LNG is faced with problems related to the necessary refuelling facilities to be used as fuel on a large scale so that the immediate availability of fuel always meets the energy requirements of ships. Therefore, appropriate facilities and infrastructure are necessary to guarantee secure, reliable and rapid intrusion into LNG. The first start in shipping to exploit LNG on a small scale was made in Norway by the small-sized LNG tanker "Pioneer Knutsen" in 2004, the "Shinju Maru" in 2003 and the "Coral Methane" in 2009, which refers to the primary transport agent that combines in a dual-fuel LNG/ ethylene engine. The totality of building the necessary mechanical infrastructure of large-scale termination stations in the current shipping phase is of paramount importance. Fuel barges could undertake part of the supply chain activities, such as stopping and heating tanks, unloading and maintaining a low temperature[777].

3.4.6 Environmental benefits

To understand why appropriate measures should be taken to reduce the pollution caused to the environment by the shipping industry, it is appropriate to access the negative effects of pollutants on the environment, in the ecosystem, and human life. Initially, it should be established that the partial or complete replacement of conventional marine liquid fuels with natural gas can achieve the aim of a sustainable ship because burning LNG produces zero emissions[778].

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[775] Žaglinskis, J., Rapalis, P., & Lazareva, N. (2018). An overview of natural gas use in ships: necessity and engine supply. Periodica *Polytechnica Transportation Engineering*, **46**(4), 185-193. DOI: https://doi.org/10.3311/PPtr.11708.

[776] Huan, T., Hongjun, F., Wei, L., & Guoqiang, Z. (2019). Options and evaluations on propulsion systems of LNG carriers. *In Propulsion systems* (pp. 1-20). London, UK: IntechOpen.

[777] Spoof-Tuomi, K., & Niemi, S. (2020). Environmental and economic evaluation of fuel choices for short sea shipping. *Clean Technologies*, **2**(1), 4. DOI: https://doi.org/10.3390/cleantechnol2010004.

[778] Jang, H., Jeong, B., Zhou, P., Ha, S., & Nam, D. (2021). Demystifying the lifecycle environmental benefits and harms of LNG as marine fuel. *Applied Energy*, **292**, 116869. DOI: https://doi.org/10.1016/j.apenergy.2021.116869.

Thus, air pollution, mainly produced by other fuels, corresponds to the emissions of various toxic components of the gas or particulate type and is a crucial danger to human life in the environment[779]. According to the International Health Organisation, air pollution is responsible for causing significant events, such as heart attacks, lung cancer, asthma, heart disease, and chronic respiratory diseases. In particular, nitrogen oxides cause negative effects on the nervous system, vision and respiratory system[780]. Nitrogen dioxide, when it reacts with the water vapour of the bronchi and alveoli of the respiratory system, causes reactions. Pulmonary edema is the main symptom, where when nitrogen dioxide accumulates and exceeds 150 ppm, it leads to death. When concentrated in large quantities, carbon monoxide is lethal, an odourless, tasteless and colourless gas[781].

Concerning particulate matter (PM), it can harm the human body in various ways. Adverse effects are divided into the following categories: respiratory, cardiovascular, mutagenic or genotoxic, mainly because of the toxic components with the ability to bind them on their surface and the ability to conduct their transportation from region to region and to penetrate, especially the thinnest, at great depth into the lungs. In addition, it has been pointed out that sulphur dioxide in small quantities and on a long-lasting basis increases the events of lung diseases. At the same time, when particles appear in the atmosphere simultaneously, they worsen the phenomena, increasing mortality. Also, sulfur dioxide and nitrogen dioxide are responsible for creating the sensation of acid rain, which destroys plants, historical monuments, and building materials[782].

Additionally, VOCs in concentration with nitrogen oxides and ozone form the photochemical cloud in the atmosphere of large cities, cause severe problems to human

[779] Sun, S., & Ertz, M. (2020). Life cycle assessment and Monte Carlo simulation to evaluate the environmental impact of promoting LNG vehicles. *MethodsX*, **7**, 101046. DOI: https://doi.org/10.1016/j.mex.2020.101046.

[780] World Health Organisation, (2021). Air Pollution. Available at: Air Pollution | WHO | Regional Office for Africa, last assessed: 29-8-2022.

[781] Theodore, M. K., & Theodore, L. (2021). Effects of Pollutants. *Introduction to Environmental Management*, 61-70. DOI: https://doi.org/10.1201/9781003171126.

[782] Choi, J., Oh, J. Y., Lee, Y. S., Min, K. H., Hur, G. Y., Lee, S. Y., ... & Shim, J. J. (2018). Harmful impact of air pollution on severe acute exacerbation of chronic obstructive pulmonary disease: particulate matter is hazardous. *International journal of chronic obstructive pulmonary disease*, **13**, 1053. DOI: 10.2147/COPD.S156617.

health (e.g. cancer) and help destroy atmospheric ozone. At the same time, some compounds, such as ethylene and formaldehyde, are considered destructive to plants[783].

For the shipping industry, it is an important test to protect the marine environment and encourage the development of maritime transport. For the time being, mainly for economic reasons, given that there is a lack of LNG distribution facilities, there is a preference for the consumption of conventional liquid fuels. They contain in marine fuels high levels of sulfur, metals and carbonate residues; their characteristic feature is their high viscosity and minimum volatility. Due to the characteristics mentioned above, their use in diesel engines is likely to produce large amounts of atmospheric emissions, which correspond to sulphur oxides, nitrogen oxides, carbon monoxide and carbon dioxide[784].

To comply with the rules of MARPOL, one option is to use processed fuels. However, due to the high cost of processing in particular areas, the utilization of LNG is a satisfactory alternative. LNG has been used as a propulsion fuel in LNG tankers for the last 40 years, but recently it has also started to be used as propulsion fuel by other vessels[785].

Air emissions from merchant ships have been primarily addressed, and their results have been highlighted in many research papers. In addition to pollutants caused by shipping which account for 2% to 3% of air emissions and their accumulation in areas that are not large, e.g., in the Baltic Sea, which is one of the most crucial areas, generate exciting outcomes in the relevant research[786]. Diesel engines in these locations are responsible for increasing the rates of air pollution. In addition, with the increase in traffic (on the part of the passing fleet) and without complying with the regulations, it is very likely that emissions will cause a significant problem for the environment in the

[783] Silva, J. S., Rojas, J. P., Norabuena, M., & Seguel, R. J. (2018). Ozone and volatile organic compounds in the metropolitan area of Lima-Callao, Peru. *Air Quality, Atmosphere & Health*, **11**(8), 993-1008. DOI: https://doi.org/10.1007/s11869-018-0604-2.

[784] Balcombe, P., Staffell, I., Kerdan, I. G., Speirs, J. F., Brandon, N. P., & Hawkes, A. D. (2021). How can LNG-fuelled ships meet decarbonisation targets? An environmental and economic analysis. *Energy*, **227**, 120462. DOI: https://doi.org/10.1016/j.energy.2021.120462.

[785] Singh, A. (2022). Economic and Legal Impact of 2020 Sulphur Limit Under Annex VI, MARPOL. *European Energy and Environmental Law Review*, **31**(4). pp. 241 – 257. DOI: https://doi.org/10.54648/eelr2022017.

[786] Jalkanen, J. P., Johansson, L., Wilewska-Bien, M., Granhag, L., Ytreberg, E., Eriksson, K. M., ... & Moldanova, J. (2021). Modelling of discharges from Baltic Sea shipping. *Ocean Science*, **17**(3), 699-728. DOI: https://doi.org/10.5194/os-17-699-2021.

coming years because emissions of nitrogen oxides and sulphur dioxide are predicted to exceed emissions of land systems[787].

In recent years, the IMO has put more stringent measures to limit emissions of sulphur oxides and nitrogen. Annex VI of MARPOL 73/78 was revised after eleven years, after which it was drafted. In February 2008, the IMO Sub-Committee on Bulk Liquids and Gases approved the Correction Plan of the Annex. Annex VI displays the emission limits for nitrogen oxides and sulphur oxides resulting from ships, not allowing emissions of components that pollute the environment and deplete atmospheric ozone[788].

In addition, the IMO and the European Union have designated certain areas called "Emission Control Areas" (ECA), which are strictly controlled in maritime activities. MARPOL also sets emission limits for sulphur and nitrogen oxides in ECAs and international waters. The Commission cannot accept Amendment No 1 to the restrictions relating to the sulphur content of fuels set by MARPOL to limit the sulphur content in the coming years[789].

In 2016, tier III regulations were implemented, aiming to gradually reduce nitrogen oxide emissions (the objective by 2016 was to reduce emissions by 80%). At a global level, the Tier I and Tier II regulations apply, while in the ECAs regions, only the limits of the Tier III regulations apply[790].

[787] Gu, B., Zhang, L., Van Dingenen, R., Vieno, M., Van Grinsven, H. J., Zhang, X., ... & Sutton, M. A. (2021). Abating ammonia is more cost-effective than nitrogen oxides for mitigating PM2. 5 air pollution. *Science*, **374**(6568), 758-762. DOI: 10.1126/science.abf8623.

[788] Bai, J., & Li, X. (2021). IMO's Marine Environmental Regulatory Governance and China's Role: An Empirical Study of China's Submissions. *Sustainability*, **13**(18), 10243. DOI: https://doi.org/10.3390/su131810243.

[789] Argüello, G., Krabbe, N., Langlet, D., Hassellöv, I. M., Martinson, C., & Helmstad, A. (2022). Regulation of ships at anchor: Safety and environmental implications. *Marine Policy*, **140**, 105052. DOI: https://doi.org/10.1016/j.marpol.2022.105052.

[790] Yusuf, A. A., Inambao, F. L., & Ampah, J. D. (2022). Evaluation of biodiesel on speciated PM2. 5, organic compound, ultrafine particle and gaseous emissions from a low-speed EPA Tier II marine diesel engine coupled with DPF, DEP and SCR filter at various loads. *Energy*, **239**, 121837. DOI: https://doi.org/10.1016/j.energy.2021.121837.

3.5 The European and International Institutional Framework of carbon dioxide (CO2) emissions

3.5.1 The development of the two policies

Based on the results from the Third IMO study, it is observed that the sea transported more than 9.8 billion tons. At the same time, carbon dioxide emissions accounted for 2.2% of international shipping and 3.1% of global shipping[791]. This underlines that, despite the increase in international trade performed through shipping, its share in carbon dioxide emissions is undoubtedly much lower than those of land transport. This balance, however, is beginning to become particularly fragile since, by 2050, carbon dioxide emissions are projected to increase by 50% to 250% if no drastic measures are installed. In light of continued global warming, this forecast significantly questions the long-term sustainability of shipping[792].

The International Maritime Organisation had already responded to this challenge by adopting a mandatory regulation incorporated into the MARPOL, the so-called Annex VI[793], which entered into force about eight years after its adoption in 2005. This Annex drastically helped to reduce the environmental footprint of air pollutants from ships, such as volatile organic compounds, ozone-depleting substances, sulphur and nitrogen oxides[794].

The IMO's action regarding carbon dioxide emissions came in 2013, with the adoption for the first time of the Kyoto Protocol, namely of mandatory and operational measures exclusively for the shipping sector. The Energy Efficiency Design Index (EEDI) is an attempt to enhance the energy efficiency of ships built since 2013[795], as there is a requirement to reduce it by 10% every five years with the ultimate goal of

[791] Boviatsis, M., & Tselentis, B. (2019). A comparative analysis between EU MRV and IMO DCS—the need to adopt a harmonised regulatory system. *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.
[792] Topali, D., Psaraftis, H.N. (2019). The Enforcement of the Global Sulphur Cap in Maritime Transport, *Maritime Business Review*, DOI: doi.org/10.1108/MABR-12-2018-0050.
[793] MARPOL, (2022). MARPOL Annex VI NOx Technical Code & SOx explained. Available at: MARPOL Annex VI NOx Technical Code explained - Website of marpol-annex-vi!, last assessed: 30-8-2022.
[794] Psaraftis, H. N. (2021). Shipping decarbonization in the aftermath of MEPC 76, *Cleaner Logistics and Supply Chain*, DOI: https://doi.org/10.1016/j.clscn.2021.100008.
[795] MARPOL, (2022). EEDI & SEEMP. Available at: EEDI & SEEMP explained - Website of marpol-annex-vi!, last assessed: 30-8-2022.

vessels operating with the lowest possible carbon dioxide emissions. On the one hand, it is undoubtedly the first binding tool in the effort to limit emissions[796].

It targets the design characteristics of the ship, while equally important is that this indicator will be reduced every five years, urging companies to take new measures to enhance the energy efficiency of their vessels. On the other hand, however, there are several reactions both on whether shipowners will eventually turn to new technologies to achieve their goal or simply to more economical solutions since it is not prescriptive in terms of means of enhancing energy efficiency and on the fact that the results from the index will be seen in a long time. This raises doubts among shipowners since if they invest in new technologies, the effect of enhancing the energy efficiency of ships will be seen 15 years later, considering the economic life of ships that ranges between 25-30 years[797].

Similarly, Ship Energy Efficiency Management Plan (SEEMP) is a mandatory operational measure for all ships of 400 GT or more. It requires establishing and creating a plan that the vessel should always carry, including ways to enhance its energy efficiency. A significant result of these two mandatory measures is the non-integration into their obligations of the principle of shared but differentiated responsibility, as provided by the UN Framework Convention, the Kyoto Protocol, and the Paris Agreement[798]. This automatically means that all countries have similar responsibilities and that the owners of developed countries will no longer be able to be relieved of responsibility and proceed with the re-registration of their ships. Both of these mandatory tools aimed to reduce carbon dioxide emissions by 180 million tons per year by 2020, 390 million by 2030 and 1 billion by 2050[799].

However, based on the European Union, these measures are insufficient to achieve satisfactory reductions in emissions from international shipping, as provided for in the Kyoto Protocol, which aims to stabilise CO_2 emissions[800]. Even the Paris

[796] Polakis, M., Zachariadis, P., & Kat, J. O. D. (2019). The energy efficiency design index (EEDI). *In Sustainable shipping* (pp. 93-135). Springer, Cham. DOI: 10.1007/978-3-030-04330-8_3.
[797] Wang, S., Psaraftis, H.N., Qi, J. (2021). Paradox of International Maritime Organisation's carbon intensity indicator. Communications in *Transportation Research*, DOI: https://doi.org/10.1016/j.commtr.2021.100005.
[798] Leggett, J. A. (2020). The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement: *A Summary*. UNFCC, New York, 2.
[799] Rao, C. S. (2007). Environmental pollution control engineering. New Age International.
[800] Thompson, S. (2021). Green and Sustainable Finance: *Principles and Practice* (Vol. 6). Kogan Page Publishers.

Agreement, which entered into force in November 2016, had the ultimate goal of keeping the increase in the average global temperature in this century well below 2°C above pre-industrial levels. Also, efforts are being made to keep temperatures to less than 1,5°C. However, the Paris Agreement did not include any commitment regarding shipping in its final text. There is only an indirect mention in Article 2.2 of the Kyoto Protocol[801].

Also, the European Union saw that there were no means of measuring and reporting carbon dioxide emissions from ships as a considerable barrier to the market for adopting other emission reduction policies. For these reasons, the Regulation on the Monitoring, Reporting and Verification of Carbon Dioxide Emissions was adopted and entered into force in 2015. This regional tool aims at the European Union's effort to go one step further than the partial inertia that characterizes the International Maritime Organisation regarding the adoption of more drastic measures, such as the adoption of market-based measures that it has long had on its agenda but has not proceeded with their implementation. However, IMO also does not try to push for the disclosure of information in the shipping sector so that there is accurate quantitative data on fuel consumption and carbon dioxide emissions from ships[802]. The regulation was published on 19-5-2015 and entered into force on 1-7-2015. As its title suggests, the regulation is based on three basic principles of this monitoring, reporting and verification, adhering to the simple idea that *"when one cannot measure, one cannot reduce"*. Monitoring and reporting obligations are subject to the responsibilities of shipping companies. At the same time, verifications are conducted by an accredited, third-party stakeholder, namely the auditor, who should be independent of the shipping company[803].

The Regulation is an exhaustive process for shipping companies. Until now, most of them may have voluntarily monitored specific parameters such as the type and consumption of fuel, the measurement of tanks, and information about the journey.

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[801] UNFCCC, (2022). Race To Zero Campaign. Available at: Race To Zero Campaign | UNFCCC, last assessed: 29-8-2022.

[802] Bayer, P., & Aklin, M. (2020). The European Union emissions trading system reduced CO2 emissions despite low prices. *Proceedings of the National Academy of Sciences*, **117**(16), 8804-8812. DOI: https://doi.org/10.1073/pnas.1918128117.

[803] Lissilour, R., Fulconis, F., Psaraftis, H.N. (2021). A Nomos Perspective of Shipping Service Industries. *European Review of Service Economics and Management* 2021, **2**(12), 125-154. DOI: https://DOI:10.48611/isbn.978-2-406-12261-6.p.0125.

However, the cargo carried will now have to monitor on a mandatory daily basis all these data and the parameters related to energy efficiency for each ship calling at European Ports. In addition, shipowners will have to determine how much carbon dioxide is emitted within ports since the regulation stipulates that emissions should also be monitored at the docks, which means that the number of ports to which they electrify on the land side (SSE) should also be included in the monitoring plans[804].

During the reporting and verification phase, companies will have to submit from 30-4-2019 and for each year, both to the European Commission and the flag state authority. This emissions report includes aggregated and qualitative information on i) carbon dioxide emissions, ii) fuel consumption per journey, iii) the average fuel consumption per distance travelled, and iv) for travel and cargo, the method of monitoring them, the time spent at sea and the identity of the controller. The report shall be submitted after it has been deemed satisfactory by the independent auditor. At the same time, the port authorities will check the vessels for whether or not they carry the relevant compliance documents, which will be valid for 18 months. The publication of the European Commission's annual report regarding each ship's carbon dioxide emissions and energy efficiency is an essential element of transparency and underlines that the Regulation brings a significant change in the regulatory framework of shipping but also a new paradigm in the environmental governance of this sector[805].

With a first comparison between the European MRV Regulation and the global fuel consumption data collection system that entered into force in 2019, under the auspices of the International Maritime Organisation, the main conclusion that emerges is that while there may be some standard features regarding the elements that should be included in the monitoring plan and their scope, the two systems are opposed[806]. Their most crucial difference lies in the publication of information. The regional system aims at the complete publication of all the data of each ship, thus giving a transparent picture of both energy efficiency and carbon dioxide emissions for each

[804] Psaraftis, H. N. (2019). Ship routing and scheduling: the cart before the horse conjecture, *Maritime Economics and Logistics*, **21**(1), pp 111–124. DOI: https://doi.org/10.1057/s41278-017-0080-x.
[805] Yan, R., Wang, S., & Psaraftis, H. N. (2021). Data analytics for fuel consumption management in maritime transportation: Status and perspectives. *Transportation Research Part E: Logistics and Transportation Review*, ***155*****,** 102489. DOI: https://doi.org/10.1016/j.tre.2021.102489.
[806] IMO, (2016). Energy Management Plans and Systems. Available at: M6 energy management plan and system final.pdf (imo.org), last assessed: 29-8-2022.

ship and making an essential perception, namely that the vessel must quantify emissions to reduce them[807].

The global system is characterized by the complete concealment of these data and strictly limited access to this data. Also, another ambiguous element of the decisions of the International Maritime Organisation is the fact that in the timetable for the adoption of a revised strategy on greenhouse gases presented at the United Nations 72nd Conference of the Parties in April 2018[808], no specific plans were mentioned after the implementation of the global data collection system such as market-based measures to substantially reduce carbon dioxide emissions, as the European Union has done where it stresses that the adoption of the regulation is the first step of a gradual approach to the implementation of market-based measures. The only thing is that with the implementation of the global MRV, shipowners must comply with two different regulations, each with additional requirements. The question, however, is how long this double compliance will still be in place and what system will eventually prevail since it seems that the European one, in terms of organisation and transparency, excels over the global one. Therefore, the International Maritime Organisation will again have to take more drastic and direct measures to achieve the harmonization of the regional instrument with the global one[809].

The costs that will be brought by the European Regulation based on the forecasts of the European Commission regarding the monitoring, reporting and certification by the independent auditors are determined at 76.4 million euros for all shipowners or 6700 Euros per entity. This, however, is offset by the positive effects that the regulation will bring, which are a 2% fuel savings, which translates into the creation of an economic benefit of EUR 8.8 billion by 2030[810].

However, there is no clear picture of whether the Commission's economic benefit forecasts include the investment and maintenance costs that shipowners will

[807] Wang, S., Zheng, L., Psaraftis, H.N., Yan, R. (2021). Implications of the EU's inclusion of maritime transport in Emissions Trading System for shipping companies, *Engineering*, **7**(5), 554-557. DOI: https://doi.org/10.1016/j.eng.2021.01.007.

[808] United Nations, (2018). Resolutions of the 72nd session. Available at: Resolutions of the 72nd session - UN General Assembly, last assessed: 29-8-2022.

[809] Zisi, V., Psaraftis, H.N., Zis, T. (2021). The impact of the global sulfur cap on CO2 emissions, *Maritime Business Review*, **6**(4), 339-357. DOI: https://doi/10.1108/MABR-12-2020-0069.

[810] Psaraftis, H.N., Zis, T., Lagouvardou, S. (2021). A comparative evaluation of Market Based Measures for shipping decarbonization, *Maritime Transport Research*, **2**, 100019. DOI: https://doi.org/10.1016/j.martra.2021.100019.

have to make to comply fully with the precision prescribed by this regional tool. Further deepening, based on the article published by the European Commission in April 2016, "*MRV Regulation Assessment of Impacts of Delegated and Implementing Acts*"[811], it is perfectly understandable that the use of information systems at every stage of the regulation's implementation will play a catalytic role in reducing the costs incurred by each company[812].

In particular, the automated systems, during the monitoring stage and the stage of reporting and verification by the independent auditors, will contribute to time savings, to lower the probability of human error. For example, the recording of fuel consumption is executed manually or via fax and e-mails, thus certainly having a higher likelihood of error than automated fuel measurement systems, sending the results directly to a database[813]. Indeed, the familiarization of human resources with the systems' operation and investment in them presuppose high costs. However, the "*compensation*" of the shipowners will be achieved through the accuracy of the results, the fewer visits of the accredited auditors to verify the annual reports and the saving of time, especially when a company has to manage numerous ships, where reports should be submitted in different Flag States, depending on the registration of each vessel[814].

By opting for information systems, therefore, the Commission's administrative expenditure can be reduced to EUR 74 million, as against EUR 74.6 million, without any information system. Accordingly, an equally important result is that each ship's independent auditor's risk assessment will significantly reduce the visits to the offices or the vessel itself to verify the results. The inspectors will only conduct visits when the risk assessment does not bring the desired effect, which automatically

[811] European Union, (2016). MRV Regulation Assessment of Impacts of Delegated and Implementing Acts. Available at: ImpactAssessmentDelegatedImplementingActs (europa.eu), last assessed: 29-8-2022.

[812] Woo, J., Fatima, R., Kibert, C. J., Newman, R. E., Tian, Y., & Srinivasan, R. S. (2021). Applying blockchain technology for building energy performance measurement, reporting, and verification (MRV) and the carbon credit market: A review of the literature. *Building and Environment*, **205**, 108199. DOI: https://doi.org/10.1016/j.buildenv.2021.108199.

[813] Lloyd's Register, (2022). EU MRV Regulation. Available at: EU MRV Regulation (lr.org), last assessed: 29-8-2022.

[814] Qi, J., Wang, S., Psaraftis, H.N. (2021). Bi-level optimization model applications in managing air emissions from ships: A review. *Communications in Transportation Research*, **1**, 100020. DOI: https://doi.org/10.1016/j.commtr.2021.100020.

means lower costs for the shipowners themselves, who will not be forced to pay the former for each visit that should be conducted[815].

A vital element of the Regulation is the choice of companies among four methods of monitoring fuel consumption or a combination of them, which should be described in detail in the monitoring plan. The main conclusions that can be drawn from the comparison mentioned in more detail above lie in the validity of the results, the costs of investment and the monitoring and reporting of the data. Expressly, the first two methods mentioned in the fuel delivery notes and the tracking of tanks indeed represent much lower investment costs than flow meters or direct measurements of carbon dioxide emissions since most ships performed this fuel monitoring voluntarily, but the validity results are reversed[816].

This means that the chances of errors in the measurements, especially in cases where the measurements in the tanks are made manually and not electronically, are very high, as well as the fact that the costs of verification by the auditors will follow the same path due to the uncertainty of the results. In the opposite case, fuel flow meters and direct measurements of carbon dioxide emissions are associated with much higher investment costs. Still, at the same time, the high accuracy in the results can lead to lower prices of monitoring fuel consumption and verification by the controllers since not enough cross-checks will be required by the same as in the two methods above[817].

What is certain, however, is that none of the monitoring systems is linked to fuel consumption based on the ship's speed or the weather conditions in which the trip occurs. This means that charterers may clearly see the total quantity for each type of fuel consumed in a reporting period based on the annual report for each ship. Still, there are no details of the total fuel consumption for each emission source nor a link

[815] Zis, T., Psaraftis, H.N. (2021). Impacts of short-term measures to decarbonize maritime transport on perishable cargoes, *Maritime Economics and Logistics*, **24**(3), 602-629. DOI: https://doi.org/10.1057/s41278-021-00194-7.

[816] Qi, Y., Harrod, S., Psaraftis, H. N., & Lang, M. (2022). Transport service selection and routing with carbon emissions and inventory costs consideration in the context of the Belt and Road Initiative. *Transportation Research Part E: Logistics and Transportation Review*, **159**, 102630. DOI: https://doi.org/10.1016/j.tre.2022.102630.

[817] IMO, (2019). Data collection system for fuel oil consumption of ships. Available at: Data collection system for fuel oil consumption of ships (imo.org), last assessed: 29-8-2022.

between this consumption and the ship's speed. This, as mentioned below, is the main point of contention whether the regulation will ultimately bring positive results[818].

Another observation is that the Regulation freezes the monitoring method for shipowners, allowing them to invest in methods with meagre costs. Hence, still more uncertain results than very high costs but with great accuracy[819]. Thus, the perception that derives from the regional tool, namely that you must first quantify the emissions to be able to reduce them afterwards, is shaken since the quantification of the results does not always constitute accuracy and depends on the chosen method by each shipowner[820].

3.5.2 Comparison between the conditions for the application of the two systems

Into the positive elements of EU MRV, it is undoubtedly included that it is an important action of the European Union to go one step further and set mandatory measures to monitor carbon dioxide emissions with the ultimate aim of limiting the pollution causes[821].

The regulation alone will not reduce carbon dioxide emissions. Still, the fact that shipowners will have quantified results in terms of fuel consumption and emissions from their ships will give them a solid incentive to take measures to enhance the energy efficiency of their fleet. The most important characteristics, however, that govern the Regulation and make its implementation meaningful are firstly the fact that the adoption of this regional tool is a first step in the European Union's strategy[822], with the imposition in the distant future of market-based measures and the transparency that characterizes it. Transparency comes from the publication of all fuel consumption and carbon dioxide emissions information for each ship, something that has never existed

[818] Psaraftis, H.N., Lagouvardou, S. (2019). Market Based Measures for the reduction of green house gas emissions from ships: a possible way forward, Samfundsøkonomen 2019, **4**, 60-70.
[819] Ibid.
[820] Boviatsis, M., & Tselentis, B. (2019). A comparative analysis between EU MRV and IMO DCS—the need to adopt a harmonised regulatory system. *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.
[821] ibid
[822] Verifavia Shipping, (2018). EU MRV vs. IMO fuel consumption data collection system. Available at: EU MRV vs. IMO fuel consumption data collection system Verifavia Shipping (verifavia-shipping.com), last assessed: 29-8-2022.

before and gives significant help to charterers to have a complete picture of the vessel they want to charter[823].

On the other hand, however, harmful elements have also been observed from its implementation. One of the most important is the regional character that governs it. When the global fuel consumption data collection system is also put in place under the auspices of the International Maritime Organisation, then shipowners will have to obey two different regulations for some time. This leads to a significant burden on the companies, and there will undoubtedly be strong reactions on their part. Furthermore, the European Regulation is an exhaustive process of monitoring fuel consumption since companies will have to monitor several parameters per trip, a characteristic quite aggravating for a company with many ships. In addition, it will lead to administrative costs for all three stages of its implementation, which will be compensated, based on the European Union's analysis, by the fuel savings that will occur later[824].

The two main obstacles are transparency governing shipping and the dispute between shipowners and charterers[825]. The first obstacle will be eliminated. The fact that it obliges for the first time and, in contrast to the global system, the entire disclosure of the data on fuel consumption and carbon dioxide emissions from ships marks a new image of shipping. Whether this affects the privacy of shipowners, as stated by the International Maritime Organisation, is something doubtful since transparency will also be able to bring about an absolute reduction in emissions. Thus, shipowners will be able to proceed with measures to enhance the energy efficiency of their fleet[826].

The other obstacle, whether it can be eliminated by applying the regional tool, is the "*dispute*" between shipowners and charterers due to the different information and incentives that exist between them. For example, the types of charters and the

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[823] Panagakos, G., de Sousa Pessoa, T., Barfod, M., Desypris, N., Psaraftis, H.N. (2019). Monitoring the Carbon Footprint of Dry Bulk Shipping in the EU: An Early Assessment of the MRV Regulation, *Sustainability*, **11**, 5133; DOI: doi:10.3390/su11185133.

[824] Psaraftis, H. N., & Zis, T. (2021). Impact assessment of a mandatory operational goal-based short-term measure to reduce GHG emissions from ships: the LDC/SIDS case study. *International Environmental Agreements: Politics, Law and Economics*, **21**, 445-467. DOI: https://doi.org/10.1007/s10784-020-09523-2.

[825] Psaraftis, H.N., Kontovas, C.A. (2020). Influence and Transparency at the IMO: the Name of the Game. *Maritime Economics and Logistics*, **22**(2), 151-172. DOI: https://doi.org/10.1057/s41278-020-00149-4.

[826] Bektaş, T., Ehmke, J. F., Psaraftis, H. N., & Puchinger, J. (2019). The role of operational research in green freight transportation. *European Journal of Operational Research*, **274**(3), 807-823. DOI: doi.org/10.1016/j.ejor.2018.06.001.

liability from fuel utilisation in the shipping industry can be differentiated. Therefore, the investment in improving the fleet's energy efficiency does not undoubtedly lead to the creation of an economic benefit for the shipowners, except in cases where they have signed long-term charter parties with the charterers or operate the ships for their benefit.

Thus, when a shipowner has to choose between the available monitoring methods and is aware of how he will operate in the "short" market without chartering his ships, it is very logical initially to invest in the least more accurate method that, as mentioned above, will bring him the most negligible costs as well as not to take drastic measures to improve energy efficiency, since the return will not be substantial[827].

In addition to the above, another negative element that falls under its implementation and reinforces the argument that this obstacle cannot be eliminated is the fact that charterers will have for the first time an idea of the annual consumption of the ship, carbon dioxide emissions or the average energy efficiency of the vessel. At the same time, they are mainly interested in the characteristics mentioned in the charter agreements[828]. The fuel consumption of the ship per nautical mile, based on the ship's speed or the weather conditions of the voyage, are not elements included in the monitoring plan[829].

Thus, charterers do not benefit significantly from the publication of this information to accept to pay higher freight to shipowners. Shipowners will therefore make high investment costs in terms of monitoring methods that will provide increased accuracy to enhance energy efficiency in the future, only if they can request higher freights. And charterers would be willing to pay higher freights if fuel savings offset this[830].

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[827] Rødseth, Ø. J., Psaraftis, H.N., Krause, S., Raakjaer, J., Coelho, N.F (2020). AEGIS: Advanced, Efficient and Green Intermodal Systems, IOP Conference Series, Materials Science and Engineering, 929 012030, presented at the *3rd International Conference on Maritime Autonomous Surface Ship* (ICMASS 2020) 11-12 November 2020, Ulsan, South Korea.

[828] Bullock, S., Mason, J., Broderick, J., & Larkin, A. (2020). Shipping and the Paris climate agreement: a focus on committed emissions. *BMC Energy*, **2**(1), 1-16. DOI: https://doi.org/10.1186/s42500-020-00015-2.

[829] Zis, T., Psaraftis, H.N., Tillig, F., Ringsberg, J. (2020). Decarbonizing maritime transport: A RoPax case study. *Research in Transportation Business and Management*, **37**, 100565. DOI: https://doi.org/10.1016/j.rtbm.2020.100565.

[830] Zis, T. P., Psaraftis, H. N., Panagakos, G., & Kronbak, J. (2019). Policy measures to avert possible modal shifts caused by sulphur regulation in the European Ro-Ro sector. *Transportation Research Part D: Transport and Environment*, **70**, 1-17. DOI: https://doi.org/10.1016/j.trd.2019.03.001.

Undeniably, this cannot be achieved because even if the shipowners invested in accurate monitoring methods, which they have the opportunity not to implement since the regulation gives them the free choice of the method with different percentages of accuracy and cost[831], charterers would not be willing to pay the highest price since the regional tool does not provide them with data on fuel consumption that are linked to speed or the weather under which the trip is conducted[832].

Conclusively, the regulation will certainly bring positive results and give a new form to the image and sustainability of shipping. For the first time, an organized effort is being made to monitor the fuel consumption that until now was performed voluntarily by the shipowners. The commitment of companies to disclose and quantify fuel consumption data and carbon dioxide emissions will also contribute to the effort at a later stage to reduce these emissions and strengthen shipping in mitigating the ever-increasing intensity of the greenhouse effect[833].

The transparency that the regulation will bring about comes to eliminate a significant obstacle that prevailed, but also the fact that the adoption of the tool is the first step in adopting a European Union strategy for taking more drastic measures in the future, such as those based on the market, certainly puts a significant pressure on the International Maritime Organisation to intensify essential policies that will contribute to the mitigation of carbon dioxide emissions[834].

Because there will be a significant burden on shipowners, the validity of 2019 of the global fuel consumption data collection system is inevitable. However, it remains to be seen whether the worldwide regulation will bring all those elements that can give the sovereignty and integration of the regional tool[835].

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[831] Verifavia Shipping, (2018). EU MRV vs. IMO fuel consumption data collection system. Available at: EU MRV vs. IMO fuel consumption data collection system Verifavia Shipping (verifavia-shipping.com), last assessed: 29-8-2022.

[832] Zis, T., Psaraftis, H.N., Ding, L. (2020). Ship weather routing: a taxonomy and survey, *Ocean Engineering*, **213**, 107697. DOI: 10.1016/j.oceaneng.2020.107697.

[833] Wang, S., Zheng, L., Psaraftis, H.N. (2020). Three potential benefits of the EU and IMO's landmark efforts to monitor carbon dioxide emissions from shipping, *Frontiers of Engineering Management*, **8**(2), 310-311. DOI: https://doi.org/10.1007/s42524-020-0096-2.

[834] Psaraftis, H.N., Kontovas, C.A. (2021). Decarbonization of maritime transport: Is there light at the end of the tunnel? *Sustainability* **13**, 237. DOI: https://doi.org/10.3390/su13010237.

[835] Blanco-Davis, E., & Zhou, P. (2016). Life Cycle Assessment as a complementary utility to regulatory measures of shipping energy efficiency. *Ocean engineering*, **128**, 94-104. DOI: https://doi.org/10.1016/j.oceaneng.2016.10.015.

Finally, the barrier between shipowners and charterers probably cannot be eliminated yet, unless other elements are included in the future that will have to be monitored and genuinely essential for the latter. The only sure thing is that the European Regulation exudes a wave of change and a real effort to reduce emissions in shipping that has been evident for many years and, with its implementation, will lead to several positive results[836].

Finally, Prof. Psaraftis suggests a loophole in the compliance of those two processes, with no interaction whatsoever. IMO and EU are procrastinating while the industry pusses for a solution. To resolve the issue, the issuance of "a big global carbon levy" is proposed, which will lead to the vessels' speed reduction and low carbon fuels and conclusively the GHG emissions reduction both in the short and long run[837].

3.5.3 Legal assessment of the EEXI Transition Clause

IMO, to soften the differences upon utilising Energy Efficiency Existing Ships Index (EEXI),[838] imposed amendments to MARPOL's Annex VI[839], entered into force on 1-11-2022 and with the relevant certificates becoming mandatory from 1-1-2023. Those regulations force the older ships to comply equally with the EEDI requirement for new builds. The EEXI certification is obtained by applying technical modifications, primarily through engine power limitation (EPL) or shaft power limitation (SHAPOLI)[840].

[836] Psaraftis, H.N. (2019). Speed Optimization vs Speed Reduction: the Choice between Speed Limits and a Bunker Levy, *Sustainability*, **11**, 2249; DOI: 10.3390/su11080000.
[837] Lagouvardou, S., Psaraftis, H.N., Zis, T. (2022). Impacts of a bunker levy on decarbonizing shipping: a tanker case study, *Transportation Research Part D, Transport and Environment*, **106**, 103257. DOI: https://doi.org/10.1016/j.trd.2022.103257.
[838] Sample of Energy Efficiency Existing Ship Index (EEXI) Clause: 'In the event that the vessel's attained EEXI does not comply with the applicable regulations in force, Owners may in their absolute sole discretion take any steps necessary in order to attain a compliant EEXI, including but not limited to reducing the vessel's MCR. Charterers shall provide any required assistance in order to implement such steps and agree that the charterparty, including the TCD, will be deemed amended accordingly to reflect any changes made to the Vessel or otherwise a result of any such steps taken by Owners. All other terms and conditions of the charter party shall remain unchanged.'
[839] Resolution MEPC.328(76)
[840] BIMCO, (2021), "EEXI TRANSITION CLAUSE FOR TIME CHARTER PARTIES 2021". Available at: EEXI Transition Clause for Time Charter Parties 2021 (bimco.org), last assessed: 22-8-2022.

To this end, BIMCO adopted 2021 the "EEXI TRANSITION CLAUSE FOR TIME CHARTER PARTIES 2021" to cooperate between shipowners and charterers[841]. Specifically, the new EEXI clause briefly states:

a) The vessels should comply with the new regulations from the effective date and thus should apply the required modifications on the vessel, and those modifications should be promptly installed[842].
b) Subject to the application of the modifications, the owners shall inform the charterers in writing about the new maximum speed and consumption[843].

[841] BIMCO, (2021), "BIMCO PUBLISHES EEXI TRANSITION CLAUSE AHEAD OF IMO EFFICIENCY REGULATION". Available at: BIMCO publishes EEXI Transition Clause ahead of IMO efficiency regulation, last assessed: 22-8-2022. "The upcoming regulatory changes will impact the way ships can be operated in the future and require a new approach to the contractual relationship between owners and charterers," says Peter Eckhardt of German shipowner F. Laeisz, who heads the drafting team. As a sample from a market C/P: "Any changes to vessels description, compulsorily applicable to be discussed and mutually agreed between Owners and Charterers"

[842] Sample clause- compliance with MARPOL Annex VI: All consequences whatsoever, including financial, deriving from any international or national regulations relating to IMO Resolution MEPC.324(75) of 20 November 2020, being adopted or coming into force after the date of this Charter Party, including but not limited to those requiring physical or other modification(s) to the Vessel or the purchase, installation and use of additional equipment and related supplies to the Vessel, and any necessary certification as a result, will be satisfied, arranged, supplied, provided and paid for by the Charterers at their time and expense, and the Vessel shall remain on-hire throughout any time lost as a result of addressing such consequences. Any modification to, and installation of equipment on, the Vessel to be subject to the prior approval of the Owners which approval is not to be unreasonably withheld.
Any necessary or requested amendment to the Vessel's existing description as provided for in the Charter Party [such as maximum sailing speeds in order to reduce emissions] will also be subject to the prior approval of the Owners which approval is not to be unreasonably withheld. The Charterers shall indemnify, protect, defend and hold harmless the Owners from any and against all losses, damages, liabilities, delays, deviations, claims, fines, costs, expenses, actions, proceedings, suits, demands arising out of the Charterers' failure to comply with this clause, and the Vessel shall remain on hire throughout.

[843] Sample of EEXI and CII Clause: "Both parties acknowledge that new emissions regulations such as EEXI and/or CII may become applicable during the period of this charter. In that case Charterers acknowledge and accept that requirements and measures incl. calculation of max EEXI speed/consumption figures according to IMO rules / regulations have to apply, Charterers will endeavor to co-ordinate with Owners well before the new emissions regulations become effective and as early as Q2 2022 insofar as EEXI and/or CII regulations are concerned, to reduce the main engine power/vessel speed's and to do whatever else they consider necessary to (a) achieve compliance with such new emissions regulations and (b) to ensure that the vessel will achieve a carbon intensity rating of A, B or C at all times in accordance with the CII regulations. To the extent that the measures taken by Owners in accordance with this clause will result in speed and/or consumption different to any figures contained in this charter, the speed and consumption figures will no longer be applicable. Owners and Charterers agree that the vessel will not be allowed to trade within European waters after 01.01.23 / 00:01 hours UTC unless Owners and Charterers have found a mutual agreement on the Emission Regulations Clause for Time Charter Parties."

c) The owners shall promptly notify the characters of the application of modifications.

d) The owners should bear the costs of modifications and the actual loss of time[844].

e) After the installation of the modifications, the owners should inform the charterers "*of the new maximum speed and corresponding consumption figures of the Vessel and other consequential changes to the Vessel's description*"[845].

f) The Charterers must comply with the newly imposed maximum speed limit[846].

g) Charterers should agree to install other EEXI modifications besides EPL or SHAPOLI[847].

h) Installation of Emissions Trading Systems (ETS)[848] and Carbon Intensity Index (CII) clause[849].

---

[844] Sample of Emissions Regulations Clause: Charterers agree to indemnify Owners in respect of any costs / expenses / charges and / or fines / penalties arising from or in connection with any regulations, legislation or laws imposed on the Vessel (or on Owners or on Owners' representatives in respect of the Vessel) in respect of the emission of greenhouse gases from the Vessel (together the "Emissions Regulations"), including but not limited to Emissions Regulations providing for an Emissions Trading System. This shall include, but not be limited to, the costs / expenses / charges in ensuring that the Vessel has sufficient allowances (or alternatively that the Owners have sufficient allowances in respect of the Vessel), or whatever else might be required by such Emissions Regulations, to comply with such Emissions Regulations. It shall also include any fines or penalties levied against Owners or Owners' representatives or the Vessel should the Vessel have insufficient allowances (or the Owners have insufficient allowances in respect of the Vessel) in violation of such Emissions Regulations. Charterers agree to reimburse Owners upon first written demand pursuant to this clause.

[845] BIMCO, (2021), "EEXI TRANSITION CLAUSE FOR TIME CHARTER PARTIES 2021". Available at: EEXI Transition Clause for Time Charter Parties 2021(bimco.org), last assessed: 22-8-2022.

[846] Tillig, F., Ringsberg, J., Psaraftis, H.N., Zis, T. (2020). Reduced environmental impact of marine transport through speed reduction and wind assisted propulsion, *Transportation Research Part D*, **83**, DOI: 10.1016/j.trd.2020.102380.

[847] Lagouvardou, S., Psaraftis, H.N. (2022). Implications of the EU Emissions Trading System (ETS) on European container routes: a carbon leakage case study, *Maritime Transport Research*, **3**, 100059. DOI: https://doi.org/10.1016/j.martra.2022.100059.

[848] BIMCO, (2021), "BIMCO PUBLISHES EEXI TRANSITION CLAUSE AHEAD OF IMO EFFICIENCY REGULATION". Available at: BIMCO publishes EEXI Transition Clause ahead of IMO efficiency regulation, last assessed: 22-8-2022, Søren Larsen, Deputy Secretary General at BIMCO stated that: 'In addition to EEXI, we are also developing clauses for emissions trading systems (ETS) and the carbon intensity indicator (CII) regime to meet the future challenges for the industry'.

[849] Sample of Carbon Intensity Index (CII) clause: In the event that corrective action(s) are required as a result of the vessel's attained annual operational Carbon Intensity Index (CII), Owners shall, in a manner determined in their absolute sole discretion, implement any such corrective action(s) as approved by the relevant authority, which will form part of the Ship Energy Efficiency Management Plan (SEEMP) and shall be deemed to be incorporated in the charterparty. Charterers shall provide any required assistance in respect of the necessary corrective action(s) and agree that the charterparty will be

3.5.3.1 Assessing a MARPOL Annex VI compliance clause.

The amendments introduced by MARPOL Annex VI are being demonstrated with a sample clause disclosed below, containing all discussed issues, namely:

"A /All consequences whatsoever, including financial, deriving from any international or national regulations relating to IMO Resolution MEPC.324(75) of 20 November 2020[850], being adopted or coming into force after the date of this Charter Party, including but not limited to those requiring physical or other modification(s) to the Vessel or the purchase, installation and use of additional equipment and related supplies to the Vessel, and any necessary certification, as a result, will be satisfied, arranged, supplied, provided and paid for by the Charterers at their time and expense, and the Vessel shall remain on-hire throughout any time lost as a result of addressing such consequences.[851]

Any modification to and installation of equipment on the Vessel is to be subject to the prior approval of the Owners, which approval is not to be unreasonably withheld.

Any necessary or requested amendment to the Vessel's existing description as provided for in the Charter Party [such as maximum sailing speeds to reduce emissions will also be subject to the prior approval of the Owners, which approval is not to be unreasonably withheld.

The Charterers shall indemnify, protect, defend and hold harmless the Owners from any and against all losses, damages, liabilities, delays, deviations, claims, fines, costs, expenses, actions, proceedings, suits, and demands arising out of the Charterers' failure to comply with this clause, and the Vessel shall remain on hire throughout.

B/ Notwithstanding the provisions of sub-clause A above, if compliance with the amendments to MARPOL Annex VI aiming at the introduction of an Energy Efficiency Design Index for existing ships (EEXI) (the "EEXI Regulations") can

deemed amended accordingly. All other terms and conditions of the charter party shall remain unchanged.

[850] MEPC.324(75), (2018). Procedures for sampling and verification of the sulphur content of fuel oil and the Energy Efficiency Design Index (EEDI). Available at: MEPC.324(75).pdf (imo.org), last assessed: 30-8-2022.

[851] Kim, M. C. (2022). Special Issue on Energy Saving Device in Ship. Applied Sciences, **12**(9), 4445. DOI: https://doi.org/10.3390/app12094445.

alternatively be achieved by way of limiting the power output of the vessel's engine (the "EEXI Power Output Limit"[852]) and resulting in a maximum speed that the vessel may achieve less than as is set out in the vessel's description clause and/or questionnaires and/or other provisions in the charter party (the "Max. EEXI Speed"), then Charterers have the option to request that compliance be achieved by the aforesaid alternative method in which case the following shall apply in respect of the EEXI Power Output Limit and the Max. EEXI Speed[853]:

a) Owners will inform Charterers of the EEXI Power Output Limit and the Max. EEXI Speed by the date when the EEXI Regulations enter into force (the "EEXI Effective Date") at the latest.

(b) From the EEXI Effective Date, the vessel will not be ordered by Charterers to sail at speed:

(aa) which would require exceeding the EEXI Power Output Limit and/or

(bb) exceeding the Max. EEXI Speed.

(c) As from the EEXI Effective Date, the speed and consumption figures and warranties as displayed in the vessel's description clauses and/or speed and consumption warranties and/or questionnaires and/or other terms of the charter party will no longer apply to the extent that these figures and warranties relating to speeds exceeding the Max. EEXI Speed"[854].

[852] Ahn, J., Lee, S., Jeong, J., & Choi, Y. (2021). Comparative feasibility study of combined cycles for marine power system in a large container ship considering energy efficiency design index (EEDI). *International Journal of Hydrogen Energy*, **46**(62), 31816-31827. DOI: https://doi.org/10.1016/j.ijhydene.2021.07.068.

[853] Ivanova, G. (2021, September). Analysis of the Specifics in Calculating the Index of Existing Marine Energy Efficiency EEXI in Force since 2023. In 2021 *13th Electrical Engineering Faculty Conference* (BulEF) (pp. 1-4). IEEE.

[854] Disclosed sample of EEXI Clause from the market, used recently in contracts.

3.6 The process of ship recycling

3.6.1 The process of ship dismantling and the de-flagging.

One of the most significant sources of pollution in the maritime industry is the process of ship dismantling[855]. During the process, the vessel is deconstructed, and the pieces are recycled to be reused in industry[856]. The issue with the process is that many pollutants are being created, and the regional maritime environments where the process is executed are destroyed. Thus, the international community adopted regulations to avoid pollution and enforce the sustainable and environmental process of ship dismantling, namely the process of ship recycling[857].

At the same time, the ship owners, who were unwilling to pay the extra costs, have adopted counter-measures, such as the process of de-flagging. Since the process of dismantling is executed in countries with low environmental standards, the only authority that can intervene is the flag state[858]. Thus, when a vessel needs to be dismantled, the company changes the ship's flag (or even better transfers the ship's ownership to another company) with another flag, so the environmental requirements and the general obligation imposed are much lower[859]. In practice, this was one of the uses for flags of convenience (FoC) which will be analysed in Chapter 5.

3.6.2 The threats of ship dismantling

The environmental impact of ship dismantling is only one of the threats to the process. The process is one of the leading causes of accidents and fatalities in

[855] Boviatsis, M., Alexopoulos, A., & Polemis, D. (2022). Evaluation of the Impact of the Present Ship Recycling Regulations by Assessing the Most Prominent Shipbreaking Countries in the Shipping Industry. *Journal of Shipping and Ocean Engineering*, **12**, 61-68. DOI: 10.17265/2159-5879/2022.02.004.

[856] EMSA. (2021). "Ship Recycling", available at: http://emsa.europa.eu/csn-menu/csn-how-it-works/items.html?cid=150:ship-recycling&id=3003, last assessed 12-1-2022.

[857] Ahmed, J. S. D. I. (2020). Safe & Environmentally Sound Recycling of Ships: A Stocktaking of the Current State of International Law. *Fordham Environmental Law Review*, **31**(1), 60–106. DOI: https://www.jstor.org/stable/26954625.

[858] Boviatsis, M., Alexopoulos, A., & Polemis, D. (2022). Evaluation of the Impact of the Present Ship Recycling Regulations by Assessing the Most Prominent Shipbreaking Countries in the Shipping Industry. *Journal of Shipping and Ocean Engineering*, **12**, 61-68. DOI: 10.17265/2159-5879/2022.02.004.

[859] Boviatsis, M., Alexopoulos, A. B., & Polemis, D. (2019, September). Problems Related to Ship Recycling IMO Regulations. *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.

dismantling countries. Specifically, the process can cause various accidents due to the hazardous nature of the employment[860]. The causes of such accidents can be from:

a) The handling of heavy objects
b) Oxygen deficiency in enclosed spaces
c) Vessel access, which is under natural dismantling (floors, stairs, corridors)
d) Lack of safety processes, protection equipment and managerial practices.
e) Malfunctions of heavy equipment can cause explosions.
f) Electric shocks
g) Poor visibility
h) Fires and explosions: Flammable liquified materials and objects.
i) Fall from heights
j) Entrapment in enclosed spaces
k) Strikes from falling objects
l) Unexpected breakage of cables, ropes, chains, belts

The threat of the process is not only from common accidents during employment. The employees are handling many harmful substances[861] that can cause severe damage, even by contact[862]. Such substances are:

a) Asbestos fibers, powders
b) Heavy metals (lead, mercury, cadmium, copper, zinc, etc.)
c) Welding fumes
d) Organotin compounds (TBT, etc.)
e) Volatile organic compounds (solvents)
f) Lack of information on hazards (storage, marking, material safety data sheets)
g) Batteries, liquid fire extinguishers
h) Compressed gases

[860] ShipBreaking.info. (2020). "Ship Breaking around the word", available at: https://shipbreakingbd.info/ship-breaking-around-the-world/, last assessed: 8-1-2022.
[861] Du, Z. F., Wang, H., Xu, H., Li, C., Yan, H. S., Xu, H. L., ... & Li, H. W. (2012). Discussion on control of hazardous materials in ship recycling activities. In Advanced Materials Research (Vol. 476, pp. 1674-1677). Trans Tech Publications Ltd. DOI: https://doi.org/10.4028/www.scientific.net/AMR.476-478.1674.
[862] Zhang, S., Chen, J., Wan, Z., Yu, M., Shu, Y., Tan, Z., & Liu, J. (2021). Challenges and countermeasures for international ship waste management: IMO, China, United States, and EU. *Ocean & Coastal Management*, **213**, 105836. DOI: https://doi.org/10.1016/j.ocecoaman.2021.105836.

Under those circumstances, one can only assume that this employment requires a combination of[863]:

a) Proper safety and health training
b) Accident prevention policies and constant audits of the processes utilised.
c) Excellent work organisation
d) Advances emergency training, first aid and rescue facilities
e) Adequate housing and sanitation processes
f) Medical facilities and social protection services.

Sadly, none of the above instances can be evidenced during ship dismantling[864]. Also, it can safely be assumed that the threats to the process can come from many sources and can impact not only the environment in general but also the health and safety of the employees[865]. Under those threats, international bodies have adopted sets of legislation and are pressing toward enforcing those rules and applying the process of ship recycling[866]. Furthermore, the method of ship recycling, while it is expensive to be used, extracts far more materials than the traditional process of dismantling, which can be utilised by industry. Therefore, while the process costs can be increased, the economic benefits from reselling those materials can be multiple[867].

3.6.3 Legislative framework on ship recycling

3.6.3.1 The UN Basel Convention

To counter all the threats mentioned above and protect the employers' lives, the UN Basel Convention was adopted in 1992, to deal with the issue and apply safety measures during the process. Initially, the Convention considered all ships intended for

[863] Mikelis, N. (2019). *Ship recycling. In Sustainable Shipping* (pp. 203-248). Springer, Cham.
[864] Rizvi, M. J., Islam, M. R., Adekola, O., & Margaret, O. N. (2020). A sustainable shipbreaking approach for cleaner environment and better wellbeing. *Journal of Cleaner Production*, **270**, 122522. DOI: https://doi.org/10.1016/j.jclepro.2020.122522.
[865] Zhou, Q., Du, Z., Liu, J., Liang, J., & Jiao, Y. (2021). Factors influencing green ship recycling: A conceptual framework and modeling. *Journal of Cleaner Production*, **322**, 129155. DOI: https://doi.org/10.1016/j.jclepro.2021.129155.
[866] Zhang, S., Chen, J., Wan, Z., Yu, M., Shu, Y., Tan, Z., & Liu, J. (2021). Challenges and countermeasures for international ship waste management: IMO, China, United States, and EU. *Ocean & Coastal Management*, **213**, 105836. DOI: https://doi.org/10.1016/j.ocecoaman.2021.105836.
[867] Alexopoulos, A. B. (2014). Scrap Activities on the Coastal Zone: Dynamic Model for the Recycling of Ships. *Journal of Shipping and Ocean Engineering*, **4**(1-2), 27-37.

dismantling as waste[868]. Most states ratified this convention, including India, Bangladesh and Pakistan, the leading countries in ship recycling[869].

The said Convention includes technical guidelines for the process of dismantling, introduces a Ban Amendment that enforces the prohibition of toxic materials being transported from such ships and dictates that the process of beaching, where ships are rushed to a remote beach for dismantling, is unacceptable under any of the international standards[870].

Despite its positive outcomes, the Convention has some flaws that the shipping companies take advantage of, such as[871]:

a) There is no control over ships' movement, and they can freely change the vessel flag.
b) When the dismantling process happens in Asia, no enforcement process is installed to monitor the removal of hazardous waste.
c) Should the decision to scrap the vessel is taken after leaving the last port of call, the Basel Convention and the Ban Protocol cannot be enforced; thus, there can be no control of the vessel[872].

3.6.3.2 The IMO Hong Kong Convention

Under those circumstances, the IMO decided to act and adopted the seemingly stringier Hong Kong Convention (HKC) established in May 2009, aiming to install mandatory requirements and enhance a concept of environmentally oriented management[873]. This Convention sets specific obligations to each stakeholder, included in the process of ship dismantling[874]. Another important aspect is that the Convention

[868] Regulation 259/93/EEC was incorporated to the European Law.
[869] Khan, S. A. (2020). Clearly hazardous, obscurely regulated: lessons from the Basel convention on waste trade. *American Journal of International Law*, **114**, 200-205. DOI: https://doi.org/10.1017/aju.2020.38.
[870] Hsuan, J., & Parisi, C. (2020). Mapping the supply chain of ship recycling. *Marine Policy*, **118**, 103979. DOI: https://doi.org/10.1016/j.marpol.2020.103979.
[871] Zhao, Y., & Chang, Y. C. (2014). A comparison of ship-recycling legislation between Chinese law and the 2009 Hong Kong convention. *Ocean Development & International Law*, **45**(1), 53-66. DOI: https://doi.org/10.1080/00908320.2013.839157.
[872] Yang, S. (2020). Trade for the environment: transboundary hazardous waste movements after the Basel Convention. *Review of Policy Research*, **37**(5), 713-738. DOI: https://doi.org/10.1111/ropr.12386.
[873] Newton, G. M. (2005). *Ship Recycling–IMO Guidelines*. Maritime Studies.
[874] Schøyen, H., Burki, U., & Kurian, S. (2017). Ship-owners' stance to environmental and safety conditions in ship recycling. A case study among Norwegian shipping managers. *Case Studies on Transport Policy*, **5**(3), 499-508. DOI: https://doi.org/10.1016/j.cstp.2017.06.003.

limits the excess utilization of hazardous materials while constructing, reconstructing, maintaining or dismantling the vessel to minimize the prospective sources of pollution[875].

Another positive factor is that the Convention severely affected the ship design and the sustainable process of shipbuilding in maritime construction zones, enhancing the facilities and promoting the alternative uses of those facilities, not only to construct vessels but also to deconstruct them environmentally[876].

Some researchers have characterised the process of utilizing the shipyards also for ship recycling as vital for the viability of the shipyards. At the same time, the workload increases disproportionately to the number of new yards constructed for shipbuilding[877].

Additionally, the Hong Kong Convention adopted a "*ship recycling plan*" which dictates the exact way and the processes when the ship will be dismantled to press the signatory members to improve the quality of their shipyards further[878]. But, sadly, the countries where ship dismantling is taking place do not accept the ratification of this convention, and this is, in fact, the weak point of this legislation, namely[879]:

Article 17 of the Hong Kong Convention on the Safe and Environmentally Sound Recycling of Ships stipulates that the Convention shall enter into force 24 months after the date on which[880]:

[875] Bhattacharjee, S. (2009). From Basel to Hong Kong: international environmental Regulation of ship-recycling takes one step forward and two steps back. *Trade L. & Dev.*, **1**, 193.
[876] Puthucherril, T. G. (2010). From shipbreaking to sustainable ship recycling: *Evolution of a legal regime*. Brill.
[877] Jain, K. P., Pruyn, J. F. J., & Hopman, J. J. (2013). Critical analysis of the Hong Kong international convention on ship recycling. *International Journal of Environmental and Ecological Engineering*, **7**(10), 684-692.
[878] Molenda, M. (2010). *Overview of international legal and technical regulations for ship recycling*. Zeszyty Naukowe/Akademia Morska w Szczecinie, 63-67.
[879] Fang, Y., & Mejia Jr, M. Q. (2012). Reinforcing the Legal Framework for the Environmentally Friendly Recycling of Ships: A Brief Look at the Hong Kong Convention. *International Proceedings of Economics Development and Research*, **48**(20), 91-95. DOI: 10.7763/IPEDR. 2012.V48. 20.
[880] Matz-Lück, N. (2010). Safe and sound scrapping of 'Rusty Buckets'? The 2009 Hong Kong ship recycling convention. *Review of European Community & International Environmental Law*, **19**(1), 95-103. DOI: https://doi.org/10.1111/j.1467-9388.2010.00667.x.

I. At least 15 States have signed the Convention without reservation as to ratification, acceptance or approval, or have deposited the required instrument of ratification, acceptance, approval or accession by Article 16;

II. The combined merchant fleets of States amount to at least 40% of the gross tonnage of the world merchant fleet, and

III. The combined maximum annual ship recycling volume of States in i. over the previous ten years shall constitute at least 3% of the gross tonnage of the combined merchant shipping of the same states.

Currently, 17 countries have signed the convention, controlling the 29,77% of the world tonnage, which does not constitute the 3% of the gross tonnage of the combined merchant shipping of the same states[881].

Thus, rules II and III are not satisfied, and the convention, despite adopting some of its proposals such as the "HKC Statements of Compliance[882]", is not yet in force. However, recently, many stakeholders from the shipping practice, in light of the E.U. Waste Shipment Regulation, are pressing toward ratifying the HKC as a more viable solution for implementing the ship recycling process[883].

3.6.3.3 European Union Waste Shipment Regulation

The primary aim of the European Union Waste Shipment Regulation, which came into force on 31 December 2020, is the safety and efficiency of the ship recycling process[884]. Therefore, the dismantling methods are designed for all parts of the vessel, not only for the hazardous materials, and the procedures are more stringent[885].

The E.U. Regulation applied to all ships under a flag of an E.U. Country and was adopted with Regulation No 1257/2013[886]. The E.U. actively participated in the

[881] IMO, (2022), Status of Conventions. Available at: Status of Conventions (imo.org), last accessed: 23-8-2022.
[882] Chockalingam, G., Sivasami, K., & Thangalakshmi, S. (2022,). Ship Recycling-The Need of A Life Cycle Approach. In OCEANS 2022-Chennai (pp. 1-4). IEEE. DOI: 10.1109/OCEANSChennai45887.2022.9775343.
[883] Jain, K., & Pruijn, J. (2017). An overview of the global ship recycling industry. Reference Module in *Materials Science and Materials Engineering*, 1-22. DOI: 10.1016/B978-0-12-803581-8.10396-0.
[884] Mikelis, N. (2013). An analysis of European Regulation of ship recycling. *BIMCO Bulletin*, **108**(6), 26-29.
[885] Alcaide, J. I., Rodríguez-Díaz, E., & Piniella, F. (2017). European policies on ship recycling: A stakeholder survey. *Marine Policy*, **81**, 262-272. DOI: https://doi.org/10.1016/j.marpol.2017.03.037.
[886] Devaux, C., & Nicolaï, J. P. (2020). Designing an EU ship recycling licence: a roadmap. *Marine Policy*, **117**, 103826. DOI: https://doi.org/10.1016/j.marpol.2020.103826.

development of the Basel Convention; thus, the E.U. Regulation incorporates most of the Basel Convention's practices, with some additions[887]:

a) The ship recycling should be executed in specific E.U. facilities.
b) The ship should be readied for recycling.
c) Installation of a ship recycling plan.
d) Special surveys and inspections are to take place.
e) All Health, Safety and Environment (HSE) regulations should be installed.
f) Strict waste management processes
g) Enhanced control mechanisms
h) Addition of two harmful substances to the list.

Thus, it is evident that the Regulation incorporates the principles of the abovementioned Conventions with the installation of more effective processes, such as the "Inventory of Hazardous Materials"[888]. Conclusively, we can regard the E.U. Regulations as an advanced version of the Basel Convention[889]. Still, the Regulation faces the same issues as the Basel Convention, namely the case where companies alter the flags of their vessels at the end of their lives to avoid the application of the Regulation[890].

3.6.4 Evaluation of the Legislation

Undoubtedly, all legislations effectively promote effective ship recycling while protecting the safety of the facilitators[891]. Addition rules and processes are also effectively applied, such as BC's Ban Amendment, with the most successful being the "Inventory of Hazardous Materials"[892].

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[887] Engels, U. D. (2013). European ship recycling regulation: *entry-into-force implications of the Hong Kong Convention* (Vol. 24). Springer Science & Business Media.

[888] Du, Z., Zhang, S., Zhou, Q., Yuen, K. F., & Wong, Y. D. (2018). Hazardous materials analysis and disposal procedures during ship recycling. *Resources, Conservation and Recycling*, **131**, 158-171. DOI: https://doi.org/10.1016/j.resconrec.2018.01.006.

[889] Solakivi, T., Kiiski, T., Kuusinen, T., & Ojala, L. (2021). The European Ship Recycling Regulation and its market implications: Ship-recycling capacity and market potential. *Journal of Cleaner Production*, **294**, 126235. DOI: https://doi.org/10.1016/j.jclepro.2021.126235.

[890] Chang, Y. C., Wang, N., & Durak, O. S. (2010). Ship recycling and marine pollution. *Marine pollution bulletin*, **60**(9), 1390-1396. DOI: https://doi.org/10.1016/j.marpolbul.2010.05.021.

[891] Boviatsis M., Alexopoulos A.B., Polemis D. (2019) Problems related to Ship Recycling IMO Regulations - *Proceedings of the 16th International Conference on Environmental Science and Technology*. 4-7 September 2019.

[892] Boviatsis, M., Alexopoulos, A. B., & Polemis, D. (2019, September). Problems Related to Ship Recycling IMO Regulations. *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.

From an overall perspective, the Basel Convention focused more on handling hazardous materials and waste, while Hong Kong Convention is invested in environmental issues, such as water pollution[893]. As for E.U. Waste Shipment Regulation, both of the abovementioned are effectively satisfied, and many HSE policies are adopted[894]. Other issues of lesser importance than the health and safety of personnel not covered by the Regulation, such as child labour and labour rights, are regulated by ILO. Nevertheless, the right to health and safety is regarded as of paramount importance[895].

Thus, the ideal solution would be the installation of the E.U. Waste Shipment Regulation in a global spectrum along with international incentives and collaboration of flag states, utilizing systems similar to the New Inspection Regime (NIR)[896] to counter the phenomenon of de-flagging[897]. Thus, subject to the above, the objectives of each convention are presented in detail in the table below:

Table 1: Ship Recycling Convention Objectives

International Conventions	Labour Rights	Child Labour	Waste and Materials	Health and Safety	Water Contamination
ILO Convention on Labour rights	✓	✓		✓	
Basel Convention			✓		✓

[893] Moncayo, G. A. (2016). International law on ship recycling and its interface with EU law. *Marine pollution bulletin*, **109**(1), 301-309. DOI: https://doi.org/10.1016/j.marpolbul.2016.05.065.
[894] Akerboom, S., & Craig, R. K. (2022). How law structures public participation in environmental decision making: A comparative law approach. *Environmental Policy and Governance*. DOI: https://doi.org/10.1002/eet.1986.
[895] Gourdon, K. (2019), "Ship recycling: An overview", *OECD Science, Technology and Industry Policy Papers*, No. 68, OECD Publishing, Paris, https://doi.org/10.1787/397de00c-en.
[896] Yu, Y. (2021). Exploring the Effectiveness of New Inspection Regime on Port State Control. *Frontiers in Economics and Management*, **2**(6), 402-406. DOI: 10.6981/FEM.202106_2(6).0063.
[897] Seco, E. (2017). Challenges Facing The Shipping Sector Due to Environmental Regulations. *Journal of Maritime Research*, **14**(2), 66-72. Available at: View of Challenges Facing The Shipping Sector Due to Environmental Regulations (unican.es).

Hong Kong Convention					✓
E.U. Waste Shipment Regulation			✓	✓	✓

Made by Author, 20-2-2022.

3.7 Sustainable operation of unmanned ships under the present legal framework.

3.7.1 Designation of a vessel as 'Unmanned.'

Technology has become vital for all vessels. During ancient years, the sailors utilised navigational tools to guide them. Those tools have evolved over the years, and the concept of a crewless vessel has materialised. Until this point, the crew on board was in charge of the ship, handling all the necessary equipment. However, things changed over the last years when the first autonomous vessels started to be tested[898].

But before the initiation of the unmanned vessel, a completely crewless vessel with self-navigation mechanisms, remote-controlled vessels are likely to be initiated first. Remote-controlled ships are controlled remotely from a control centre on land[899]. All actions are subject to a high level of automation, as the vessel is expected to be self-guided. However, if unexpected events occur, human intervention may be requested[900].

An Autonomous is a ship that can perform a series of defined functions without a bridge crew. This does not necessarily mean that no man is on board. More specifically, it is a ship on which a control system will be responsible for handling, coordinating procedures and continuous monitoring. A more advanced unmanned

[898] Boviatsis, M. & Vlachos, G. (2022). Sustainable Operation of Unmanned Ships under Current International Maritime Law. *Sustainability,* **14**(12), 7369. DOI: https://doi.org/10.3390/su14127369.
[899] Gauci, G. M. (2016). Is it a vessel, a ship or a boat, is it just a craft, or is it merely a contrivance. *J. Mar. L. & Com.*, **47**, 479.
[900] Hogg, T., & Ghosh, S. (2016). Autonomous merchant vessels: examination of factors that impact the effective implementation of unmanned ships. *Australian Journal of Maritime & Ocean Affairs*, **8**(3), 206-222. DOI: https://doi.org/10.1080/18366503.2016.1229244.

vessel would be a completely autonomous vessel. For the operation of such a vessel, the human interaction would only be on setting the course of the vessel[901].

The operation of such a vessel, absent the human element, will solely rely on pre-programmed instructions and artificial intelligence for their navigation. These "computerised" vessels will utilise sensors and other data-gathering equipment to gather information about the environment around the vessel and assess those data for the central navigational system to adjust its course appropriately. In addition, the autonomous vessel shall be connected to a shore-based monitoring or operation centre for intervention in maintenance or emergencies[902].

The word "unmanned" denotes that there is no human on board the vessel to execute or supervise the operations, only a specially trained team from the land that will oversee all actions of the ship. Vessels operating remotely are operated remotely by operators on-shore at the Shore Control Centre (SCC), to which the vessel connects wirelessly. On the SCC, the delegated personnel will gather all necessary information via a radar or other systems deployed onboard and assess those data to intervene in the vessel's navigational tools and adjust the ship's navigation. The SCC authority would be supportive of the movement of the vessel but, in any case, would also be overriding[903].

3.7.2 Advantages of Unmanned Vessels

Unmanned vessels seem to be the most viable option from many perspectives for all stakeholders invested in shipping transport. Unmanned vessels practically limit the involvement of the human element in vessel operation, which is almost the leading cause of maritime accidents. At the same time, shipowners can minimise an essential aspect of their operating expenses: crew expenses[904].

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[901] Burmeister, H. C., Bruhn, W., Rødseth, Ø. J., & Porathe, T. (2014). Autonomous unmanned merchant vessel and its contribution towards the e-Navigation implementation: The MUNIN perspective. *International Journal of e-Navigation and Maritime Economy*, **1**, 1-13. DOI: https://doi.org/10.1016/j.enavi.2014.12.002.

[902] Caban, J., Brumerčík, F., Vrábel, J., Ignaciuk, P., Misztal, W., & Marczuk, A. (2017). Safety of maritime transport in the Baltic Sea. In *MATEC web of conferences* (Vol. 134, p. 00003). EDP Sciences.

[903] Ferreira, F., Alves, J., Leporati, C., Bertolini, A., & Bargelli, E. (2018). Current regulatory issues in the usage of autonomous surface vehicles. In *2018 OCEANS-MTS/IEEE Kobe Techno-Oceans (OTO)* (pp. 1-9). IEEE.

[904] Boviatsis, M., and Vlachos, G. (2022). Sustainable Operation of Unmanned Ships under Current International Maritime Law. *Sustainability,* **14**, no. 12: 7369. DOI: https://doi.org/10.3390/su14127369.

Thus, the depreciation of personnel onboard subsequently reduces costs related to the human element, such as salaries, training, catering, embarkations, etc. The most important is the reduction in the crew's wages; as an outcome, the shipowner can save the cost of the crew, which can generally amount to between 30% and 60% of the ship's operating costs. Also, during vessel construction, more space can be allocated for the transportation of goods because, absent the human element, no room for navigation and accommodation is required[905].

When the vessel is ashore by an SCC, the amount of personnel that will supervise and control the vessel will be less. Subsequently, their salaries will be less because the personnel operating the SCC will not need the same training and qualifications as the crew onboard. In addition, the SCC personnel will not be exposed to maritime perils and will not require to be far from their homes and work more than 8 hours daily[906].

Another advantage of autonomous vessels is fuel reduction and emissions minimisation. Automation will enable unmanned vessels to sail much more efficiently while consuming less fuel and thus reducing fuel emissions. In addition, comparing manned to unmanned vessels while carrying the same amount of cargo, the vessels will become lighter, absent crew and the installed facilities for housing and navigation. If the various stakeholders in the shipping and port industries decide to cooperate further, they could reduce costs even more[907].

Shipping companies, port authorities, port operators and other stakeholders could coordinate their timetables by exchanging information and relying on the automation expanded to the facilities on shore. An alternative and more sustainable fuel use is the slow steaming strategy, adopted as an emergency solution during the drop in demand and the ample supply of ships that arose due to economic fluctuations in the shipping cycle. Its use reduces carbon dioxide emissions and fuel costs through lower

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[905] Chauvin, C., Lardjane, S., Morel, G., Clostermann, J. P., & Langard, B. (2013). Human and organisational factors in maritime accidents: Analysis of collisions at sea using the HFACS. *Accident Analysis & Prevention*, **59**, 26-37. DOI: https://doi.org/10.1016/j.aap.2013.05.006.

[906] Porathe, T. (2014). Remote Monitoring and Control of Unmanned Vessels–The MUNIN Shore Control Centre. In *Proceedings of the 13th International Conference on Computer Applications and Information Technology in the Maritime Industries (COMPIT '14)* (pp. 460-467).

[907] Aps, R., Fetissov, M., Goerlandt, F., Kujala, P., & Piel, A. (2017). Systems-Theoretic Process Analysis of maritime traffic safety management in the Gulf of Finland (Baltic Sea). *Procedia Engineering*, **179**, 2-12. DOI: https://doi.org/10.1016/j.proeng.2017.03.090.

consumption. Thus, unmanned vessels can implement slow steaming even more effectively by executing this strategy and being less pollutive than their counterparts[908].

As mentioned earlier, the human factor is one of the principal causes of maritime accidents. Therefore, replacing humans with automated navigation and surveillance control systems will drastically reduce accidents and the overall number of human errors. This way, safety levels will increase, and the chances of accidents will drop significantly. Also, the resilience of the personnel will not be tested anymore because the vessel operators will be on land and issues such as fatigue, loss of concentration, and physical and mental seclusion will not affect them anymore[909].

From a technical perspective, unmanned vessels can be operated more efficiently due to the enhanced navigational tools installed and the advanced energy management systems. Additionally, the vessel design is becoming more aerodynamic without the imitations of installing accommodation for personnel. Subsequently, the ship's resistance can be further minimised, as with fuel and operating costs and thus maximises the overall efficiency of navigation. The transition from human-crewed vessels to unmanned is an excellent step toward sustainability, but this transition cannot be initiated in just a few years; many issues should be resolved first. Thus, while autonomy is yet in its initial steps, the advantages of its implementation are evident[910]:

a) Better navigational control results in fewer accidents.
b) Advanced systems and more detailed maintenance will reduce machinery malfunctions.
c) Better communication systems and tools can simplify operational and navigational processes, create more effective management, and reduce expenses.

It is not situational that many traditional shipping countries are systematically investing in unmanned vessels, believed to be the future vessel. Besides the advantages

[908] Moroza, N., Hudenko, J., & Jurgelane-Kaldava, I. (2020, October). The development of the Baltic Sea Region as a centre of global logistics: The situation report and future prospects. *In International Conference on Reliability and Statistics in Transportation and Communication* (pp. 678-690). Springer, Cham.
[909] Ahvenjärvi, S. (2016). The human element and autonomous ships. *TransNav: International Journal on Marine Navigation and Safety of Sea Transportation*, **10**(3). DOI: 10.12716/1001.10.03.18.
[910] Curcio, J. A. (2016). Rules of the road for unmanned marine vehicles. In *Springer Handbook of Ocean Engineering* (pp. 517-526). Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-16649-0_23.

mentioned above, there are other benefits to utilising unmanned vessels. These newly established benefits derive from the absence of manned personnel on board, the main of which are[911]:

a) There is no threat of crew accidents onboard the ship.

b) Crewless vessels are an impactful solution to the ever-increasing decline of seafarers.

c) More percentage of the vessel dedicated to cargo transfer.

d) The advanced safety and security systems installed on the vessels will create a continuous flow of data vital for automated, computer-oriented navigation[912].

3.7.3 Obstacles and challenges of Unmanned Vessels

While a vessel travelling with increased safety and lesser costs seems ideal, many obstacles must be passed for this concept to materialise. The most critical issues are the technical problems that must be resolved for the vessel to be equipped with the appropriate navigational tools and safety systems. In addition, there is a severe lack of integration of the concept of the unmanned vessel in the existing regulatory framework due to the slow adoption of the maritime community to change[913].

As a matter of technology, shipping was granted radio frequencies around 1910. Electrically powered navigational tools appeared in the 1930s, and vessels adopted satellite navigation early on. Installation of anti-collision systems has become mandatory on the vessel since the 1970s, and automated reconnaissance equipment since 2002[914]. Recently, enhanced systems and equipment are also available on the commercial market. It is evident that technological progress is continuous, and the pace of technological evolution has substantially increased[915]. To this end, the established

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[911] Komianos, A. (2018). The autonomous shipping era. operational, regulatory, and quality challenges. *TransNav: International Journal on Marine Navigation and Safety of Sea Transportation*, **12**(2). DOI: 10.12716/1001.12.02.15.

[912] Galdorisi, G., & Rowley, J. (2022). Engineering Unmanned Surface Vehicles Into an Integrated Unmanned Solution. *Naval Engineers Journal*, **134**(1), 49-59.

[913] Guo, L., Yang, D., & Yang, Z. (2018). Port integration method in multi-port regions (MPRs) based on the maximal social welfare of the external transport system. *Transportation research part A: Policy and practice*, **110**, 243-257. DOI: https://doi.org/10.1016/j.tra.2017.09.008.

[914] Lange, E. R. (2022). Unmanned Vessels and the Law. In *International Conference on Dynamics in Logistics* (pp. 191-203). Springer, Cham. DOI: https://doi.org/10.1007/978-3-031-05359-7_16.

[915] Alawadhi, M., Almazrouie, J., Kamil, M., & Khalil, K. A. (2020). Review and analysis of the importance of autonomous vehicles liability: a systematic literature review. *International Journal of System*

Maritime Unmanned Navigation through Intelligence in Networks (MUNIN) Project has identified some areas of interest in need of further research[916]:

a) Detection of specific targets and systemic election of ignorance, avoidance or further attention from competent personnel.
b) Immediate avoidance of specific targets in accordance with the established rules of navigation (COLREG, etc.)[917].
c) Integration of information into the automated navigational tools to alter the course when required.

Several risks are identified as necessary for resolution. First, the navigation software must be thoroughly checked. Errors when detecting objects of smaller sizes are crucial, as they can be debris, people, small yachts or other boats and objects that must be avoided. Failure to detect objects, particularly in low visibility conditions, can lead to accidents. Verifying an enhanced sensor system is critical for addressing all the requirements in object detection, even under extreme weather conditions. Any malfunction in vessels' propulsion systems will render the vessels immovable. Another issue is that in case of a malfunction, there will be no personnel to counter and amend the problem; thus, systems that resolve these issues must be installed. Additionally, all these issues of technical nature should be under specific legislation, setting requirements and obligations to stakeholders and established liabilities, should the regulations not abided[918].

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the primary IMO regulation concerning specific pollution forms from ships. It includes particular requirements for construction and equipment[919]. Unmanned ships should comply with MARPOL provisions to the same extent as their manned

Assurance Engineering and Management, **11**(6), 1227-1249. DOI: https://doi.org/10.1007/s13198-020-00978-9.

[916] MUNIN, (2016). MUNIN's Rationale. Available at: MUNIN's Rationale | MUNIN (unmanned-ship.org), last assessed: 30-8-2022.

[917] Campbell, S., Naeem, W., & Irwin, G. W. (2012). A review on improving the autonomy of unmanned surface vehicles through intelligent collision avoidance manoeuvres. *Annual Reviews in Control*, **36**(2), 267-283. DOI: https://doi.org/10.1016/j.arcontrol.2012.09.008.

[918] Van Hooydonk, E. (2020). *Maritime safety in Belgium: an overview of the legal framework*. Maritime Safety in Europe, 65-73. Routledge. DOI: https://doi.org/10.4324/9781003030775.

[919] Xing, W., & Zhu, L. (2021). A functional approach to reassessing the legal status and navigational rights of ships and ship-shaped structures. *Transport Policy*, **106**, 120-130. DOI: https://doi.org/10.1016/j.tranpol.2021.03.025.

counterparts. However, the absence of crews on the autonomous ship is expected to impact environmental legislation regarding onboard procedures, such as waste management and reporting requirements, as there will be no crew to perform these procedures. Therefore, they will have to be done automatically and electronically[920].

3.7.4 The current legal framework for unmanned vessels

While the technology, which is the most vital part of the utilization of the concept of unmanned vessels, is evolving, it seems that the current legal framework has not yet been appropriately explored[921]. In addition, issues will also emerge with the crew's absence, when the vessel will be under different types of charter parties and when the liability will be transferred from charterer to ship owner[922].

In any case, the absence of the crew will not affect the present liability status, where any liability caused by crew negligence would be transferred to the responsible stakeholder under each specific contract of carriage[923]. Thus, while the ship is under control or monitored by an SCC, any liability caused by the operators will be transferred directly to the carrier, in charge of and ultimately liable for the operation of the SCC[924].

Also, with the crew's absence, the shipping industry's training will be altered. It will be directed to more technology-literate personnel without the need for training in safety and security processes, such as firefighting[925]. Many parts of fundamental Conventions, such as SOLAS and MARPOL, will be utterly altered, and new legislative frameworks should emerge[926].

Another issue is where a vessel's system malfunctions and a liability emerges as an outcome. In that case, the autonomous motor vehicle industry solution can be

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[920] Karlis, T. (2018). Maritime law issues related to the operation of unmanned autonomous cargo ships. *WMU Journal of Maritime Affairs*, **17**(1), 119-128. DOI: https://doi.org/10.1007/s13437-018-0135-6.

[921] Boviatsis, M., and Vlachos, G. (2022). Sustainable Operation of Unmanned Ships under Current International Maritime Law. *Sustainability*, **14**(12), 7369. DOI: https://doi.org/10.3390/su14127369.

[922] Lange, E. R. (2022). Unmanned Vessels and the Law. In *International Conference on Dynamics in Logistics* (pp. 191-203). Springer, Cham. DOI: https://doi.org/10.1007/978-3-031-05359-7_16.

[923] Burmeister, H. C., Bruhn, W. C., Rødseth, Ø. J., & Porathe, T. (2014). Can unmanned ships improve navigational safety?. In *Proceedings of the Transport Research Arena,* TRA 2014, 14-17 April 2014, Paris.

[924] So, L. K., & Sooksripaisarnkit, P. (2021). Seaworthiness and Autonomous Ships: Legal Implications in the 21st Century. *Austl. & NZ Mar. LJ*, **35**, 21.

[925] Veal, R., Tsimplis, M., & Serdy, A. (2019). The legal status and operation of unmanned maritime vehicles. *Ocean Development & International Law*, **50**(1), 23-48. DOI: https://doi.org/10.1080/00908320.2018.1502500.

[926] Van Hooydonk, E. (2014). The law of unmanned merchant shipping–an exploration. *The Journal of International Maritime Law*, **20**(3), 403-423.

applied, where the liability strictly from a system malfunction is transferred from the shipowner to the manufacturer[927].

Some other threats and hazards may emerge during the operation of an unmanned vessel, such as collisions or piracy attacks or even threats unfamiliar to human-crewed vessels, such as cyberattacks[928]. Under those circumstances, it is suggested that for the operational malfunction of the SCC, the liable should be the shipowner; for the system or machinery malfunctions, the liability should fall to the manufacturer unless the issue resulted from a failure to maintain the equipment properly and is proved that the ship owner failed to exercise due diligence[929].

3.7.5 First applications of an unmanned vessel

Several years ago, the ships had more than enough people to operate them. However, after technological innovations and strict managerial policies, companies are beginning to reduce their crew to the absolute minimum required[930]. The reduction in crew numbers is the automation of many vessel processes[931].

Initially, Norway, Finland and China designated some of their marine areas as exclusive autonomous ship test areas. The governments of these countries are investing enough money so that all the necessary tests can be conducted. They are joined by many other countries such as Japan, the USA, Denmark, the UK and many others. Specifically, in 2016, a large section of Trondheimsfjord in northern Norway was selected as an official simulation environment and test site for autonomous ships by the NCA (Norwegian Coast Management Agency) in Trondheim. Presently, the

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[927] Alawadhi, M., Almazrouie, J., Kamil, M., & Khalil, K. A. (2020). Review and analysis of the importance of autonomous vehicles liability: a systematic literature review. *International Journal of System Assurance Engineering and Management*, **11**(6), 1227-1249. DOI: https://doi.org/10.1007/s13198-020-00978-9.

[928] Li, L., Tuo, Y., Li, T., Tong, M., & Wang, S. (2022). Time-varying formation control of multiple unmanned surface vessels with heterogeneous hydrodynamics subject to actuator attacks. *Applied Mathematics and Computation*, **422**, 126987. DOI: https://doi.org/10.1016/j.amc.2022.126987.

[929] Poornikoo, M., Øvergård, K.I. Levels of automation in maritime autonomous surface ships (MASS): a fuzzy logic approach. *Maritime Economics & Logistics,* **24**, 278–301 (2022). DOI: https://doi.org/10.1057/s41278-022-00215-z.

[930] Polemis, D., Darousos, E. F., & Boviatsis, M. (2022). A Theoretical Analysis of Contemporary Vessel Navigational Systems: Assessing the Future Role of the Human Element for Unmanned Vessels. *TransNav, the International Journal on Marine Navigation and Safety of Sea Transportation*, **16**(4), 637-646. DOI: 10.12716/1001.16.04.05.

[931] Rapp-Hooper, M. (2018). Freedom of navigation and the UNCLOS order. *In Maritime Order and the Law in East Asia* (pp. 145-157). Routledge.

Mayflower Autonomous Ship is tested[932], while the MV Yara Birkeland, a 120 TEU container ship, is currently operational[933].

It is essential that classification societies also participate in various research groups along with designers, shipyards and large shipping companies to construct autonomous ships. For this step to proceed positively, the entire transport sector must be automated, such as ports, offices, etc. For example, there have already been some automatic ports for loading and unloading containers where cranes and trucks operate without operators and drivers[934].

This should be done at a slow and stable pace, not negatively affecting the shipping industry. And although prototype small autonomous ships are already being built for research and testing, the next stage will practically be shipped with increased remote control from land via satellite, partially manned for any eventuality; more information about the categorization is below[935].

The International Maritime Organisation has begun defining the current international regulations for autonomous ships. The IMO has therefore put the issue on its agenda, demonstrating that it will not be long before this implementation is a reality on many future merchant ships. As a result, shipping will be driven over the following years to constant and complete change[936].

Chartering will now be done through technology and applications. The ship will be chartered at the touch of a button in an app. Unfortunately, the naval skills of the crews, as well as the managerial skills of the shipping companies, in which the Greeks traditionally excel, will no longer have a role in fully automated shipping.

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[932] MASS 400. (2022). It's time for the Mayflower Autonomous Ship. Available online at: Mayflower Autonomous Ship (mas400.com), last assessed 5-6-2022.

[933] Størkersen, K. V. (2021). Safety management in remotely controlled vessel operations. *Marine Policy*, **130**, 104349. DOI: https://doi.org/10.1016/j.marpol.2020.104349.

[934] Rose, H., Lange, A. K., Hinckeldeyn, J., Jahn, C., & Kreutzfeldt, J. (2022). Investigating the Requirements of Automated Vehicles for Port-internal Logistics of Containers. In *International Conference on Dynamics in Logistics* (pp. 179-190). Springer, Cham.

[935] Othman, A., El-gazzar, S., & Knez, M. (2022). A Framework for Adopting a Sustainable Smart Sea Port Index. *Sustainability*, **14**(8), 4551. DOI: https://doi.org/10.3390/su14084551.

[936] IMO, (2022). Autonomous shipping. Available at: Autonomous shipping (imo.org), last assessed: 28-8-2022.

Future autonomous ship fleets will require unique, high-tech, expensive management centres and reduced personnel[937].

3.8 Sustainable Shipping through proactiveness and due diligence

Sustainability has been an emerging concept in shipping over the last few years. This concept aims to make shipping environment-friendly, with emission-free vessels and processes. Sustainability is concentrated around three pillars[938]:

a) Environmental sustainability is where the natural resources are kept in balance.
b) Economic sustainability is where all nations have access to all required resources to develop their societies and care for their citizens.
c) Social Sustainability, where all people are treated with equal opportunities and through abundant resources, fundamental rights are being protected[939].

For achieving continuity in the process of sustainability in shipping, three principles of success have been established:

a) every newbuilt to be cleaner and more energy-efficient than its predecessors
b) the existing vessels to have refits
c) stricter regulations to achieve an emission-free sailing

Implementing those pillars is achievable through constant training and increasing crews' and ship owners' awareness of the need to adopt stricter environmental policies and safeguard the environment[940].

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[937] He, Z., Jiang, S., Zhang, J., & Wu, G. (2022). Automatic damage detection using anchor-free method and unmanned surface vessel. *Automation in Construction*, **133**, 104017. DOI: https://doi.org/10.1016/j.autcon.2021.104017.

[938] Felício, J. A., Rodrigues, R., & Caldeirinha, V. (2021). Green shipping effect on sustainable economy and environmental performance. *Sustainability*, **13**(8), 4256. DOI: https://doi.org/10.3390/su13084256.

[939] Hermundsdottir, F., & Aspelund, A. (2021). Sustainability innovations and firm competitiveness: A review. *Journal of Cleaner Production*, **280**, 124715. DOI: https://doi.org/10.1016/j.jclepro.2020.124715.

[940] EMSA, (2022). Sustainability at work. Available at: About - Environmental Management - EMSA - European Maritime Safety Agency (europa.eu), last assessed: 30-8-2022.

Many factors influence the adoption of sustainable practices in shipping, and the main factor is that including environmentally friendly/sustainable processes severely increases operational expenses. The shipping sector, having its main characteristic of market volatility, is reluctant to install even more processes without any operational impact, especially when it undergoes a crisis[941]. Adopting those practices seems catastrophic when the demand has decreased, and the shipping companies are struggling to break even their expenses. However, introducing corporate social responsibility (CSR)[942] to the maritime sector has helped the shipping community accept and adopt those processes and incorporate them into daily operational practice.

Out of many factors, three factors are the most prominent in shipping practice to be regarded as of paramount importance for the further evolution of sustainable shipping:

a) Implementation of energy-efficient processes and procedures.
b) Application of new technologies for the advancement of ship design and the construction of emission-free vessels.
c) Adoption of alternative options regarding the equipment, fuels and other machinery that can be pollutive.

To assess the term proactiveness, the use of an example might be adequate. Thus, the European Union Waste Shipment Regulation dictates that all hazardous materials should be noted when a vessel is constructed[943]. During the ship recycling, the competent shipyard will be aware of the harmful substances and execute the recycling process with due diligence. This example is how to present legislation should

[941] Koufopoulos, D. N., Lagoudis, I. N., & Pastra, A. (2005). Planning practices in the Greek ocean shipping industry. *European Business Review*, ***17***(2), 151-176. DOI: https://doi.org/10.1108/09555340510588020.
[942] Martos-Pedrero, A., Jiménez-Castillo, D., Ferrón-Vílchez, V., & Cortés-García, F. J. (2023). Corporate social responsibility and export performance under stakeholder view: The mediation of innovation and the moderation of the legal form. *Corporate social responsibility and Environmental Management*, **30**(1), 248-266. DOI: https://doi.org/10.1002/csr.2352.
[943] Du, Z., Zhang, S., Zhou, Q., Yuen, K. F., & Wong, Y. D. (2018). Hazardous materials analysis and disposal procedures during ship recycling. *Resources, Conservation and Recycling*, **131**, 158-171. DOI: https://doi.org/10.1016/j.resconrec.2018.01.006.

be drafted and executed by assessing all parameters and foreseeing all possible outcomes[944].

The prediction of all potential sources of a system malfunction may seem impossible. Still, the utilization of systems that incorporate the experience accumulated to be used for the system's self-improvement is a notion that has been established and is a shiny example of good practice. Systems such as TMSA are relying on their self-correction to, in fact, predict and counter an emerging threat to its source. Thus, it can be said that proactiveness combines the ability to predict and avoid along with the ability to utilise your so-far experience to assess and improve your next prediction[945].

On the other hand, when you are not predicting and not trying to avoid an incident eruption, you are only left to counter the threat and struggle to minimize the losses. Thus, the notion of reactiveness occurs after the failure of proactiveness and after the emergence of an incident. The more successful an incident's proactiveness is, the less sound its reactiveness[946].

Currently, the legislative framework can only be reactive, first experiencing the accidents and then installing countermeasures. Unfortunately, numerous incidents, from Exxon Valdez and Torrey Canyon to Covid-19, prove that the shipping industry first needs to suffer and then act.

While there are sufficient examples and incidents, even now, many accidents are still happening while the legislative framework has already been installed. Thus, the legislation in shipping not only lacks proactiveness but also lacks enforcement by evidencing many accidents happening for the same reasons. Subject to this, to be sustainable means to be emission-free, thus, not having incidents create pollution.

[944] Nosratabadi, S., Mosavi, A., Shamshirband, S., Zavadskas, E. K., Rakotonirainy, A., & Chau, K. W. (2019). Sustainable business models: A review. *Sustainability*, **11**(6), 1663. DOI: https://doi.org/10.3390/su11061663.

[945] Hossain, K., Soon Lee, K. C., Abdul Ghani Azmi, I. B., Idris, A. B., Alam, M. N., Rahman, M., & Mohd Ali, N. (2022). Impact of innovativeness, risk-taking, and proactiveness on export performance in a developing country: evidence of qualitative study. *RAUSP Management Journal*, **57**, 165-181. DOI: https://doi.org/10.1108/RAUSP-01-2021-0002.

[946] Awal, Z. I., & Hasegawa, K. (2017). A study on accident theories and application to maritime accidents. *Procedia engineering*, **194**, 298-306. DOI: https://doi.org/10.1016/j.proeng.2017.08.149.

Currently, the proactiveness of shipping is evidenced only by Codes and systems that establish effective processes and that are auto-corrected[947].

It is not uncommon that the five Ps of proactiveness, namely: i) prediction, ii) prevention, iii) planning, iv) participation, and v) performance, are being incorporated into the same pattern in the most advanced safety systems, where the aim is to eliminate any source of danger before it even emerges and starts to materialize[948].

Due diligence, on the other hand, is a concept where the steps of a process are executed in such an order and detail that there are two options: i) any accident or liability will emerge or ii) even if an incident emerges, the care of the party to avoid this incident will be so much evidenced that this party will be excluded of any liability[949].

In many cases, the concept of due diligence is mixed with the duty of care. Under specific rules, the duty of care is "*the legal obligation of an agent to act in a manner befitting the principal's goals, including the duty to act on behalf of the principal, rather than in the self-interest of the salesperson or broker*"[950].

Thus, while the duty of care is a principle that requires action based on the best interests of the responsible party, due diligence[951] is a latent state where the quality and the importance of each action executed towards the completion of the process are monitored and evaluated when an issue emerges[952]. While with the duty of care, we consider an act of a party trying to prove its effectiveness, with due diligence, we monitor and evaluate the quality and impact of a whole process[953]. When coupled with

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[947] Prokopenko, O., & Miśkiewicz, R. (2020). Perception of" Green Shipping" in the contemporary conditions. *Entrepreneurship and Sustainability Issues*, **8**(2), 269. DOI: 10.9770/jesi.2020.8.2(16).

[948] Haapasaari, P., Helle, I., Lehikoinen, A., Lappalainen, J., & Kuikka, S. (2015). A proactive approach for maritime safety policy making for the Gulf of Finland: Seeking best practices. *Marine policy*, **60**, 107-118. DOI: https://doi.org/10.1016/j.marpol.2015.06.003.

[949] Theotokas, I., & Alexopoulos, A. (1998). Safety and Quality in the Shipping Industry: A Legal Analysis of the ISM Code's Principles and Applications. *European Research Studies Journal*, **1**(3), 81-98.

[950] Smith, J. C., & Burns, P. (1983). Donoghue v. Stevenson: The not so golden anniversary. *The Modern Law Review*, **46**(2), 147-163. DOI: http://www.jstor.org/stable/1095489.

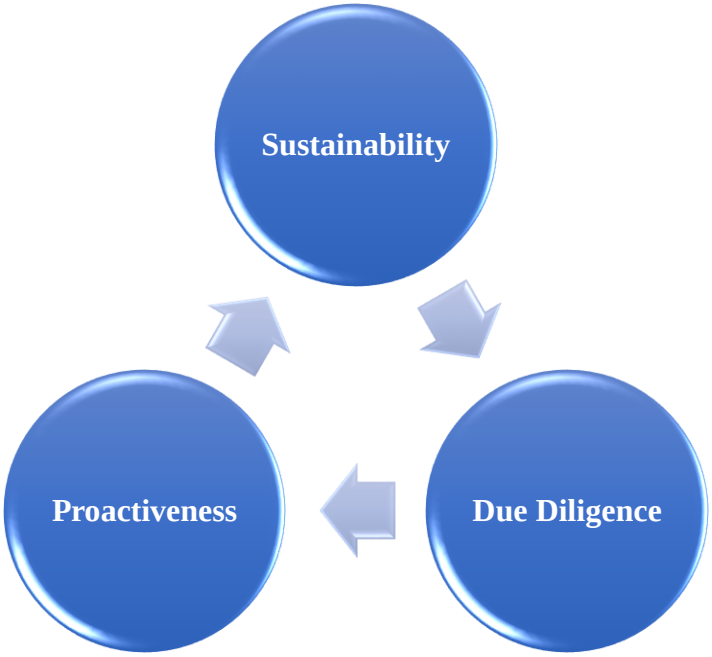
[951] Davies, M., & Lin, J. (2021). Shanghai Tongshun Transportation Co., Ltd. v. Zhoushan City Dongjing Shipping Co., Ltd. et al. In *Chinese Maritime Cases* (pp. 1255-1281). Springer, Berlin, Heidelberg. DOI: DOI: 10.1007/978-3-662-63810-1_42.

[952] Chacón, V. H. (2017). The Origin of the Obligation of Practicing Due Diligence in Maritime Transportation. In *The Due Diligence in Maritime Transportation in the Technological Era* (pp. 15-99). Springer, Cham. DOI: 10.1007/978-3-319-66002-8_2.

[953] Psaraftis, H. N. (2002). Maritime safety: to be or not to be proactive. *WMU Journal of Maritime Affairs*, **1**(1), 3-16. DOI: https://doi.org/10.1007/BF03195022.

proactiveness, namely with prediction and utilization of the accumulated experience, the outcome will be the ultimate system of self-assessment, leading toward the goal of sustainability[954].

Graph 5: Correlating the concepts of proactiveness and due diligence to achieve sustainability.



Made by Author, 24-2-2022.

While sustainability is the goal, due diligence and proactiveness can be characterised as the means to achieve it[955]. Another important aspect of this relationship is the continuity of the relationship and the constant repeat of the process, thus increasing the experience of the process, correcting all emerging malfunctions, assessing the quality and performance of the system, and predicting any possible future issues. However, from the assessed legislation, only the Codes from the previous chapters utilised such characteristics along with the Waste Management and Ship Recycling legislations. Also, it is evident that while those systems are deemed as successful and can achieve sustainability in their sector, the shipping practice has found

[954] Hossain, K., Soon Lee, K. C., Abdul Ghani Azmi, I. B., Idris, A. B., Alam, M. N., Rahman, M., & Mohd Ali, N. (2022). Impact of innovativeness, risk-taking, and proactiveness on export performance in a developing country: evidence of qualitative study. *RAUSP Management Journal*, **57**, 165-181. DOI: https://doi.org/10.1108/RAUSP-01-2021-0002.

[955] Psaraftis, H. N., Amboy, P., & Psaraftis. (2019). Sustainable shipping. Berlin: Springer International Publishing.

methods to avoid their utilization and devaluate the concept of sustainability in the maritime industry[956].

3.9 Research Outcomes

The concept of **sustainable shipping** is an **emerging trend**, introduced recently to the shipping industry. It was found that the concept incorporates: i) all **safety practices and management**, installed with the **adoption of maritime codes and safety systems**, along with ii) the established principle of **environmental protection** from the perspective of minimisation of emerging environmental hazards coupled with iii) the **elimination of all sources of pollution** during a routine operation process and lastly iv) the application of **Corporate Social Responsibility** to the shipping industry. Thus, to achieve sustainability, effective **safety systems**, such as TMSA, are required to **enforce legislations**, such as MARPOL and CLC, having installed proactive applications and measures, **coupled with new legislations**, such as Waste Management Treatment, Low Sulfur Cap or Ship Recycling, installed **to minimise and prospectively eliminate pollution sources**. The cost of all those measures requires heavy investments in resources. At this point, the instalment of the concept of Corporate Social Responsibility can upset the reaction of the shipping industry.

While addressing the most prominent of that legislation bound to eliminate all sources of pollution, **Ballast Water Management** is controversial legislation. The ballast water management process is impactful and effective in **handling the unloaded ballast**, eliminating all potential environmental hazards. On the other hand, the negative outcome of this process is **the mounting costs** for the vessels and the possible delays in utilising the ballast handling facilities of port authorities. Furthermore, from the vessel's perspective, the ballast helps **stabilise the ship during navigation**, minimising vibrations and other emerging incidents caused by the lack of stability; thus, it is paramount for safe navigation. Nevertheless, to avoid the costs, shipping companies usually **unload their wastes to open seas** and avoid utilising the set processes from BWM Convention, with **shady techniques** in

[956] Boviatsis, M., & Vlachos, G. (2022). Correlation of the Concepts of Proactiveness and Due Diligence to Achieve Sustainability in the Maritime Sector. *Journal of Shipping and Ocean Engineering*, **12**, 33-42. DOI: 10.17265/2159-5879/2022.02.001.

collaboration with other stakeholders. To counter this phenomenon, the creation of **an aquatic (bio)map was proposed**, evaluating alterations in the biodiversity of the local environments and notifying the local authorities of possible violations of the set regulations.

With regard to air Emissions, during the last years, IMO and the other international bodies have adopted a successful set of measures to counter the emerging threat from air pollutants. Specifically, regarding **CO2 emissions**, new sets of rules based on **MEPC 76 and SEEMP** have been installed, which, in conjunction with the CCS method, leading to an unprecedented reduction of **the majority of emissions**. Furthermore, regarding **VOCs**, the mandatory utilisation of **vapour lines in port facilities** has been internationally introduced, subject to **Regulation 15 of MARPOL Annex VI**. Additionally, regarding **SOx scrubber wash waters**, IMO 2020 directed the shipping community towards the **utilisation of scrubber systems** and fuels of high quality as an alternate factor for countering emerging environmental threats.

After the adoption of the new low-sulfur cap, the shipowners were found with three options, namely i) to **utilise HFO** with the installation of emission reduction technologies, ii) to use **MGO or ULSFO** as compatible fuels or iii) use **LNG as fuel**. From the analysis of the three options, it has been proved that **LNG is the most reliable option** because it **does not pollute** the environment and its **sulfur content is negligible**. Furthermore, it was also evidenced that LNG expansion is proportionate to the instalment of LNG facilities in ports, such as FSRUs. Therefore, the more the installation of facilities will expand, the more the LNG as a fuel will be utilised.

In addition, while LNG is the most sustainable fuel, **another fuel** will soon emerge as a viable and prospectively dominant force in the fuel market in 2050. That fuel is **ammonia**, which will be tested for the first time in 2024 when the **first ammonia-powered machines** are created. While there are installations, no training for utilising ammonia, and it is pretty early to exclude remarks, it has been spotted **that ammonia will probably have the course of LNG**. From its initial initiation as marine fuel in 2037, as estimated, it will need roughly the same time as LNG to dominate the fuel market. The fuels of the future will **compete** concerning **cost, safety, and available facilities and technology** to be utilised. When fuel is **distinguished as the most effective**, it will require a specific amount of time, usually **proportional to the**

time needed for facilities to be installed to **dominate the market**. Currently, this is the case with LNG, and it may be the case with ammonia.

Regarding the installation of the **monitoring processes** for the control of the low sulfur cap, a **loophole in the compliance** of those two processes, namely **EU MRV and IMO CDS**, is evident with no interaction whatsoever. Sadly, the IMO and E.U. procrastinate while the industry pusses for a solution. To resolve the issue, the issuance of "**a big global carbon levy**" is proposed by Prof. Psaraftis, which will lead to the vessels' speed reduction and low carbon fuels and conclusively the GHG emissions reduction both in the short and long run. Nevertheless, to share the costs of this Regulation, BIMCO adopted the "EEXI TRANSITION CLAUSE FOR TIME CHARTER PARTIES 2021" to resolve the dispute between the charterers and shipowners. Sadly, the utilisation of this clause **will not be enough** when structural issues, such as which monitoring system should be abided by, have not been answered, further exposing the gaps in international legislation, significantly overlapping with national or regional legislation.

A similar case of system overlap is evidenced in the process of **ship recycling**. Currently, there are two international (one of which is not in force but partially followed) and one regional legislation on ship recycling. Thus, while all legislations effectively **promote effective ship recycling while protecting the safety of the facilitators**, the **gaps** in their utilisation have led the shipping industry to implement the process of **de-flagging** to avoid the effects of the said legislation. From the analysis, it was concluded that the ideal solution would be the **installation of the E.U. Waste Shipment Regulation** in a global spectrum along with **international incentives and collaboration of flag states**, utilising systems similar to the **New Inspection Regime (NIR)** to counter the phenomenon of de-flagging.

Thus, while for all emerging pollutants, processes have been installed to counter effectively them, presently, the shipping industry is developing yet another project that will effectively counter the most common factor for most **maritime accidents**, namely the **human factor**. This project utilises unmanned vessels, and they aim to eliminate the human element and interaction from the shipping industry prospectively, thus reducing the chances of accidents and, at the same time, the operational costs of the shipping company. Presently, the Mayflower Autonomous Ship

is tested, while the MV Yara Birkeland, a 120 TEU container ship, is currently operational. While **the project is evolving** and it will effectively reshape the market upon initiation, it was concluded that **this transition should be executed at a slow and stable pace**, not negatively affecting the shipping industry. And although prototype small autonomous ships are operated, the next stage will practically be **navigation with increased remote control from land via satellite, partially operated** for any eventuality.

Additionally, while currently there is **no mention of the unmanned vessel in international legislation**, the abolishment of the crew didn't seem to disregard the unmanned vessels being categorised as "vessels". Nevertheless, it was concluded that **the international legal framework is underdeveloped,** and **many alterations to legislation**, such as UNCLOS and COLREG, **should be made before the adoption of unmanned vessels** is initiated. From the analysis of unmanned vessels, it was evidenced that international legislations are very slow to reach such groundbreaking changes. T**o avoid legal gaps in the future**, **the legal community should realise that the rapid expansion of technology is pressing all sections of the maritime sector towards constant reshaping and evolution**.

Thus, it can also be concluded that the **expansion of technology** is another **critical factor** in implementing and enforcing the **adopted regulatory framework**. Specifically, **the inclusion of technology** in the shipping industry has been **substantial** over the last few years. After the spread of Covid-19, **various sections of the maritime industry rely solely on technology**, abolishing the human element. Technology has also been of significant help to the shipbuilding industry and in developing new materials to increase the quality and performance of newly built vessels. That said, the massive reliance on technology leads to the **development and processes** which rely on **recently introduced materials and initially help on issues such as navigation but can be the leading cause of other kinds of pollution.**

A typical example is the above-assessed case of ballast water, which was utilised to help the vessel's stability but ultimately led to the destruction of regional maritime environments. Another example is the utilisation of anti-fouling systems, which increase a vessel's speed and life cycle but cause pollution to regional environments simultaneously. Thus, **the utilisation of technology and new processes**

should be coupled with the instalment of proactive and sustainable measures to access and prevent the creation of emerging pollutants.

The majority of the said systems and legislation include **the concept of sustainability**. But **how can sustainability be re-assessed, as TMSA does, to** enhance itself constantly? It is proposed that **sustainability can work in a continuous correlation with due diligence and proactiveness**.

Currently, the legislative **framework can only be reactive**, first experiencing the accidents and then installing countermeasures. Unfortunately, numerous incidents, from Exxon Valdez and Torrey Canyon to Covid-19, prove that the shipping industry **must suffer first and then act**.

While there are numerous examples and incidents, even now, many accidents are still happening while the legislative framework has already been installed. Thus, the legislation in shipping **not only lacks proactiveness but also lacks enforcement** by evidencing many accidents happening for the same reasons. Subject to this, to **be sustainable means to be emission-free, thus, not having incidents create pollution**. Currently, the proactiveness of shipping is evidenced only by Codes and systems that establish effective processes and that are auto-corrected.

Due diligence, on the other hand, is a concept where **the steps of a process are executed in such an order and detail that there are two options: i) any accident or liability will emerge or ii) even if an incident emerges, the care of the party to avoid this incident will be so much evidenced that this party will be excluded of any liability.**

While **sustainability is the goal, due diligence and proactiveness can be characterised as the means to achieve it**. Another important aspect of this relationship is the **continuity** of the relationship and **the constant repeat of the process**, thus **increasing the experience of the process**, correcting all emerging malfunctions, assessing the quality and performance of the system, and predicting any possible future issues. **However, from the assessed legislation, only the Codes and some legislation, such as CLC and OPA, from the previous chapters utilised such characteristics along with the Waste Management and Ship Recycling legislations**. Also, it is evident that while those systems are deemed as **successful** and can **achieve**

sustainability in their sector, the **shipping practice** has found methods **to avoid their utilisation and devaluate the concept of sustainability** in the maritime industry.

Chapter 4

Maritime Legal Framework: Adoption of a business-oriented perspective

In the fourth chapter, the present legal amendments are assessed, and an evaluation of their impact on sustainability is executed. Specifically, the current amendments to charter party clauses are evaluated along with the revisions in aspects of maritime law, such as collisions, salvage, and general average.

Then, the present changes in marine insurance are assessed, focusing on the amendments introduced with the adoption of MIA 2015. Finally, an evaluation of maritime arbitration's impact is addressed, focusing on its status in conjunction with court processes. The chapter concludes with the assessment of the present legal amendments and their possible integration to maritime sustainability.

Research Layout

Chapter 4: Maritime Law: Evolution & Implications

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4.1 Carriage of Goods by Sea

4.1.1 Types of Charter Parties

The process of chartering is the most crucial element of shipping. In fact, a ship owner invests in shipping merely to charter a ship, namely, to offer transportation services to a cargo owner and, from the process, to achieve profit[957]. The chartering department is the only department in a shipping company that creates profit. All other departments, such as operations and technical, are invested in the optimum operation and maintenance of the vessel, thus creating only expenses. For legal practice, there are only two chartering options[958]: a voyage charter and a time charter. In shipping practice, there are other utilisations of the vessel, offering more options, such as i) bareboat charter, ii) contract of affreightments (CoA), iii) consecutive voyage, and iv) time charter trip. Evidently, all these options are either variations of the primary two options or managerial decisions that ultimately lead to a voyage or a time charter party[959].

4.1.1.1 Voyage Charter

Under this chartering, the vessel is employed to transfer cargo from a specified port or region to another geographical area. It is mainly elected by charterers who require the vessel services only for one specific transport with no subsequent actions to follow[960].

The shipping company is responsible, i) for the transportation, ii) the cargo loading and iii) unloading services are remunerated with a monetary fee called freight. The company/carrier is obliged to be presented at the first (or, respectively, the only) port of loading, providing the exact vessel as described in the charter party. Should the company be unable to provide the specific vessel, as described in the charter party, the charterer can terminate the contract and claim for damages[961].

Additionally, the charterers should be informed of the exact time of arrival at least a few days ago, subject to the charter party details, to transport the cargo diligently to the port of loading and make preparations for moving the cargo to the exact place of the vessel's berth to avoid any unnecessary delays. Additionally, the contract of carriage

[957] Baatz, Y. (Ed.). (2020). *Maritime law*. Taylor & Francis. DOI: https://doi.org/10.4324/9781003046943.
[958] Athanasiou L. & Antapasis A. (2020). *Maritime Law*. Law Library, Athens. (in Greek)
[959] Vlachos G.P., (2011). *Chartering*. Stamoulis Publications, Piraeus. (in Greek)
[960] Thomas, R. (Ed.). (2020). *The evolving law and practice of voyage charterparties*. Taylor & Francis.
[961] *Hong Kong Fir Shipping Co Ltd v Kawasaki Kisen Kaisha Ltd* [1962] 2 QB 26; [1961] 2 Lloyd's Rep 478.

makes special consideration for the precise time under which the loading and the unloading of the vessel should be executed[962], called laytime[963] and should the time of loading or unloading is excessive to the agreed time, the charterer is obliged to compensate the owner[964] with a predetermined daily sum, called demurrage[965].

Under a voyage charter, the owner assumes responsibility for covering the vessel's operating expenses (OPEX), such as bunkering, including crew expenses, supplies, port and service dues, insurance, etc[966]. Subsequently, the ship owner is liable for any increased expenses; in many cases, he must pay the required expenses for the completion of the voyage and then receive the freight in full. Also, under a voyage charter, the owner is held liable for the duration of the voyage, which may vary considerably from the pre-agreed time of the voyage[967]. In fact, so many unpredicted factors or extenuating circumstances can extend the time of the voyage that it is impossible to set a specific time for the voyage and be certain that this will be executed in detail. In addition, delays are so common in shipping that their causes have been categorised. Special provisions in charter parties dictate which party is liable under which circumstance[968]. Those delays lead to the compensation of the affected party, called demurrage, which is paid for any additional day spent beyond the agreed time set in the charter agreement[969].

There are also cases where the loading and unloading process can be completed sooner than expected. Under this circumstance, the ship owner will be obliged to compensate the charterer for the decreased voyage time. This compensation is usually agreed upon and a fraction of the agreed demurrage amount[970]. It aims to reimburse the charterer for any unscheduled expenses that he should pay due to the

[962] *Glencore Grain Ltd v Flacker Shipping Ltd (The Happy Day)* [2002] 2 Lloyd's Rep 487.
[963] *Navalmar UK Ltd v Kalemaden Hammeddeler Sanayi Ve Ticaret AS (The Arundel Castle)* [2017] EWHC 116 (Comm); [2017] Lloyd's Rep Plus 22.
[964] See e.g. cl 7 of Gencon 1994.
[965] See e.g. cl 8 Asbatankvoy.
[966] Vandeventer, B. (1974). Analysis of Basic Provisions of Voyage and Time Charter Parties. *Tul. L. Rev.*, **49**, 806.
[967] *DGM Commodities Corp v Sea Metropolitan SA (The Andra)* [2012] EWHC 1984 (Comm); [2012] 2 Lloyd's Rep 587.
[968] *Glencore Grain Ltd v Flacker Shipping Ltd (The Happy Day)* [2002] 2 Lloyd's Rep 487.
[969] ibid
[970] *Nippon Yusen Kaisha v Marocaine de L'Industrie du Raffinage* (The Tsukuba Maru) [1979] 1 Lloyd's Rep 459. Contrast, e.g. cl 7.3.2 of BPVOY 4.

vessel's arrival[971]. Evidently, this option is chosen by ship owners when the charter market is on the rise, and they have already found another charter party to the port of call with a higher freight[972]. On the other hand, when the market declines, the ship owners, even if they arrive sooner, usually elect to wait until the scheduled arrival time and then give notice to the charterer[973]. There are many variations to a voyage charter, such as the "FIO" (Free In and Out), where the charterer is responsible for loading and unloading the vessel. Still, the central concept is that under a voyage charter, the carrier is liable to execute one specific transport from one place to another, mainly at his own expense[974].

The precise description of the cargo to be transported and its specific characteristics are of particular importance in order to provide clarity and avoid deliberate or unintentional misinterpretations and friction between the parties[975]. Thus, reference should be made to the type of cargo (or consignments) to be transported, its condition, volume, individual features, etc. The problem that arises is that, as the different goods have different volumes compared to their weight, the total quantity that will eventually be loaded varies depending on the case. Thus, the description of the transported goods in the charter party should be identical to the description in the bill of lading[976] to avoid claims and, most notably, for the vessel to be eligible to carry the cargo[977].

In some cases, the freight is agreed upon either per ton (when the load is heavy) or per cubic meter (if the load is light but requires more space). Rarer is the case of determining the freight according to the value of the cargo (ad valorem), and indeed this way tends to disappear since the expensive cargoes for which this practice was

[971] *Ocean Pride Maritime Ltd Partnership v Qingdao Ocean Shipping Co* [2007] EWHC 2796 (Comm); [2008] 1 Lloyd's Rep 511.
[972] E.g. cl 18 of NYPE 1946 and cl 23 of NYPE 1993 and cl 8 of Gencon 1994, but not cl 21 of Asbatankvoy.
[973] *Bilgent Shipping PTE Ltd v ADM International Sarl (The Alpha Harmony)* [2019] EWHC 2522 (Comm).
[974] Gelgec, A. (2021). Challenging the Impact of FIOST Clauses on Cargo Interests. U. *Bologna L. Rev*., **6**, 29.
[975] *Markappa Inc v N W Spratt & Son Ltd (The Arta)* [1985] 1 Lloyd's Rep 534.
[976] Reynolds, F. (2020). Time charterparties and bills of lading. *In Legal Issues Relating to Time Charterparties* (pp. 161-175). Informa Law from Routledge.
[977] See cl 2 NYPE 1993 and cl 2(b) and (c) of NYPE 2015.

applied (e.g. precious metals, semi-precious stones, etc.) are now transported by air, faster and safer[978].

The time allowed for the charterer to pay the freight, the method of payment and the currency are also essential issues that should be specified in detail in the charter agreement. The most widespread way is to pay the freight in foreign currency – mainly in dollars – to the shipowner's bank within 3-5 days after the completion of the loading, the signing and delivery of the bills of lading. A shipowner rarely agrees to carry the goods without paying even a portion of the freight[979].

Additionally, the owner has the right to withhold the cargo in order to press the charterers to pay the freight in case of delay. If the unloading has already been completed, then the freight payment by the charterers will be rather difficult. For this reason, the master does not in any way allow the agents to deliver the bills of lading, instructing them not to hand them over without having his written authorisation earlier, even making them responsible for the event that they act otherwise[980].

In case of a dispute arising from a charter party clause, the chartering agreement has incorporated a clause where the parties agree on the legislation governing the contract. Recently, this clause contained not only the legislative authority under which the affected party should make a claim to the competent court authorities but also the option for the dispute to be resolved by alternative dispute resolution, usually arbitration. The arbitration process has been installed over the last decades as the most effective way to resolve most differences because it is faster and less expensive than court processes. In addition, the arbitrators have usually experienced individuals from the market, not necessarily instructed in the law, adding an essence of practicality and making arbitration a more business-oriented process[981].

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[978] *DGM Commodities Corp v Sea Metropolitan SA (The Andra)* [2012] EWHC 1984 (Comm); [2012] 2 Lloyd's Rep 587.

[979] Davies, M., & Lin, J. (2021). Zhoushan Baolong Shipping Co., Ltd. v. Tangshan Hongtai Freight Forwarding Co., Ltd. *In Chinese Maritime Cases* (pp. 1445-1474). Springer, Berlin, Heidelberg. DOI: https://doi.org/10.1007/978-3-662-63810-1_49.

[980] Cooke, J., Young, T., Ashcroft, M., Taylor, A., Kimball, J., Martowski, D., ... & Sturley, M. (2014). *Voyage charters*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315795027.

[981] Nair, A. (2013). A note on Norden: Voyage Charterparties, the Hague/Visby Rules and Enforcing Foreign Arbitration Awards. *Austl. & NZ Mar. LJ*, **27**, 90.

4.1.1.2 The Time Charter

A time charter is an option for the ship to be "rented" by a charterer for a continuous period, lasting from a few weeks to many years. This chartering form is preferred when charterers need to transfer additional cargo beyond the amount only a single voyage can transport[982]. This form of chartering is also customary by liner companies, which are often in the process of transporting larger quantities of cargo, but also to better meet the requirements of their suppliers with greater frequency and regularity of routes[983].

Under this type of charter, the ship shall continue to be managed by the shipowner, who shall be obliged to cover his fixed costs. However, instead of collecting freight, the owner is rewarded at regular intervals in advance[984], with a predetermined amount called hire[985], which is calculated based on the days the ship is chartered, with the exceptions of off-hire[986]. The charterer is responsible for the operation of the vessel, as well as for its operating costs. Furthermore, it has the right to give the master instructions on the course of the ship and the general functions he must perform, provided that he is within the framework of the agreed terms of the contract[987].

Charterers are also obliged to supply the ship with all the necessary supplies and equipment (except for those which have been exempted because they were considered being related to crew activities, e.g., cooking) and undertake to cover port, pilotage, towing, agency, supplies, lighthouses, canals, consular and all other relevant expenses. Also, when the vessel enters a port at the carrier's request or due to a problem that occurred under the carrier's responsibility, then the carrier undertakes the coverage of all additional charges. Also, the carrier will be charged with the cost of disinfecting

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[982] Meirong, Z., Yi, Y., & Wei, T. (2009). An Analysis of the Legal Issues in Lien Clause in the Time Charter Party. *China Oceans L. Rev*., **350**.

[983] Vlachos G.P. (2011). *Chartering*. Stamoulis Publications, Piraeus. (in Greek).

[984] See e.g. cl 11(b) NYPE 1993, cl 11(b), cl 9(a) Shelltime 4 and the BIMCO Non-Payment of Hire Clause for Time Charter Parties. However, there is not always such a clause – see e.g. *ENE 1 Kos Limited v Petroleo Brasileiro SA (The Kos)* [2012] UKSC 17; [2012] 2 WLR 976; [2010] EWCA Civ 772; [2010] 2 Lloyd's Rep 409; [2009] EWHC 1843; [2010] 1 Lloyd's Rep 87

[985] Cls 4 and 5 NYPE 1946, cl 11(a) of NYPE 2015 and cl 6 Baltime 1939.

[986] Cl 11 of the Baltime form, cl 15 of NYPE 1946, cl 17 of NYPE 1993, and cl 17 of NYPE 2015. See *The Marika M [1981] 2 Lloyd's Rep 622; The Pythia [1982] 2 Lloyd's Rep 160; The Ira [1995] 1 Lloyd's Rep 103; London Arbitration 6/99 LMLN 504; The Houda [1994] 2 Lloyd's Rep 541; London Arbitration 11/96 LMLN 442; Action Navigation Inc v Bottigliere di Navigatione SpA (The Kitsa) [2005] EWHC 177; [2005] 1 Lloyd's Rep 432, LMLN 660; Bottiglieri di Navigazione Spa v Cosco Qingdao Ocean Shipping Co (The Bunga Saga Lima) [2005] EWHC 244; [2005] 2 Lloyd's Rep 1.*

[987] Lopez, N. (1991). The master's role in charter performance. *MLAANZ Journal*, **8**, 3.

the ship if illness occurs in a member of the crew or any other expenses that are relevant to crew health and safety. However, suppose the disinfection or any other relevant action becomes necessary due to the cargo carried or because of the ports of call, throughout the duration that the ship operates under the chartering agreement. In that case, the relevant cost will concern the charterers[988].

In the time-chartering of a ship, the charterers also undertake the obligation to transport cargoes, from which all pre-agreed dangerous cargoes are excluded, and undertake to approach exclusively to safe ports. Also, the charterer should provide the necessary materials for fixing the cargo and all additional assembly materials, which may be required for a special trip or an unusual cargo. If these already exist on board, they will have permission from the owners to use them. Furthermore, another charterer's responsibility is to cover the cost of cargo handling expenses created in the ports and assign the loading and unloading to competent stakeholders. Finally, the charterer should pay the hire in advance[989]. Otherwise, in the absence of timely payment[990], the owner reserves the right to withdraw his ship, ordering the master to cease performing the contract of carriage[991].

Among the obligations of the shipowners is the payment of the ship's insurance premiums, lubricants and all supplies relating to the cabins, the deck, the engine room, and all other required supplies. In addition, the shipowner must also undertake the full coverage of the salaries and catering of the crew. The owner shall, moreover, continue to bear all the costs of maintaining the ship and the cost of maintaining its machinery and equipment in satisfactory condition throughout the chartering period while maintaining the speed of the vessel and the fuel consumption

[988] Stopford, M. (2008). *Maritime Economics*, 3rd Edition. Routledge. DOI: https://doi.org/10.4324/9780203891742.

[989] Cl 5 NYPE 1946 form and cl 6 Baltime 1939.

[990] BIMCO, (2006). Non-Payment of Hire Clause for Time Charter Parties. Available at: Non-Payment of Hire Clause for Time Charter Parties 2006 (bimco.org), last assessted: 29-8-2022.

[991] See e.g. ll 153–158 of cl 11 of NYPE 1993, cl 11(d) of NYPE 2015 and the BIMCO Non-Payment of Hire Clause for Time Charter Parties. See also cl 10(e)(4) of BIMCO Supplytime 89 form which permits the owners to suspend the service temporarily without giving an anti-technicality notice – Greatship (India) Limited v Oceanografia SA de CV [2012] EWHC 3468 (Comm); [2013] 1 All ER (Comm) 1244. In that case Gloster J considered that the wording of the revised cl 12(f) of BIMCO Supplytime 2005 form is unclear

as agreed in the charter agreement. Finally, the special issue of overtime hours of crew members is regulated by a special agreement between the parties[992].

A charterer, by drawing up a time charter contract, acquires the ability to use the ship to carry his cargo. In this way, he will not receive any freight from the ship's operation but will be able to avoid the constant search and chartering of vessels, which is usually more expensive[993]. In many cases, a vessel may have been chartered for the sole purpose of being sub-charterer by the charterer, who has the right as disponent owner (i.e., the owner who has the ability to dispose of the ship for a certain time) to sub-charter it[994].

From a managerial perspective, when the market is on the rise, chartering a ship for a more extended period and at a lower hire[995] ensures a profit from the difference in hires payable compared with the spot charter values. Other charterers still prefer to charter the ship for a specific period to ensure that they can transport their goods at a predetermined time and, therefore, at a fixed cost for each ton or unit of product transported, avoiding the well-known fluctuations of the international freight market. In some cases, the charterer, bound by some charter parties to transport a certain quantity of cargo between two or more ports, charters a suitable ship to ensure his unforeseen future transport needs[996].

During the return journey, it is often observed that the vessel is empty, a reason that makes the charterer look for other additional cargoes, with the ultimate goal of reducing his expenses, in order to transport his cargo at the lowest possible cost, that is, by offsetting the hires he pays to the shipowner with the freights he collects[997].

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[992] Branch, A. E. (2012). Economics of shipping practice and management. Springer Science & Business Media.
[993] Ibid.
[994] *Itagrani Export SA v Care Shipping Corp (The Cebu)* (No 2) [1990] 2 Lloyd's Rep 316; *Western Bulk Ship-owning III A/S v Carbofer Maritime Trading ApS (The Western Moscow)* [2012] EWHC 1224; [2012] 2 Lloyd's Rep 163.
[995] *Western Bulk Carriers K/S v Li Hai Maritime Inc (The Li Hai) [2005] EWHC 735 (Comm)*; [2005] 2 Lloyd's Rep 389.

[996] Vlachos, G.P. (2011). *Maritime Economics*. Stamoulis Publications, Piraeus. (in Greek)
[997] Wang, H., Huang, S., Liu, Z., & Zheng, L. (2013). Optimal tanker chartering decisions with spot freight rate dynamics considerations. *Transportation Research Part E: Logistics and Transportation Review*, **51**, 109-116. DOI: https://doi.org/10.1016/j.tre.2012.12.006.

4.1.1.3 Bareboat Charter or Charter by Demise

Bareboat charter or charter by demise is an alternative chartering option where the owner charters his vessel to a charterer, who now assumes all the obligations of the vessel and commands the ship as a regular owner[998]. In return, the shipowner receives a lower reward, compared to the market prices of chartering in a period, commensurate with the reduced responsibilities and risks he acquires from this new charter. The charterer now becomes the ship's temporary manager (owner, bare-boat owner); that is, he manages, mans and charters the vessel as if he were the actual owner. The demise charter (concession) may differ from the bareboat charter in particular because it can be agreed between the contracting parties that the owner will provide the master and the crew and possibly organize the vessel's insurance[999].

The condition in which the ship will be found during the re-delivery to the owner is a particularly crucial element of the chartering of the bare ship. For this reason, detailed inspections are conducted during and after delivery. Moreover, the conditions relating to the ship's maintenance, which are incorporated in the agreement's text, are also strict. There are several bareboat time agreements worldwide, but the most popular one seems to be BIMCO's BARECON[1000].

Bareboat time chartering is a financial tool designed to enable investors to buy ships, leaving their management and management to charterers or operators, who are more skilled in shipping matters. It is not found in recent years with the same frequency as it had in earlier times. From a legal perspective, while it resembles time chartering, bareboat chartering should not be regarded as a chartering option but as a managerial option which will consecutively lead to a voyage or time charter by the vessel's manager[1001].

4.1.1.4 Contract of Affreightment/COA

Contract of affreightment (COA) concerns the undertaking by one shipowner of the obligation to transfer a given quantity of cargo from one predetermined port to another, under specific chartering conditions, performing multiple shipments. COAs usually concern exact amounts of cargo, which will have to be transported over a certain

[998] See e.g. *BW Gas AS v JAS Shipping Ltd* [2010] EWCA Civ 68; [2011] 1 All ER (Comm) 236.
[999] Vlachos, G.P. (2011). *Chartering*. Stamoulis Publications, Piraeus. (in Greek)
[1000] BIMCO. (2017). BARECON 2017. Available at: BARECON 2017 (bimco.org), last assessed: 29-8-2022.
[1001] Gilabert Gascón, A. (2021). Insurance related problems in bareboat charter agreements. *Journal of Shipping and Trade*, **6**(1), 1-18. DOI: https://doi.org/10.1186/s41072-021-00093-3.

time[1002]. Difficulties arise when drawing up the charter agreement since it is not a simple journey but a charter with many risks, each of which must be taken into account, and the most appropriate way to deal with it must be found[1003].

The leasing contract enables the owner to use his other vessels as an alternative, i.e. without tying up any specific one, but always having the opportunity to use any available ship. He will also likely charter third-party ships if one of his own is not available at the specific time to cover the contract's obligations[1004]. The conclusion of such a contract gives the shipowner the advantage of ensuring the continuous employment of his ships throughout their duration, which is of great importance, especially if the shipowner expects the freight market to fall. The owner is remunerated according to the ship's tonnage or the quantity of cargo to be transported. At the same time, his obligation is always to have available the vessel required to transport the goods in question[1005].

The leasing agreement is also of particular interest to operators (cargo managers), i.e., those who undertake foreign cargoes and transport them by ships chartering on their behalf, caring for the difference in freights. The charterer, through this contract, retains the advantage of postponing the processing of the details of the voyages to the owner (or the operator). At the same time, he supervises only the materialisation of the charter[1006].

Also, in case of a rise in freight market prices, the charterers have bound some shipowners with their contract to lower freights (provided, of course, that the latter will not find any pretext to withdraw but will complete the agreement by the end). Even if the market remains at the same level or moves downwards (i.e., against the charterer's

[1002] Sandevärn, A. (2018). The Volume Contract of Affreightment. In *Shipbroking and Chartering Practice* (pp. 293-312). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315087979.
[1003] Williams, R. (2020). The impact of deviation on contracts of affreightment. In *The Evolving Law and Practice of Voyage Charterparties* (pp. 289-306). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781003122869.
[1004] Irfani, D. P., & Wedayanti, P. Y. T. (2018). The determinants of tanker spot freight rates: case study of oil transport. *International Journal of Oceans and Oceanography*, **12**(1), 17-28.
[1005] Abrahamsson, B. J. (2019). Types of Transport Contracts. In *International Ocean Shipping: Current Concepts and Principles* (pp. 83-93). Routledge. DOI: https://doi.org/10.4324/9780429052057.
[1006] Rogers, A., Chuah, J., & Dockray, M. (2019). *Cases and Materials on the Carriage of Goods by Sea*. Routledge. DOI: https://doi.org/10.4324/9780429059742.

interests), the charterers will have to overcome the insecurity and any instability that may exist regarding the long-term course of freights[1007].

4.1.1.5 Chartering of Consecutive Voyages

Chartering consecutive voyages is an option of voyage chartering with a clause that after the end of a voyage, another voyage will automatically reenact between the same charterer and shipowner under the same agreement. This chartering enables charterers to cope with the fluctuations in the freight market by securing an agreement in advance on the prices they will be forced to pay for the transport of their cargo[1008]. For his part, the owner is obliged to make the vessel available to the charterer on the predetermined dates in order to transport the predetermined cargo. Otherwise, he is obliged to pay compensation for any delay or cancellation of the carriage[1009].

In some cases, the shipowner has to deal with short-distance travel, which does not generate significant freight and often, no cargo is found for the return journey. Therefore, in charters of this kind, several trips are agreed upon. The option is given for a possible continuation, primarily determined by the course of the freight market. If the trend is downward, the charterer may prefer to withdraw from this contract and sign a new one at a lower price[1010].

The calculation of the fare is made separately for each trip. In addition, for each voyage, the time allowed for the ship's stay in port for loading and unloading is also calculated, always depending on the number of cargo it loads on each voyage.

4.1.1.6 The chartering of a Time Charter trip

This charter has elements both from voyage chartering (as it has the duration of a trip) and from time chartering (because the contracting parties are entrusted with the rights and obligations found in time chartering). The time charter trip sometimes it is characterised as a short-time charter party. The hire of time charter trips is higher related to the spot market and does not follow the lower levels of time charters (which, as they ensure stable employment on board for a long time, do not follow the amount

[1007] Vlachos G.P. (2011). *Chartering*. Stamoulis Publications, Piraeus. (in Greek)
[1008] Plomaritou, E., & Papadopoulos, A. (2017). *Shipbroking and chartering practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315689609.
[1009] Cooke, J., Young, T., Ashcroft, M., Taylor, A., Kimball, J., Martowski, D., ... & Sturley, M. (2014). *Voyage charters*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315795027.
[1010] Stopford, M. (2008). *Maritime Economics*, 3rd Edition. Routledge. DOI: https://doi.org/10.4324/9780203891742.

of spot freight market). The hire is paid in the same way as the charter, i.e. in advance and depending on the dwt of the summer season, as in employment for a period of time[1011].

4.1.2 Main terms of chartering

4.1.2.1 Safe Port

A safe port guarantee is a statutory condition that the charterers will direct the ship to a safe port without threat[1012]. There is almost always an explicit term in the charter agreement, time and voyage: e.g. "*Load on a safe port*", "*safe port, safe berths and safe anchorages and places*"[1013]. The condition protects shipowners from heading to an unsafe port and gives them the right to refuse[1014] instructions from charterers or should they arrive at a hazardous port and be compensated if they finally enter this port and suffer damage[1015].

According to "The Eastern City" [1958] [1016], a port cannot be characterised as safe unless, under a specific timeframe, the particular ship can reach the port, use it, and return from it without its exposure to danger, which is unavoidable by good navigation and seamanship, absent of any abnormal occurrences.

A port will not be safe if:

a) Itis always or sometimes unsafe for any ship or

b) Always or sometimes unsafe for the ship in question.

On the contrary, a port will be safe if that ship only faces danger through negligent governance or seamanship. In any case, the shipowners are entitled to protection if they expressly agree to send their ship to a specifically named port, and as far as they are aware, the port can be characterised as safe[1017]. The port's security should be assessed in two timeframes: i) at the time of naming and ii) before the entrance. If

[1011] Vlachos G.P. (2011). *Chartering*. Stamoulis Publications, Piraeus. (in Greek).

[1012] See e.g. cl 5 of NYPE 1993, cl 1(b) and 1(c) of NYPE 2015 and cls 1 and 9 of Asbatankvoy.

[1013] See e.g. cl 3 of Shelltime 3 and cl 4 of Shelltime 4.

[1014] The owner may take reasonable time to consider the order and refuse a fair way into the port approach. However, after NOR is tendered the owner is assumed to have waived his right to refuse, cf. The Kanchenjunga. However, he may claim damages. Also The Chemical Venture where the crew negotiated with owners consent and agreed to a war risk premium in order to proceed on unsafe voyage- this also amounted to waiver of right to refuse.

[1015] *Kodros Shipping Corp v Empresa Cubana de Fletes (The Evia) (No 2)* [1982] 2 Lloyd's Rep 307.

[1016] *Leeds Shipping Co v Societe Francaise Bunge (The Eastern City)* [1958] 2 Lloyd's Rep 127, at p 131 applied in *Gard Marine & Energy Ltd v China National Chartering Co Ltd (The Ocean Victory)* [2017] UKSC 35; [2017] 1 WLR 1793.

[1017] *C-Trade of Geneva SA v Uni-Ocean Lines Pte of Singapore (The Lucille)* [1984] 1 Lloyd's Rep 244 (CA).

the port becomes unsafe after the ship's arrival, the charterer shall not be obliged to indicate another port[1018].

Factors that can render a port unsafe:

a) Entrance barrier
b) Temporary absence of marine aid
c) War[1019]
d) Epidemic[1020]
e) Adverse weather conditions

The issue of safe port and safe birth warranty went through a period of ambiguity, with i) the overturning in CoA in the "*Ocean Victory*"[1021] case assessing each fact of the case separately and thus classifying a port as prospectively safe (while under a combination of severe conditions)[1022], ii) with the adoption from the US courts of the UK legal position upon safe birth and safe port, while assessing the "Athos I" case[1023], iii) the conditions that a port should be deemed as safe or unsafe during Covid-19 incident[1024].

4.1.2.2 Vessel description

The vessel's description is an essential issue while drafting a charter party. Pursuant to the "Seaflower" case[1025], when a ship owner and a charterer have agreed upon a specific ship with specific characteristics, the owner is obliged to provide the

[1018] Eastern City, vessel to be able to reach, use and return safely in the absence of abnormal circumstances. Ocean Victory, whether concurrent causes are abnormal must be assessed by the situation as a whole. The Evia, prospectively safe, not absolute safety all the time but only prospectively for reach, use and return with the use of the skill and care of a prudent master.

[1019] See e.g. cl 31(e) of NYPE 1993 and the BIMCO War Risks Clause CONWARTIME 2013 in cl 34 of NYPE 2015.

[1020] Boviatsis, M. (2022). Legal assessment of BIMCO's infectious or contagious diseases (IOCD) clauses for voyage and time charter parties. *Marine Policy*, **144**, 105206. DOI: https://doi.org/10.1016/j.marpol.2022.105206.

[1021] *Gard Marine & Energy Ltd v China National Chartering Co Ltd (The Ocean Victory)* [2017] UKSC 35; 1 WLR 1793.

[1022] Todd, P. (2014). Safe port issues: The Ocean Victory. *Lloyd's Maritime and Commercial Law Quarterly*, 1-12.

[1023] Boviatsis, M., & Daniil, G. (2022). Legal Analysis of the US Supreme Court Position Upon a Safe Berth Warranty and Evaluation of the UK Legal Position. *TransNav, International Journal on Marine Navigation and Safety od Sea Transportation,* **16**(1). DOI: 10.12716/1001.16.01.01.

[1024] Boviatsis, M., & Daniil, G. (2022). Legal Analysis of Impact of Revised BIMCO Clauses on Crew Health and Safety During COVID-19 Era. *Transactions on Maritime Science*, **11**(1), 270–277. DOI: https://doi.org/10.7225/toms.v11.n01.020.

[1025] *BS &N. Ltd. v. Micado Shipping Ltd.(Malta)(The" Seaflower")*, 2001 Lloyd's Rep 1 341 (2001).

same ship, not even a similar ship or even better ship[1026]. If this clause is not satisfied, the charterer has the right to terminate the contract and claim damages. A similar ruling was also in the prominent case of the "Hongkong Fir Shipping" case,[1027] where the issue of unseaworthiness after the reenactment of the charter party was addressed[1028].

The proposal that Judge L.J. Waller suggested was the most outstanding during the classification of the description of the vessel in "the Seaflower" case. Specifically, the Judge suggested initiating a test, which later took his name as the "Waller test", to evaluate if a clause should be deemed a condition, warranty or innominate term[1029]. The Judge proposed that a clause should be regarded as a condition if:

a) it can be found as such in a legislation
b) it is already evaluated as such in a previous judicial decision
c) it is expressly stated as such in the chartering agreement

[1026] Cases relevant to description: i) Name: Diana Prosperity (identity test, hull number not a part of vessels identity/subject matter of the contract, thus not a condition, this to be assessed differently than description in sale contracts), ii) Class, Routh Macmillan, condition upon delivery, iii) Flag, Isaachs Mccallum, condition throughout the CP, iv) Position when fixed, condition Behn v Burness, v) ETL (expected ready to load) when stated, condition Mihalis Angelos (expected ready to load, no reason to believe they would comply later on), vi) Legally ready, The Madeline (de-ratting certificate lacked), cancellation right according to warranty clause as the vessel was not legally ready to proceed, vii) Not fully ready, refers to the crucial terms i.e. not bunkers cf. The North Sea- chr could not cancel as the vessel was fit for cargo service and had enough fuel to get to first bunkering station on route, viii) Speed, innominate term, The Apollonius, ix) Oil Major Approval, Seaflower/The Rowan, likely to be held as a condition similar to class and flag, throughout the contract, x) MARPOL oil requirement, owners warranty throughout cf. Elli & Frixtos (had to rebuild vessel to comply, breach of shipowner not to comply).

[1027] *Hong Kong Fir Shipping Co. Ltd. v. Kawasaki Kisen Kaisha Ltd.*, 1961 Lloyd 1 (1961). par Shipping AS v Grand China Logistics Holding (Group) Co Ltd [2016] EWCA Civ 982; [2016] 2 Lloyd's Rep 447 discussed at page 171 where the Court of Appeal held that the obligation to pay hire on time was an innominate term.

[1028] Nolan, Donal, Hongkong Fir Shipping Co. Ltd. v. Kawasaki Kisen Kaisha Ltd., the Hongkong Fir (1961) (May 30, 2008). Fedtke, J. (2011). Charles Mitchell and Paul Mitchell (eds). (2010). *Landmark Cases in the Law of Tort*, Hart Publishing. DOI: https://doi.org/10.1515/jetl.2011.330.

[1029] A condition should only be implied by the Waller test limb 4 if damages would not be enough, there are clear and severe consequences for every breach of the term in question, it is detrimental to certainty, uncertainty following breach would "hand over the parties" relationship, implied term for business sense/appropriate in light of commercial considerations (Bunge v Tradax), and damages would not be enough and time is of the essence (as stated in Hong Kong Fir when seaworthiness was held to be an innominate term due to its wide range of potential breaches and their different severity). Held that loss of oil major approval was very serious because the CP was of no use without the approvals in place. The court sought to avoid literal interpretation of the clauses due to poor drafting and sought to imply a term as a condition to reach consistency and business sense. It was apparent from the contract as a whole that the oil major approvals were of detrimental importance.

d) it goes to the root of the contract (it is of paramount importance for the charter)[1030]

Thus, if a clause is attached to one or more of the above-mentioned "limbs" (as the Judge called them), the unclassified clause, which was regarded as an innominate term up to this point[1031], can be considered as a condition and the affected party can terminate the contract and claim for damages[1032]. Alternatively, the clause should be deemed a warranty, and the affected party can only claim damages[1033].

4.1.2.3 Deviation of the vessel

Under a charter party, the vessel is usually obliged not to deviate from the course[1034] unless the charterer agrees[1035]. Evidently, there are occasions that the ship owner has to deviate from the course, such as:

a) Necessary repairs.
b) Fuel supply or loading and unloading.
c) Saving life.

[1030] Wurman, I. (2020). The Origins of Substantive Due Process. *The University of Chicago Law Review*, **87**(3), 815–881. https://www.jstor.org/stable/26910604.

[1031] *BS & N Ltd (BVI) v Micado Shipping Ltd (Malta) (The Seaflower)* [2001] 1 Lloyd's Rep 341. *Ark Shipping Co LLC v Silverburn Shipping (IoM) Ltd (The Arctic)* [2019] EWCA Civ 1161; [2019] 2 Lloyd's Rep 603 the clause did not state that it was a condition and the Court of Appeal stated that this was "in no way decisive", but held that the clause was an innominate term. E.g. cl 24 of NYPE 1946, cl 31(a) of NYPE 1993, and clause 33(a) of NYPE 2015. The NYPE charterparty may also provide that any cargo claims as between the owners and the charterers shall be settled in accordance with the Inter-Club Agreement 1996 (as amended 1 September 2011) or any subsequent modification or replacement thereof – see e.g. clause 27 of NYPE 2015. On the Inter-Club agreement see *Transgrain Shipping (Singapore) Pte Ltd v Yangtze Navigation (Hong Kong) Co Ltd (The Yangtze Xing Hua)* [2017] EWCA Civ 2107; [2018] 2 All ER (Comm) 99 and *Agile Holdings Corp v Essar Shipping Ltd (The Maria)* [2018] EWHC 1055 (Comm); [2018] Bus L R 1513.

[1032] E.g. cl 3(iii) of the Shelltime 4 form and additional typed clauses as in The Seaflower, discussed at pages 143 and 144. See also *Dolphin Tanker Srl v Westport Petroleum Inc (The Savina Caylyn)* [2010] EWHC 2617 (Comm); [2011] 1 Lloyd's Rep 550 on the construction of an oil majors' approval and vetting clause in an amended Shelltime 4 charterparty and fn 119.

[1033] *Ark Shipping Co LLC v Silverburn Shipping (IoM) Ltd (The Arctic)* [2019] EWCA Civ 1161; [2019] 2 Lloyd's Rep 603 (an obligation to "keep the Vessel with unexpired classification of the class indicated in Box 10 [i.e., BV] and with other required certificates in force at all times" was an innominate term).

[1034] *Whistler International v Kawasaki Kisen Kaisha Ltd (The Hill Harmony)* [2001] 1 Lloyd's Rep 147.

[1035] Deviation is the unjustified departure from the agreed voyage- not allowed unless vessel is in distress/ to safe life at sea or to communicate with a vessel in distress (common law, no exceptions for cargo) or under HVR r. IV r 4 (to save property as well + "reasonable deviation", i.e. to avoid foul weather, to join a convoy, to avoid capture or detention, to take stricken passengers or crew for medical attention, to effect necessary repairs, (though this may be evidence of unseaworthiness etc. Provision interpreted contra proferentem. Distinguish between deviation (liberty to deviate) and agreed alternative route in case of certain events (strike clause, Caspiana, more liberal attitude and interpretation)

d) Avoidance of collision.

e) If necessary (e.g., avoiding piracy).

From the moment the vessel starts to deviate[1036], claims arise such as unnecessary fuel spending, delays, etc[1037]. In case of a dispute, the shipowner should prove that one of the occurrences mentioned above was the reason that led the vessel to deviate[1038]. Should the deviation have proved unjustified[1039], the charterer:

a) Is entitled to cancel the chartering agreement.

b) Shall be entitled to claim compensation if he has suffered damage

On the other hand, the ship owner will lose any rights to limit liability or exceptions established in the charter party[1040].

4.1.2.4 Issues and clauses related to time charters.

While under a time charter party, as already mentioned, the charterer hires the ship from the ship owner and has control of the vessel's movement and actions[1041]. The hire is usually paid periodically and in advance for the next fortnight. Any delay in

[1036] See e.g. cl 3 of Gencon 1994.

[1037] Prima facie impled term of direct geographical route. Exceptions subject to narrow interpretation (*Glynn v Margetson*, restricted "call at all ports" to bean ports substantially on the way to destination, oranges carried from Malaga to Liverpool. Leduc v Ward, substantially on route, unlawful deviation shippers consent irrelevant for consignee)

[1038] *Alianca Navegacao e Logistica Ltda v Ameropa SA (The Santa Isabella)* [2019] EWHC 3152 (Comm); [2020] Bus LR 360.

[1039] Tate & Lyle: however minor or harmless a deviation might be, a breach of this type always gives the innocent party the right to treat the contract of affreightment as having ended at the moment the deviation began. Where an election of this type is made, then, from the commencement of the deviation, the innocent party is not bound by exclusion clauses or by any other term in the contract in favour of the carrier. Stag Line, the doctrine also applies under HVR (engineers had to be let off along the dangerous coast of Cornwall, vessel grounded, unreasonable deviation under HVR because it was not a route a prudent master taking into account all parties interests would have chosen to make).

[1040] Presently deviation is covered by P&I Clubs and better insurance, lack of need for "fundamental breach doctrine". Also development of contract law, judges developed the concept of 'fundamental breach' of contract as a means of striking down – often contrary to the express wording – exemption clauses in cases where the court found the conduct of the contract breaker particularly gross or flagrant. After Unfair Contract Terms Act in 1977, the rationale for the doctrine deteriorated. In Photo Production HL held that fundamental breach does NOT operate so as to prevent reliance upon an exclusion clause when a contract is brought to an end by breach. This is a matter of construction. This was about an employment relationship and exclusion of liability and not direct authority for deviation.

[1041] Cl 11(c) of NYPE 2015. See *Spar Shipping AS v Grand China Logistics Holding (Group) Co Ltd* [2016] EWCA Civ 982; [2016] 2 Lloyd's Rep 447, [39(v)].

delivering the hire is regarded as a condition[1042], and the ship owner can terminate the contract and claim damages[1043] and the vessel's delivery[1044].

There are instances when there is an inability to use the ship by the charterers for some time, and it can be agreed that for this period, no hire will be due, leading to suspension of the time charter, characterising this as an off-hire clause[1045]. Indicatively, cases of off-hire can be initiated when the vessel[1046] i) deviates, ii) is deemed unseaworthy after an incident, iii) lacks crew competence, iv) maintenance is required, or v) dry-docking is scheduled vi) is in a state of war[1047].

The clauses related to delivery - redelivery[1048] of the vessel can be executed under a specific margin, usually that of ten to fifteen days[1049]. The ship should be

[1042] *The Gregos* [1995] 1 Lloyd's Rep 1. See also B. Davenport and M. White, "Last Voyage Orders: Again (The Gregos)" [1994] LMCLQ 154.

[1043] *Torvald Klaveness A/S v Arni Maritime Corporation (The Gregos)* [1995] 1 Lloyd's Rep 1, where the arbitrator held that "maximum 70 days" did not allow for a margin.

[1044] Owner has a contractual remedy to remove the ship from chr service due to unpaid hire (regardless of hire being paid later, The Laconia and regardless of payment being available as overdraft when it should have been in cash, cf. Chikuma), must exercise within reasonable time (Scaptrade, Møre Romsdal Fylkesbåter) and cannot temporarily withdraw (Mihalios Xilas) and chr will not get relief from forfeiture (Scaptrade, Møre Romsdal). Only if notice given according to contract (if required), typically compliance with anti-tec clause needed, cf. Afovos (unconditional notice), Li Hai (ultimatum required under anti-tec clause stating withdrawal, why and how much money due).

[1045] See e.g. cl 52(c) of the NYPE 2015.

[1046] MV Saldhana (pirates, not off-hire, no deficiency of men or accident happening to ship nor "any other cause" in the absence of the word "whatsoever"). Maestro Georgis (arrest, geographical and legal restriction on vessel, owners sphere of responsibility). Roachbank (refuges did not prevent the vessel being "full working" as it was the port authority and not the vessel that caused the delay). The clause is an exception in the CP and is typically interpreted contra proferentem and the courts give weight to the word "whatsoever" in order to extend the scope of events beyond the type of events listed in the clause itself.

[1047] NYPE, cl. 15. has an exception if the cause is due to some act/omission of "charterer or chr agents". In Global Santosh a CIF sellers arrest of the vessel was held to be acting in capacity of exercising chr rights under the CP and thus there was a sufficient connection between the event causing delay and the excersising of chr rights under the CP. The vessel was thus not off-hire. The test was not strictly on whos side of the responsibility line did the event occur, but the court needed to establish a sufficient connection between the event (CIF sellers arrest) and the exercising of chr rights under the CP, a nexus between the act and the agents actual function for chr.

[1048] In *Maestro Bulk Ltd v Cosco Bulk Carrier Co Ltd (The Great Creation)* [2014] EWHC 3987 (Comm); [2015] 1 Lloyd's Rep 315 damages for breach of the obligation to give a notice of redelivery were considered.

[1049] Fixed return date (the court will imply a margin), "6 months, 20 days more of less" as in Dione (courts will not imply a further margin), "about" 50 maximum 70 days (court will not imply a further margin, cf. The Gregos) Days might also be added to the end under special clauses allowing extension for off-hire periods as in Kriti Akti. CP might state a duration "without guarantee" where the charterer simply has to make a good faith estimate as to how long the last legitimate voyage will be, cf. Lendoudis Evaggelos.

delivered at the final agreed date[1050], or the charterer should compensate the shipowner for the extra vessel employment[1051]. The charterer has the right to order for a trip that, if executed, will lead to the ship's return after the expiration date[1052], provided that the shipowner will be compensated[1053].

Also, there is the LAYCAN/Cancelling clause which defines the time of arrival of a ship at the loading port and installs a cancellation option in case of delay[1054]. When there is a cancellation term in the charter agreement, the charterer may cancel the contract[1055], for a short or long delay, without the right to compensation and the obligation to prove a breach of contract or damage[1056]. They may claim compensation only if the delay is due to the charterer's breach of duty to sail at a reasonable speed or to a deliberate delay[1057].

[1050] E.g. cl 3(iii) of the Shelltime 4 form and additional typed clauses as in The Seaflower, discussed at pages 143 and 144. See also *Dolphin Tanker Srl v Westport Petroleum Inc (The Savina Caylyn)* [2010] EWHC 2617 (Comm); [2011] 1 Lloyd's Rep 550 on the construction of an oil majors' approval and vetting clause in an amended Shelltime 4 charterparty and fn 119.

[1051] See e.g. cl 1 of Asbatankvoy, See e.g. cl 8 of NYPE 1946, See e.g. cl 8 of NYPE 1993 and cl 8(a) of NYPE 2015.

[1052] The Peonia, clauses allowing a margin for redelivery do not permit chr ordering a last voyage knowing that the original redelivery date will be breached, the extra time is only a margin not an extension of the duration of the CP. The CP might contain provisions allowing the last voyage to continue at CP hire price regardless of its delay in returning, cf. The World Symphony.

[1053] The owner can elect to treat as repudiatory breach or keep CP alive regardless of chr cooperating unless the interest in keeping the contract alive is without reason and perverse (not likely), cf. Aquafaith. Damages for too early redelivery, Achileas, Golden Endurance, Golden Victory, New Flamenco. Damages for too late delivery, market date beyond last delivery date, cf. The Peonia (the owners could demand a new nomination within the CP duration, chr refused to give one and the owners elected to accept the illegitimate last order and claim damages of market rate for the extra days on voyage).

[1054] E.g. cl 14 of NYPE 1946, cl 16 of NYPE 1993, cl 3 of NYPE 2015, and cl 5 of Asbatankvoy.

[1055] *Yuzhny Zavod Metall Profil LLC v EEMS Beheerder BV (The Eems Solar)* [2013] 2 Lloyd's Rep 487 – the case was appealed but the Court of Appeal held ([2014] EWCA Civ 333) that unless the cargo owner complied with an earlier interim payment order its appeal against the owners in respect of damage caused to its cargo would be struck out. Furthermore it was appropriate to allow the owners to adduce fresh evidence in relation to a point for which the cargo owner had been granted leave to appeal but where the point had been neither pleaded nor argued at trial. *Societe de Distribution de Toutes Merchandises en Cote-D'Ivoire v Continental Lines NV (The Sea Miror)* [2015] EWHC 1747; [2015] 2 Lloyd's Rep 395.

[1056] *Classic Maritime Inc v Limbungan Makmur Sdn Bhd* [2019] EWCA Civ 1102; [2019] 4 All ER 1145.

[1057] Spar Shipping. Astra was wrong, certainty achieved by cancellation right protecting future performance and future running costs. Damages for breach would normally be enough for most hire payment breached (i.e. claim the hire payment plus interest). What about the uncertainty for chr if risk of cancellation/market damages after a wrongful calculation of hire deduction (Mihalios Xilas), wrongful equitable set-off in good faith (The Nanfri/New Vanguard) or payment two days late due to bank misunderstanding (Georgios C)? If the non-payment of hire was a condition why would the parties have to stipulate cancellation right? Also the presence of a right to deduct in good faith + anti-tec clauses indicate the potential misuse of a cancellation right. Cancellation vs. termination (cancellation

4.1.2.5 Issues and clauses related to voyage charters.

While under a voyage charter party, as already mentioned, the charterer compensates the shipowner for the cargo movement, and the shipowner undertakes all voyage expenses. The payment is called freight and is paid in instalments or lump sum[1058]. Any delay in paying the freight is regarded as a condition, and the ship owner can terminate the contract and claim damages. Alternatively, he can refuse to deliver the cargo unless the total amount of freight is paid.

Under a voyage contract, the charterer must complete loading and unloading under a fixed amount of time (laytime)[1059]. After the expiration of this time, the charterer is entitled to a reimbursement, called demurrage, as compensation for liquidated damages. This clause is not a penalty, and the charterer must prove specific damage to be entitled to it. The charterer is allowed only to the agreed compensation unless he demonstrates that the delay leads to the cancellation of the contract, usually in cases such as the imposition of detention from port authorities.

For the laytime to begin, the ship must have arrived[1060]. There is a difference between port arrival and arrival at berth[1061]. Under a (safe) berth clause, the vessel has arrived when it is at the anchorage[1062]. Under a safe port clause in the charter party, the ship has deemed to have arrived when it has arrived at the port[1063]. Time counts if the vessel arrives at the port but does not reach the loading/unloading point due to traffic. Specifically, subject to "The Johanna Oldendorf" case[1064], the ship is deemed as "arrived" when[1065]:

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lacks the implied damages, only a contractually stipulated remedy when triggered by certain event, not a new ground for liability for damages). Not a condition under Waller-test limb 3. Or 4.

[1058] See cl 2 of Asbatankvoy.

[1059] *Cobelfret Bulk Carriers NV v Swissmarine Services SA (The Lowlands Orchid)* [2009] EWHC 2883 (Comm).

[1060] *Bunge Corporation v Tradax Export SA* [1981] 1 WLR 711; [1981] 2 Lloyd's Rep 1.

[1061] E.g. cl 6 of Asbatankvoy.

[1062] *K Shipping Co Ltd v BB Energy (Asia) Pte Ltd* [2000] 1 All ER (Comm) 810.

[1063] *Maredelanto Compania Naviera SA v Bergbau-Handel GmbH (The Mihalis Angelos)* [1970] 2 Lloyd's Rep 43.

[1064] *EL Oldendorff & Co GmbH v Tradax Export SA (The Johanna Oldendorff)* [1973] 2 Lloyd's Rep 285.

[1065] Reid test Johanna Oldendorf: confirmed by MV Arundel; legal, and geographical area of port as perceived by its usage, assumed to be at the chr immediate and effective disposal if at customary waiting place. Find the usual usual waiting place was or was not within the port to determine "effective and immediate disposal of the chr" □ the area within which a port authority exercises its various powers can hardly be difficult to ascertain. Some powers with regard to pilotage and other matters may extend far beyond the limits of the port. Those which regulate the movements and conduct of ships would seem to afford a good indication. In many cases the limits of the port are defined by law". A step to include "places outside the legal, fiscal or administrative area where vessels are ordered to wait for

a) It is located within the geographical and legal area of the port.
b) Be at the charterer's disposal, ready to arrive in a loading position as soon as it is available.
c) The ship is at the charterer's disposal in a normal waiting position within the port.

After the safe birth, the ship should be made ready for loading, and a Notice of Readiness (NOR)[1066] should be issued to inform the charterer to initiate the loading process[1067]. Questions arise as to whether the ship should be first inspected and deemed ready for loading or whether the inspection should be conducted after the loading.

Additionally, the calculation of laytime is made[1068]: i) by setting a specific number of days for the completion of loading or ii) by determining a specific loading/unloading rate of the cargo[1069]. Suppose the available laytime passes and the demurrage calculation has begun. In that case, the exceptions to the calculation of waiting, e.g., rain, holidays, Sundays, etc., do not apply (establishing the principle "Once on demurrage, always on demurrage[1070]") unless it is provided in the chartering agreement or it is proved that the delay is due to the vessel owner's fault. Lastly, when the delay of loading or unloading is extended, it consecutively leads to the cancellation of the contract[1071].

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their turn" is a large one indeed. Physical limits of a port ... may extend far beyond the limits of what those using it would regard as the port. □ strive for certainty.

[1066] Where six means of giving notice of readiness were listed in a charterparty but did not include email, notice of readiness given by email was not valid – see *Trafigura Beheer BV v Ravennavi SpA (The Port Russel)* [2013] EWHC 490 (Comm); [2013] 2 Lloyd's Rep 57.

[1067] See e.g. cl 5 and 6 of Asbatankvoy and cl 6(c) Gencon.

[1068] Laytime not to be calculated for the time lost due to certain events, i.e. a requirement of causation between interruption and loss. Interpreted contra proferentem (The Ladytramp, fire at the port was not held to be a mechanical breakdown and the port authority denying loading was not a "act of government interference" thus no interruption to laytime). General exception clauses like strike clauses (Johs Stove) do not stretch to cover exceptions from laytime regime.

[1069] *Tidebrook Maritime Corporation v Vitol SA (The Front Commander)* [2006] 2 Lloyd's Rep 251 (CA).

[1070] Automatic running of stipulated daily rate after laytime, presupposing laytime was validly commenced and expired, cf. Eagle Valencia where no demurrage could be claimed because laytime was not started correctly. Reason for the maxim: general CP exceptions, laytime exceptions and interruptions do not apply unless specifically drafted to cover demurrage (Kalliopi, assume the word demurrage is used to exclude it from running, often clauses like "demurrage not to accrue" for certain events. Silence indicated not covered). Exceptions interpreted contra proferentem.

[1071] Baatz, Y. (Ed.). (2020). *Maritime Law*. Taylor & Francis. DOI: https://doi.org/10.4324/9781003046943.

4.1.3 Impact of Covid-19 on Charter Parties

Undoubtedly, the outbreak of Covid-19 was something unprecedented on a global spectrum. However, while caught off-guard by the rapid expansion of the epidemic, the shipping industry had already developed safety mechanisms[1072]. This proactive "stance" of the maritime sector derives from the fact that Covid-19 was not the first disease encountered. Specifically, over the last twenty years, two more outbreaks have affected maritime transport, namely SARS and Ebola[1073].

During the last outbreak of Ebola, BIMCO decided to adopt specific clauses that should be incorporated into charter parties and activated once an outbreak emerges. Thus, BIMCO has created the Infectious or Contagious Diseases (IOCD) Clauses, applying to only to the Ebola outbreak but all other diseases[1074]. These clauses have established the concepts of 'Disease' and 'Affected Area', effectively helping the contractual parties nominate a safe port and counter the spread of diseases[1075].

While the clauses were proved initially effective, issues emerged with the allocation of liability. Pursuant to the older version of IOCD Clauses, the ship owner was excluded from liability in case of a Covid-19 incident when effectively exercising due diligence to counter the virus[1076]. Unfortunately, this allocation of liability created many issues in practice, where ship owners avoided the declaration of Covid-19 incidents on board and even avoided crew changes to counter the contamination of the crew[1077]!

[1072] Gavalas, D., Syriopoulos, T., & Tsatsaronis, M. (2022). COVID–19 impact on the shipping industry: An event study approach. *Transport Policy*, **116**, 157-164. DOI: https://doi.org/10.1016/j.tranpol.2021.11.016.

[1073] Boviatsis, M., & Daniil, G. (2022). Legal Analysis of Impact of Revised BIMCO Clauses on Crew Health and Safety During COVID-19 Era. *Transactions on Maritime Science*, **11**(1), 270-277. DOI: https://doi.org/10.7225/toms.v11.n01.020.

[1074] BIMCO, (2021). Coronavirus (Covid-19), Available at: Coronavirus (COVID-19) (bimco.org), last assessed: 3-7-2022.

[1075] BIMCO, (20210). COVID-19 Crew Change Clause for Time Charter Parties 2020. Available at: COVID-19 Crew Change Clause for Time Charter Parties 2020 (bimco.org), last assessed: 3-7-2022.

[1076] Zhang, Y., & Sun, Z. (2021). The Coevolutionary Process of Maritime Management of Shipping Industry in the Context of the COVID-19 Pandemic. *Journal of Marine Science and Engineering*, **9**(11), 1293. DOI: https://doi.org/10.3390/jmse9111293.

[1077] Boviatsis, M. (2022). Legal assessment of BIMCO's infectious or contagious diseases (IOCD) clauses for voyage and time charter parties. *Marine Policy*, **144**, 105206. DOI: https://doi.org/10.1016/j.marpol.2022.105206.

Thus, BIMCO was forced to develop new sets of clauses, with the last being BIMCO's Infectious or Contagious Diseases Clause for Time Charter Parties 2022[1078], sharing the liability and expenses between charterers and ship owners for crew facilitation in case of Covid-19 incident liability can and should be shared between charterers and ship owners[1079].

4.2 Maritime Law

This section will assess the so-called "wet liabilities" in respect of the vessels[1080]. Current issues, such as the inclusion of technology, the liability aspect or the application to new types of ships, will be analysed. Specifically, the assessment will include the issues of i) collision, ii) salvage, iii) general average and some other issues, such as towage and pilotage, which will not be assessed.[1081]

4.2.1 Collision

One of the most common liabilities in shipping is vessel collision. Special consideration has been given to this issue with the instalment of the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (1960/1948/1910) (COLREGs) (1910/1948/1960), a convention unifying the rules of navigation and establishes crucial regulations for international shipping, such as the traffic separation schemes[1082]. Under this convention, mandatory proportional liability is established, and his duty of care defines the portion of each party's liability during an emerging incident. Supportively to COLREGs, the International Convention Relating to the Arrest of Sea-Going Ships (1952) established in Article 1(1a) the vessel collision as a maritime claim[1083].

[1078] BIMCO, (2022). Infectious or Contagious Diseases Clause for Time Charter Parties 2022, Available at: Infectious or Contagious Diseases Clause for Time Charter Parties 2022 (bimco.org), last assessed: 3-7-2022.

[1079] Thomas, R. (Ed.). (2020). *Legal issues relating to time charterparties*. Taylor & Francis.

[1080] Baatz, Y. (Ed.). (2020). *Maritime law*. Taylor & Francis. DOI: https://doi.org/10.4324/9781003046943.

[1081] Athanasiou L. & Antapasis A. (2020). *Maritime Law*. Law Library, Athens. (in Greek)

[1082] Demirel, E., & Bayer, D. (2015). Further studies on the COLREGs (collision regulations). *Transnav-International Journal on Marine Navigation and Safety on Sea Transportation*, **9**(1). DOI: https://doi.org/10.12716/1001.09.01.02.

[1083] International Convention Relating to the Arrest of Sea-Going Ships (1952). Available at: International Convention Relating to the Arrest of Sea-Going Ships (Brussels 1952) (admiraltylawguide.com), last assessed 27-8-2022.

The purpose of compensation after the collision is to put the injured party in the position he would have been in if the damage had not occurred. The measure of compensation is the value of the ship at the time of the incident (market value) and the value of the vessel as an object of exploitation for its owner (value as a going concern). (Liesbosch Dredger v SS Edison, Wagon Mound[1084]). The purchase value can be estimated minus the corresponding devaluation if there is no market value. In addition to the value of the ship, a claim for loss of profits can be made.

When the ship is damaged but not lost: i) the perpetrator has no right to choose the place or manner of the repair, ii) the injured party must act as he would if he paid for the repairs himself, iii) the injured party is entitled to receive compensation for incidental damages[1085]:

a) Delay due to damage
b) Loss of profits due to deprivation of use. The loss should not be too remote.
c) Other expenses (costs of assistance at sea and towing, expert's expenses, agent costs, etc.)

The affected party is allowed to sue the other ship, as the carrier will probably raise objections to the Hague Visby rules for a naval misdemeanor against the cargo owner. The other ship will request participation from the carrier, who will pay 50% of any amount that the other vessel is required to pay, while according to the contract of carriage, it would have legal objections[1086]. For this reason, most bills of lading and charter agreements are given the clause "Both to Blame Collision Clause"[1087]. The clause provides that the cargo owner will compensate the carrier for any amount he may have to pay to the other ship in the event of a collision[1088].

To avoid collisions, complete execution of COLREGs rules has been proved crucial, and even in case of collision, the party that proves that he followed the rules of

[1084] Dias, R. W. M. (1961). Negligence—Remoteness—The Polemis Rule. *The Cambridge Law Journal*, **19**(1), 23-30. DOI: https://doi.org/10.1017/S0008197300010126.
[1085] Force, R., Davies, M., & Force, J. S. (2010). Deepwater Horizon: Removal costs, civil damages, crimes, civil penalties, and state remedies in oil spill cases. *Tul. L. Rev.*, **85**, 889.
[1086] *The Mount Apo and the Hanjin Ras Laffan* [2019] SGHC 57; [2019] 2 Lloyd's Rep 287.
[1087] Mahafzah, Q. A. (2010). The Legal Effectiveness of the Both-to-Blame Collision Clause under Bills of Lading and Charterparties. *J. Mar. L. & Com.*, **41**, 263.
[1088] Note that a collision by itself is not proof of negligence (see e.g. *The Cythera* [1965] 2 Lloyd's Rep 454, Supreme Court (New South Wales)). Note also that a duty of care was imposed on the officers supervising young offenders who escaped from a detention centre and damaged a yacht (*Home Office v Dorset Ship Company Ltd* [1970] AC 1004).

COLREG with care will be deemed as the affected party, compensated by the other party. The most important regulations of COLREGs are[1089]:

a) Rule 5: Look out: Visual and audible surveillance and surveillance with all appropriate means.
b) Rule 6: Safe speed: Factors are described in setting the safe speed so that a collision can be avoided. No specific speed limit is established except for the limitations imposed by port authorities.
c) Rule 8: Action to avoid a collision: Timely handling and significant changes of course and speed are required so that they are immediately noticed by the other ship.
d) Rule 10: Traffic Separation Systems/ separation schemes: International maritime routes and sea lanes are established to enhance maritime navigation safety.
e) Rule 13: Overtaking: The arrival ship must be removed from the arrival course. Arriving is a ship that distinguishes only the stern light and none of the side lights seen up to an angle of 22.5 degrees from the middle of the vessel to the stern. When in doubt, the ship must consider that it is arriving. A subsequent change does not make the arriving ship intersect.
f) Rule 14: Head-on situation: Each ship changes course to the right to pass through the left side of the other.
g) Rule 15: Crossing situation: The ship facing the other from the right side is removed.
h) Rule 16-17: Guarded-Guarding Ship (action by giving way-stand on a vessel): The guarding ship makes timely operations to keep it away from the guarded one. The guard maintains its course and speed. The guard is handled only to avoid a collision if the guard does not conduct the correct handling.

Evidently, COLREG's rules have been proven effective in practice[1090]. Thus, the rules of 1972 are still in effect. Nevertheless, COLREGs will need to be restructured

[1089] International Convention Relating to the Arrest of Sea-Going Ships (1952). Available at: International Convention Relating to the Arrest of Sea-Going Ships (Brussels 1952) (admiraltylawguide.com), last assessed 27-8-2022.
[1090] Owners of *Mitera Marigo v Owners of Fritz Thyssen (The Fritz Thyssen)* [1967] 1 All ER 628.

as soon as the first vessels operated by a Shore Control Centre (SCC) enact their operations. In addition, new, more stringent safety measures need to be adopted[1091].

4.2.2 Salvage

The issue of salvage is simple but, at the same time, complicated. Specifically, it is simple to define salvage, but giving the correct incentives for the shipping community to be less reluctant to offer assistance is complicated. To be regarded as such, the salvage services should be: i) beneficial, ii) exercised voluntarily and without prior connection with the ship, iii) in marine property, and iv) under threat[1092].

The service provider is called a salvor, and after the services, he is entitled to remuneration (under maritime law), called the salvage award or reward. The salvor has the right of possession over the property (possessory lien); if the property is not in his control, he has a maritime lien. The right to remuneration is independent of the marine insurance, as the salvor is entitled to remuneration regardless of whether the property is insured[1093].

The process of salvage is regulated by the International Convention on Assistance at Sea 1989[1094]. The most important principle established is "no cure, no pay". Subject to this principle, the services must be beneficial and leading to the salvage of the property or part of it. No remuneration is paid if the efforts of the rescuers did not have a successful result. The services must have had significant assistance in saving the property[1095].

Third parties must also provide services voluntarily, with no connection with the vessel in distress[1096]. Officers and crew members of the endangered ship cannot usually claim remuneration for its rescue, as the relevant employment belongs to their duties. An exception is when the ship was abandoned on the order of the master, and then assistance was provided by the crew members. The services on the maritime property are provided on endangered ships, their parts and/or cargo and/or freight but

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[1091] Boviatsis, M., & Vlachos, G. (2022). Sustainable Operation of Unmanned Ships under Current International Maritime Law. *Sustainability*, **14**(12), 7369. DOI: https://doi.org/10.3390/su14127369.

[1092] Chen, L. (2001). Salvage. *The international Journal of marine and Coastal law*, **16**(4), 686-698. DOI: https://doi.org/10.1163/157180801X00298.

[1093] *The Unique Mariner (No 2)* [1979] 1 Lloyd's Rep 37.

[1094] INTERNATIONAL CONVENTION ON SALVAGE, (1989). Available at: Salvage-Convention-1989.pdf (iflos.org), last assessed: 26-8-2022.

[1095] *Wells and Another (Paupers) Appellant v The Owners of the Gas Float Whitton No 2 Respondents (The Gas Float Whitton No 2)* [1896] P 42 (CA), [1897] AC 337 (HL).

[1096] *Ocean Crown (Owners) & Ors v Five Oceans Salvage Consultants Ltd (The Ocean Crown) [*2009] EWHC 3040 (Admlty); [2009] 2 CLC 878.

not on any other property. Lastly, the property must be in danger. The risk must be present and real, not an assumption or an event that has not yet emerged[1097].

There is no specific amount or percentage of the value of the saved property. The amount of the fee is judged either in arbitration, when a LOF has been signed, or by the courts and is calculated at their sole discretion (unless the international convention is in force). The payment is proportional and separate from remuneration between the salvaged value of the ship and cargo. The remuneration is usually paid by the insurers of the vessel and the cargo, who benefit from the assistance because if the property were destroyed, they would be obliged to pay the insurance compensation. Life-saving is calculated for the award of remuneration. There is no separate reward for saving human life from the provisions for sea assistance. However, it is provided for by specific legislation. Specifically, Article 13 of the Salvage Convention 1989[1098] sets out the following criteria for calculating remuneration:

a) Saved value of a ship and other property.
b) Pretentiousness and efforts to prevent or minimize damage to the environment.
c) Size of business success.
d) Nature and extent of risk.
e) Efforts to save the ship, other objects and life.
f) Time, expenses and losses of helpers.
g) Risks to responsibilities for rescuers.
h) Timely provision of services.
i) The utilisation of supportive vessels.
j) The state of readiness and efficiency of the salvor's equipment and the value thereof.

In the 1970s and early 1980s, there were incidents with ships that could cause caused marine pollution and in which rescuers were not willing to assist because there was little chance of a successful result[1099]. As a result, they were in danger of making significant expenses with no benefit. On the contrary, with the risk of damage to his

[1097] *The Sea Eagle* [2011] EWHC 1438 (Admlty); [2012] 2 Lloyd's Rep 37.
[1098] INTERNATIONAL CONVENTION ON SALVAGE, (1989). Available at: Salvage-Convention-1989.pdf (iflos.org), last assessed: 26-8-2022.
[1099] *Ocean Crown (Owners) & Ors v Five Oceans Salvage Consultants Ltd (The Ocean Crown)* [2009] EWHC 3040 (Admlty); [2009] 2 CLC 878.

property and possible responsibility for the pollution. Therefore, P&I Clubs, which cover all costs and responsibilities from marine pollution, which can be exorbitant, wanted to incentivise rescuers to intervene in the above cases to prevent or reduce marine pollution[1100].

A distressed ship is usually required to sign a 'Lloyd's Open Form' (LOF) agreement with every possible rescuer, especially professional rescuers. The LOF is a typical 'No cure - no pay' contract[1101], which means that if the rescue attempt is unsuccessful, there is no fee for the rescuer. However, in recent years, it has been allowed to pay a fee in cases where, for example, there was a risk of environmental pollution, even though the ship was not rescued[1102].

In other cases, the rescuer may activate the LOF SCOPIC clause, which provides a fee even if the rescue attempt is unsuccessful, limited to the rescuer's expenses. Still, in case of a successful rescue, the fee is less[1103].

Initially, LOF 1980 provided for a "safety net" in cases where services were provided to a tanker laden. In this case, the rescuer's reasonable costs were covered even without a successful result. Lof 1990 incorporated the International Convention on Marine Assistance, including Article 14, six years before it entered into force. LOF 2000 introduced the first attempt to overcome the difficulties of the International Convention by allowing the introduction of the SCOPIC clause. The most recent LOF 2011 edition is a short form that incorporates/refers to several standard terms, such as Lloyd's common arbitration terms (LSSA), Lloyd's procedural rules, and the SCOPIC term[1104].

Subsequently, Article 14 of the 1989[1105] International Convention on Assistance at Sea provided that a rescuer who offers rescue services to a ship which or its cargo is threatened to cause damage to the environment is entitled to remuneration

[1100] Note also that many of the criteria are solely applicable to professional salvors. Since vessels passing by cannot possibly satisfy some criteria it can be argued that for the same salvage a professional salvor is likely to be rewarded more under the Convention than a non-professional salvor.
[1101] International Salvage Union, (2022). No cure – no pay. Available at: No cure – no pay – The International Salvage Union – Saving Lives, Ships and Cargo (marine-salvage.com), last assessed; 29-8-2022.
[1102] Baughen, S. (2018). *Shipping law*. Routledge. DOI: https://doi.org/10.4324/9781315172040.
[1103] Ibid.
[1104] Lloyd's Open Form (LOF), (2022). Available at: Lloyd's Open Form LOF - Lloyd's (lloyds.com), last assessed: 26-8-2022.
[1105] INTERNATIONAL CONVENTION ON SALVAGE, (1989). Available at: Salvage-Convention-1989.pdf (iflos.org), last assessed: 26-8-2022.

in accordance with Article 13, at least equal to the Special Compensation (which is covered by the P&I Club of the ship if any)[1106].

The Special Compensation consists of the costs of the rescuer as determined by the article[1107]. If the rescuer prevented or reduced the environmental damage, the Special Compensation might be increased up to 30% of the rescuer's expenses. Considering the criteria of Article 13, the court may, if it considers it correct and fair, further increase the Special Compensation, up to 100% of the rescuer's costs.

According to Article 14, the rescuer's 'costs' are:

a) Its actual costs during the operation and
b) A reasonable percentage of the equipment and personnel were actually and reasonably used for the rescue operation in accordance with the criteria displayed in Article 13.

In the "Nagasaki Spirit" case (1997)[1108], it was held by the House of Lords that a "*reasonable rate*" for equipment and personnel means a "*reasonable percentage of expenses*" and does not include any item of profit[1109].

Following the above case, there were further negotiations between the International Salvage Union and the International Group of P&I Clubs for the calculation of the remuneration of Article 14, which is covered by P&I insurance, and it was agreed to introduce the Special Compensation P&I Club Clause (SCOPIC) clause in the LOF contracts. The clause gives mutually insuring cooperatives greater participation in the undertaking where there is a risk of pollution and replaces the calculation of the compensation referred to in Article 14[1110].

Shipowners shall activate the clause in writing at any time, even if there is no environmental risk. The compensation calculation under the clause is made from the time of its activation. There is a detailed list of fees for tugs, personnel, other ships and

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[1106] De La Rue, C., & Anderson, C. (2015). *Shipping and the Environment*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315673325.

[1107] *Ocean Crown (Owners) & Ors v Five Oceans Salvage Consultants Ltd (The Ocean Crown*) [2009] EWHC 3040 (Admlty); [2009] 2 CLC 878.

[1108] Gilligan, A. (1997). Nagasaki Spirit: A Recent Decision Affecting Marine Salvage and Environmental Concerns. *Tul. Mar. LJ*, **22**, 619.

[1109] Coric, D. (1996). House of Lords: Semco Salvage & Marine PTE. Ltd. v. Lancer Navigation Co. Ltd.(Ship Nagasaki Spirit). -152 *Uporedno Pomorsko Pravo*, **149**, 164.

[1110] International Salvage Union, (2022). The origins of Lloyd's Form. Available at: The origins of Lloyd's Form – The International Salvage Union – Saving Lives, Ships and Cargo (marine-salvage.com), last assessed; 29-8-2022.

equipment, and the rescuer is usually entitled to a 25% increase in the prices on the list[1111].

If the SCOPIC clause is activated and the remuneration referred to in Article 13 is greater than the calculated SCOPIC compensation, the remuneration referred to in Article 13 shall be reduced by 25% of the difference between the remuneration referred to in Article 13 and the SCOPIC allowance. The benefits of the P&I Clubs clause are that i) they retain some control over the relief business, ii) they have the right to send a Special Casualty Representative (SCR) to the place of the incident, iii) they have the right to terminate the application of the LOF and iv) there is a limited increase in remuneration[1112].

The advantages for rescuers are: i) they are not required to prove the danger to the environment, ii) they collect prices for tugboats with a profit, iii) they have a more secure security (guarantee obligation of USD 3.000.000 within two days of the activation of the term)[1113].

According to Article 65 MIA[1114], if the insurance policy does not provide more than the remuneration for the assistance, which has become necessary to avoid a loss from an insured risk and can be compensated as a loss from the specific risk. Therefore, an expense for rescuing property in distress at sea can be included in three cases: Sue and labour, general average, and sea assistance[1115].

Example: If a ship without cargo and charter runs aground and the master hires a tugboat for an hourly fee, the insurers will compensate this fee as a sue and labour expense[1116]. If the above ship had cargo, the tugs' fee would be the expense of general indifference. The amount paid would be a relief fee if no contract were signed. If LoF were signed, the fee would be either sue and labour or general average[1117].

Lastly, the spontaneous execution of salvage will be considerably minimised with the installation of unmanned vessels, while absent of crew, those vessels will be

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[1111] Lloyd's, (2020). SPOPIC CLAUSE. Available at: SCOPIC (lloyds.com), last assessed: 29-8-2022.
[1112] Ibid.
[1113] Djadjev, I. (2015). The SCOPIC clause as a major development in salvage law. DOI: http://dx.doi.org/10.2139/ssrn.2627798.
[1114] Marine Insurance Act, (1906). Salvage charges. Article 65. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
[1115] Malashkina, N. (2010). Law Reform in the International Regime of Salvage: The Insurance Perspective.
[1116] *Kuwait Airways Corp & Anor v Kuwait Insurance Co SAK [*1999] CLC 934.
[1117] Rose, F. (2013). Aversion and Minimisation of Loss. In Marine Insurance (pp. 487-520). Informa Law from Routledge.

rendered unable to provide assistance. At the same time, salvage with be utterly professionalized, with supportive vessels mainly offering assistance and with the development of other cases of salvage, such as tech experts arriving on unmanned ships via helicopters to amend system malfunctions or port operators remotely calibrating the course of an unmanned vessel when entering or exiting a port of call[1118].

4.2.3 General Average

A general average is an act of sacrifice to save a greater good in value or importance[1119]. The classification of the "goods" on board the vessel is i) human life, ii) environment, iii) vessel, iv) cargo, v) freight, and the sacrifice is executed by tossing to the sea or disposing of the good of lesser importance to save a good of greater. The general average, to be valid, should be an[1120]:

a) extraordinary
b) deliberate
c) reasonable
d) act of sacrifice or expenditure
e) in cases of common marine danger
f) which is done to save the ship, cargo and freight[1121].

The general rule in cases with no effort is that the interests in danger in a maritime adventure bear the risk of their loss or destruction. However, the general average is the exception to the rule, i.e. the sharing of the economic consequences of an unexpected maritime incident among the parties who benefited from the extraordinary, willful and reasonable sacrifice of one of the parties to the naval operation to save the entire process[1122].

The concept of the General Average is very ancient and is found in the Law of the Rhodians (408 BC) and Roman Law, while it was regulated by law initially in

[1118] Boviatsis, M., & Vlachos, G. (2022). Sustainable Operation of Unmanned Ships under Current International Maritime Law. *Sustainability*, **14**(12), 7369. DOI: https://doi.org/10.3390/su14127369.
[1119] Rose, F. D. (2017). *General Average: Law and Practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315099842.
[1120] Hudson, G., Madge, T., & Sturges, K. (2012). *Marine Insurance Clauses*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315874364.
[1121] YORK-ANTWERP RULES (2016). Rule A1: "There is a general average act when, and only when, any extraordinary sacrifice or expenditure is intentionally and reasonably made or incurred for the common safety for the purpose of preserving from peril the property involved in a common maritime adventure". Available at: YAR-2016-English-with-Rule-XVII-correction.pdf (comitemaritime.org), last assessed: 27-8-2022.
[1122] Hayden, R. P., & Leland, K. C. (2010). General Average-Issues to Consider. *USF Mar. LJ*, **23**, 103.

France in the 17th century[1123]. The concept provided that in case of voluntary disposal of cargo on board the ship, in order to preserve the property because of immediate danger, the damage would be shared among all who benefited from the rescue[1124].

Over time, other damages or expenses incurred in the ship's interest and the cargo were included in the legislation. This made it necessary to reach an international understanding to regulate the various requirements that arose with complex issues. International understandings resulted in the formulation of York Antwerp rules, constantly updated with the most recent editions in 2016. York Antwerp rules are not a binding international convention but are incorporated into charter agreements and bills of lading. The rules detail what expenditure is included in the general requirements and the manner of guarantees[1125].

For general average provisions to apply, the following conditions must be fulfilled:

a) True danger. There must be a danger for a general average, and the risk must be significant and real. A ship without an engine in the ocean is in danger, while a ship that takes refuge in port due to bad weather forecasts is not in danger. In the Watson V firefighter's Fund Insurance case, the captain mistakenly considered a fire and caused steam damage to the cargo to extinguish it, but there was no fire on the ship.
b) The sacrifice and expense must be extraordinary and not reduced to necessary actions to execute the sea transport contract. Therefore, the shipowner's usual expenses or sacrifices do not constitute a general average.
c) Sacrifice and expense must be made for the common adventure, that is, to relate jointly to the ship, the cargo and the non-vested freight. Therefore, it does not constitute a general average to save only the cargo or part of it.
d) Sacrifice and expenditure must be made deliberately for the benefit of common adventure. The sacrifice must be deliberate, and the property must have been lost because of the sacrifice.

[1123] Rosen, S. (1934). The Origin and Development of the Modern Maritime Law. *Law Soc'y J.*, **6**, 240.
[1124] Felde, L. S. (1952). General Average and the York-Antwerp Rules. *Tul. L. Rev.*, **27**, 406.
[1125] BIMCO, (2016). GENERAL AVERAGE: YORK-ANTWERP RULES 2016. Available at: General Average: York-Antwerp Rules 2016 (bimco.org), last assessed; 29-8-2022.

e) Sacrifice and expense must be reasonable.

Typical cases of general average are[1126]:

a) Voluntary dumping of part of the cargo carried overboard (jettison). It is the most common form of sacrifice of the general average. The most common case is the sacrifice of a ship's engines or equipment to save the rest of the vessel. For example, wooden spare parts were cut for fuel to operate a pump. They were not in regular use, and the ship would have sunk without the pump. It was judged that there was a general average.
b) Costs of unloading, storage and reloading of cargo unloaded due to risk.
c) Deliberate grounding of the ship. It is a general necessity to deliberately ground to avoid sinking and save the ship and the cargo.
d) Damage to the ship when attempting to detach after an attempt.
e) Destruction of part of the cargo due to water being thrown to extinguish a fire and save the remaining load.
f) Use of part of the cargo as fuel (in oil tankers).
g) Salaries and catering expenses after obstruction of departure due to war, etc.
h) Damage and expenses incurred to prevent danger, due to a defect in the ship or cargo, to the fault of a master, or to the fault of the cargo holder.
i) Expenditure in the port of refuge.

In cases of declaration of general average, average adjusters are appointed usually through the insurers. In cooperation with the adjusters, the shipowners will decide on the form of guarantee to be requested from the cargo recipients and will send instructions to the agents at the landing ports[1127]. The guarantee is given before the delivery of the cargo by the recipients or their insurers, which usually provide the relevant guarantees[1128].

The usual forms of warranty are as follows:

a) Signature of the average bond by the cargo recipients (for small amounts).

[1126] YORK-ANTWERP RULES (2016). Available at: YAR-2016-English-with-Rule-XVII-correction.pdf (comitemaritime.org), last assessed: 27-8-2022.
[1127] de Arruda, M. A. (2022). General Average Is a Necessity. *Beijing L. Rev.*, **13**, 340.
[1128] Raadi, K. (2005). General Average in the Marine Insurance Law. *Journal of Legal Research*, **4**(8), 217-242.

b) Signature of the average bond and provision of an average guarantee letter by the cargo insurers.
c) The average bond is signed in urgent cases, and the parties must provide a financial guarantee when the weight is calculated.

The contribution amount is settled when the trip is completed and is governed by the Law of the place of delivery. If the costs of the general average of the ship and the cargo are lost before the completion of the voyage, the owner is not entitled to claim the cargo owners[1129].

The basic principle of the settlement of the general average is that all the property that was in danger during the event that caused the general average and was saved from the sacrifice or expense will contribute to the general average reward[1130]. The property's value is examined at the time of trip completion except for the cargo, which is reviewed upon its value during loading. Cargo unloaded before the incident or loaded after will not contribute to the general average[1131].

As already established, there is an act of general average when an extraordinary sacrifice or expense of a lesser good is made, deliberate and reasonable, for the common rescue and salvation of a much greater good and the preservation of the property (ship and remaining cargo) in an ordinary sea adventure. When there is an act of general average, there is, of course, a relevant marine insurance policy to cover the losses resulting from it. The principle of general average in marine insurance was codified in Article 66 of MIA 1906[1132]. With regard to new technologies, it is yet unknown how the concept of the general average will be executed when the remotely controlled or the utterly unmanned vessels are further developed[1133].

[1129] BIMCO, (2022). General Average Clause. Available at: General Average Clause (bimco.org), last assessed: 30-8-2022.
[1130] *Corfu Navigation Co v Mobil Shipping Co (The Alpha) (No 2)* [1991] 2 Lloyd's Rep 515.
[1131] *Marida Ltd v Oswal Steel (The Bijela)* [1994] 2 Lloyd's Rep 1.
[1132] Subject to MIA 1906 Article 66: "The general average includes an expense as well as a sacrifice. In the event of a general loss, the party is entitled, under the conditions imposed by the MIA 1906, to a taxable contribution against the other interested parties, and this contribution is called the general average contribution. Additionally, the party is also entitled to be compensated for the extraordinary sacrifices or expenses. The act must also be deliberate, reasonable and in any case willful, and the retention of property must involve a serious risk." Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed; 29-8-2022.
[1133] Boviatsis, M., & Vlachos, G. (2022). Sustainable Operation of Unmanned Ships under Current International Maritime Law. *Sustainability*, **14**(12), 7369. DOI: https://doi.org/10.3390/su14127369.

4.3 Marine Insurance

4.3.1 Definition and Scope

Marine insurance assumes the liability of the assured for loss or damage of vessels, cargo or any other liability incurred during the execution of a contract[1134]. Expressly, with a marine insurance contract, an insurance company (insurer) undertakes all liabilities from the risks included in the contract to be compensated by the company in exchange for compensation by the assured, called premium. Recently, the legislation of Marine Insurance (MIA 1906) was amended in the UK, and the new MIA 2015[1135] was adopted, imposing changes in various aspects of marine insurance, such as the duty of good faith[1136].

The raison d'être of insurance is the coverage of a need that arises for any matter. In most cases, this need concerns an economic loss or the coverage of moral and social damage. Marine insurance's economic utility is to support maritime companies' current strategy, to constantly invest their net profits in expanding their fleets while keeping only a small amount of their earnings as stock in an emergency. Thus, when an emergency occurs, for instance, a collision, the company does not have the appropriate liquidity to cover the liability arising[1137].

The insurance contract shall include at least the details of the parties and the beneficiary of the insurance contract, if he is a different person, the duration of the insurance cover, the person or the object and its monetary value or the property threatened or related to the occurrence of the risk, the type of risks insurance risks), any maximum liability limit of the insurer (insurance amount), any exclusions of coverage, the premium and the applicable law[1138].

4.3.2 Historical Development

The first appearance of the concept of compensation dates back to Mesopotamia, circa 1780 BC, in the famous Codex of Hammurabi. In ancient Athens

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[1134] Athanasiou, L. & Antapasis A. (2020). *Maritime Law*. Law Library, Athens. (in Greek)

[1135] Costabel, A. M. (2015). The UK Insurance Act 2015: A Restatement of Marine Insurance Law. *Thomas L. Rev.*, **27**, 133.

[1136] Baatz, Y. (Ed.). (2020). *Maritime law*. Taylor & Francis. DOI: https://doi.org/10.4324/9781003046943.

[1137] Rose, F. (2013). *Marine insurance: law and practice*. CRC Press. DOI: https://doi.org/10.4324/9781315874357.

[1138] Hodges, S. (2013). *Law of marine insurance*. Routledge-Cavendish.

and the time of Solon, institutions were developed in the form of associations of citizens whose purpose was to support each other and to distribute the damage of a member to more persons. As far as maritime transport is concerned, as early as ancient India and Babylon in the 6th century BC, the need to shift the risks from economically weak and insecure traders to financially powerful and willing to risk their capital financiers was diagnosed[1139].

Thus, the institution of the naval loan was inaugurated. According to this, the merchant who would attempt a long and potentially dangerous journey received money from the financier, who took it back augmented with high interest if the voyage was successfully completed. This is the first appearance of naval insurance, in which the loan amount corresponds to the amount of insurance, while the interest corresponds to the premium. The naval loan was a thriving institution and quickly spread to the seafaring peoples of the time: Phoenicians, Greeks, and Romans[1140].

At the same time, the institution of the general average had been adopted: If a ship was in danger. It was judged that some goods (of relatively lesser value and greater weight) needed to be sacrificed to save the vessel. Those who had an interest and financial interest in the trip had to participate in covering the damage. In the Middle Ages (until the 13th century), mutual aid institutions such as the Byzantine society of profits and losses (Italian Colonna) and the mutual aid guilds ("gildae") of the German, Anglo-Saxon and Scandinavian populations were maintained and expanded[1141].

At the end of the 11th century, the clauses appeared, regulating the premium according to the percentage of liability of each party involved in the enterprise. Then, in 1236, Pope Gregory IX imposed a series of prohibitions on the hitherto rare forms of insurance. Thus, these are gradually replaced by the legislation of general application from the 13th to the 16th century[1142].

During the 17th century, there was activity by independent insurers but also the establishment of the first large insurance companies in England, France, Denmark, Belgium, Sweden, Germany and Italy. At the same time, insurers began to create (in

[1139] De Roover, F. E. (1945). Early examples of marine insurance. *The Journal of Economic History*, **5**(2), 172-200. DOI: https://doi.org/10.1017/S0022050700112975.
[1140] Vance, W. R. (1908). Early History of Insurance Law. *Colum. L. Rev.*, **8**, 1.
[1141] Leonard, A. (Ed.). (2016). *Marine Insurance: Origins and Institutions*, 1300-1850. Springer.
[1142] Herschaft, J. A. (2004). Not your average coffee shop: Lloyd's of London-a twenty-first-century primer on the history, structure, and future of the backbone of marine insurance. *Tul. Mar. LJ*, **29**, 169.

the early 18th Century) mutual assurance associations (mutual hull underwriting associations), which were granted legal personality in 1862[1143].

The first such organisation historically was the one that started from the café of Edward Lloyd (founded in 1686 or 1688), which gathered people of shipping, including insurers. The Lloyd's community currently includes many insurance organisations, while Lloyd's Corporation operates independently and regulates the acts that periodically amend marine insurance contracts. Indicative of Lloyd's prestige is that the first insurance policy drafted by them (in 1779) is known as "Lloyd's Marine S. G. Policy"[1144] and is used with some modifications to this day[1145].

The other major organisation is the Institute of London Underwriters, which began similarly to Lloyd's from Jerusalem Café in the mid-18th Century and was officially founded in 1884. The Institute of London Underwriters also developed the standardization of many marine insurance terms (clauses). At the same time, special committees (Joint Committees) deal with all issues related to marine insurance while cooperating harmoniously with Lloyd's in decision-making on a standard policy[1146].

In the United States of America, marine insurance began in the middle of the 18th century in Philadelphia and extended to other cities. To deal with incidents of "fraudulent" losses, American businessmen, who were simultaneously merchants and shipowners, formed the first common insurance companies with the character of a "protective organism", which were forerunners of today's P&I clubs[1147].

[1143] Martin, F. (1876). The History of Lloyd's and of Marine Insurance in Great Britain: With an Appendix Containing Statistics Relating to Marine Insurance (No. 44525-44529). Macmillan.

[1144] In the 17th century, the importance of London as a shopping centre led to an increasing demand for ship and cargo insurance. The coffeeshop of Edward Lloyd was established as a place for the conclusion of marine insurance and from there began the Lloyd's that is known to us today. There are several insurance organisations. these are not actually, insurers, but are Lloyd's Corporation, an independent organisation and regulator that acts to protect and maintain insurance. The members operate individually or in groups and take out insurance by assuming the relevant obligations either directly or through a representative. The business registered in Lloyd's is aimed at specialized trade unions, which price and take on insurance and reinsurance risks, through brokers and shareholders. Lloyds co-operate together as unions and take on the above risks.
Lloyd's insurance market has a pool of specialized expertise on maritime insurance. More than 50 insurance companies, more than 200 lloyd's registered brokers and a global network of more than 4,000 local counterparties are active and bring businesses to Lloyd's market.

[1145] Lay, H. G. (1925). Marine Insurance: A Textbook of the History of Marine Insurance; Including the Functions of Lloyd's Register of Shipping. Post magazine.

[1146] Kingston, C. (2007). Marine insurance in Britain and America, 1720–1844: a comparative institutional analysis. *The Journal of Economic History*, **67**(2), 379-409. DOI: doi:10.1017/S0022050707000149.

[1147] Staring, G. S., & Waddell, G. L. (1998). Marine Insurance. *Tul. L. Rev.*, **73**, 1619.

In the 19th century, the Merchant Shipping Act of 1894 was adopted in the UK, which regulates the limitation of the liability of shipowners, and allows the shipowners to insure against the liability attributed to them by the illegal navigation of the ship.

4.3.3 Legal Framework

There is no legal framework for Maritime Insurance at the international level, except for certain international treaties that provide compulsory insurance for specific risks[1148]. The CMI International Working Group[1149] has also recognized good faith, risk allocation and the change in warranties as the most controversial areas of maritime insurance.

At the European level, although the European Civil Code (European Civil Code) is under construction, the European Directives do not provide contractual regulations in the field of marine insurance[1150].

In the English Legislative system, maritime security issues are regulated by the Marine Insurance Act 2015 (M.I.A)[1151], the main Legislative Act that codifies previous court decisions and Laws in marine insurance. Contrary to Greek Law[1152], in the Anglo-Saxon Legal System, the so-called Customary Law (Common and Case Law) is applied in conjunction with the Contract Law.

An important role with the force of a provision of international commercial law (international lex mercatoria) is played by the Clauses of I.L.U.[1153], as Institute

[1148] Comite Maritime International (CMI) (2002). Available at: no.-2-1.pdf (comitemaritime.org), last assessed: 28-8-2022.
[1149] Ibid.
[1150] Regulation (EC) No 593, (2008). Rome I. Available at: European Civil Code (civil-code.com), last assessed: 29-8-2022.
[1151] Kendall, D., & Wright, H. (2017). *A practical guide to the insurance act 2015*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315189161.
[1152] In the Greek Legal System, Maritime Law and Maritime Insurance are regulated by both the Provisions of the Code of Private Maritime Law (KIND) and the general provisions of Law 2496/1997.
[1153] The Institute of Insurers of London (INSTITUTE OF LONDON UNDERWRITERS - I. L. U) is an organisation of English insurers, where it represents the insurance interest of its members in the market of naval insurance in London regarding issues related to the insurance of ships, cargoes, construction, war risks, risks from atomic energy in the drafting of technical terms, etc. Specifically, it was founded in 1884 and until a few years ago only British controlled companies were capable of becoming its members. The aim of the Institute is to promote the interests of maritime insurance by providing facilities to its members regarding formalities, clauses, conditions and finding reasons for joint agreements to solve problems affecting the insurance market. The Institute mainly focuses on maritime operations. In particular, the Institute establishes Joint Committees, which include members of Lloyd's and members of the Institute, to decide on issues affecting the entire market and make recommendations. "The Joint Hull Committee" are two important such committees. The "The Joint Hull Returns Bureau" committee acts as a monitoring office for the reimbursement of premiums to shipowners due to a ship holiday and is under the auspices of "The Joint Hull Committee" for the benefit

Clauses, as over 70% of maritime insurance policies are based on these clauses.

4.3.4 Basic Principles of Marine Insurance

4.3.4.1 Insurance Premium

In the event that there is no agreement to the contrary between the contracting parties[1154], the duty of the assured or his representative is to pay the premium[1155], and the insurer must provide the insurance coverage to the assured or his representative[1156].

4.3.4.2 Insurance Policy

Marine insurance is non-existent if it is not signed in written form. In particular, the insurance policy acts as a document to prove the corresponding contract, i.e. it has an approbative and not a constituent character. Therefore, the points below should be mandatorily incorporated into the insurance policy as conditions, namely: i) date, ii) the names of the contracting parties as well as their residence, iii) the subject of the insurance, iv) an indication of the risks covered, v) the amount of the premium and vi) the name - type - tonnage - the nationality of the ship[1157].

4.3.4.3 Insurable Interest

The principle of insurable interest must govern insurance policies as an essential element of the insurance contract in the form of the expected profit. The insurance interest is defined in Article 259 of the CPR as well as in Article 5 of the MIA 1906[1158], which clearly articulates the principle of the indemnification nature of the marine insurance and the economic link of the party to the property object, as long as the relationship does not contradict the legal system. Interest should exist at the moment when the damage occurs[1159]. The party does not need a legitimate interest when the

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of the marine insurance market. The Institute also manages the Office "Policy Signing Office" which has been operating since 1942, the Insurance Control Service and the "Claims Payable Abroad" Service on behalf of its member Companies. The Institute with the Joint Committees, which also include members of Lloyd's, acts as a liaison between the independent member companies and Lloyd's on matters of decision-making on a common policy.

[1154] *JA Chapman & Co Ltd (In Liquidation) v Kadirga Denizcilik ve Ticaret AS* [1998] Lloyd's Rep IR 377.

[1155] Marine Insurance Act, (1906). The Premium, Articles 52-54. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.

[1156] *Universo Insurance Co of Milan v Merchants Marine Insurance Co Ltd* [1897] 2 QB 93.

[1157] Marine Insurance Act, (1906). The Policy, Articles 22-31. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.

[1158] Marine Insurance Act, (1906). Insurable interest, Article 5. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.

[1159] Rose, F. (2013). *Insurable Interest*. In Marine Insurance (pp. 107-128). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315874357.

contract is concluded or entered into force[1160].

4.3.4.4 Duty of Utmost Good Faith

The concept of good faith is paramount for the implementation of current insurance contracts[1161]. As a duty, it should be kept by the assured and by the insurer, from the stage of contractual negotiations up to the signing, execution and completion of the contract. The Marine Insurance Act 1906 imposed the observance of "maximum" good faith (Uberrimae Fidei) in paragraphs 17, 18, 19, and 20 of the MIA, stipulating the responsibility to monitor the utmost good faith in both parties who have signed the insurance policy[1162]. The contract must be based on utmost good faith. In other words, both parties must have a higher degree of honesty than in other contracts to achieve the scope of the agreement and keep the correspondence between the provision and consideration constant[1163].

Additionally, these obligations are in a broad sense different from the genuine obligations in the strict sense existing in insurance law, such as the obligation to compensate the insurer in the form of an insurance premium, which is one of the so-called insurance burdens and which are rules of conduct involving acts or omissions of the contracting parties. The absence of good faith may result in the parties being relieved of their obligations without any indication of fraud. This differs from an invalid policy, such as proof-of-interest insurance (PPI policies)[1164]. Only the Law defines the contracts that are invalid from the outset. On the contrary, in case of violation of the insurance burdens[1165], it is possible to appeal to the Court to determine whether a contracting party is entitled to avoid the obligations imposed by the insurance contract in case the counterparty does not comply with the insurance burden, such as that of

[1160] *Kerr LJ General Reinsurance Corp v Forsakringsaktiebolaget Fennia Patria* [1983] QB 856; [1983] 2 Lloyd's Rep 287.
[1161] Gurses, O., & Merkin, R. (2016). Insurance contracts after the Insurance Act 2015. *Law Quarterly Review*, **132**(3), 445-469. DOI: https://ore.exeter.ac.uk/repository/handle/10871/20256.
[1162] The IA 2015 retained the following words in section 17 of the MIA 1906 "A contract of marine insurance is a contract based upon the utmost good faith" but it repealed the following words from section 17 of the MIA 1906 "…, and, if the utmost good faith be not observed by either party, the contract may be avoided by the other party".
[1163] Merkin, R., Hjalmarsson, J., Bugra, A., & Lavelle, J. (2014). *Marine insurance legislation*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315816678.
[1164] Salzman, G. I. (1966). The Law of Insurable Interest in Property Insurance. *Ins. LJ*, **394**.
[1165] *North Star Shipping Ltd v Sphere Drake Insurance Plc* [2006] EWCA Civ 378; [2006] 2 Lloyd's Rep 183.

maintaining good faith[1166].

The amendment initiated by the new provisions of the Marine Insurance Act 2015 effectively abolished the previous Sections of MIA 1906 related to the duty of utmost good faith[1167]. Instead, the newly installed legislation concerns the duty of disclosure by policyholders or their agents and pre-contractual representations based on insurance policies by installing the new task of "Fair Presentation"[1168].

This new duty requires policyholders to disclose *"any material circumstance[1169]"* of which the policyholder is aware or ought to be aware[1170]. This new obligation is similar to the previous policy in many aspects, except in the cases of executing investigations by the insurer. Specifically, the assured has no obligation to disclose circumstances[1171] to the insurer that would minimise the risk of the insurer; that is, the assured has no obligation to disclose claims made in previous insurance terms under the same insurance policy, providing that the insurer would have already become aware of these claims[1172].

4.3.4.5 Warranties of Marine Insurance

According to the Marine Insurance Act of 1906, a warranty is defined as a "promissory guarantee", i.e., the warranty through which the insured undertakes to execute or not to execute something, or to fulfil certain conditions, or through which he certifies or denies the existence of a state of affairs. In addition to the warranties listed in the contract and called expressed warranties, there are also implied warranties provided by English Law[1173]. According to the Marine Insurance Act 1906, the express warranties are:

a) Warranty of Seaworthiness: This warranty, while not explicitly mentioned in the insurance policy, is implicit because its application is required by law. Specifically, this warranty stipulates that the ship must be seaworthy and

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[1166] *Eagle Star Insurance Co Ltd v Games Video Co (GVC) SA (The Game Boy)*, [2004] EWHC 15 (Comm); [2004] 1 Lloyd's Rep 238.
[1167] *New Hampshire Insurance Co Ltd v MGN Ltd* [1997] LRLR 24.
[1168] Kim, J. W. (2019). The Duty of Disclosure under the Doctrine of Utmost Good Faith in Marine Insurance Contract: In Connection with the UK Insurance Act in 2015. *Korea Trade Review*, **44**(3), 137-154. DOI: https://data.doi.or.kr/10.22659/KTRA.2019.44.3.137.
[1169] *Pan Atlantic Insurance Co Ltd v Pine Top Insurance Co Ltd.* [1995] 1 AC 501; [1994] 2 Lloyd's Rep 427.
[1170] *Western Trading Ltd v Great Lakes Reinsurance* (UK) Plc [2015] EWHC 103 (QB).
[1171] *Decorum Investments Ltd v Atkin (The Elena G)* [2001] 2 Lloyd's Rep 378.
[1172] *Marc Rich & Co AG v Portman* [1997] 1 Lloyd's Rep 225.
[1173] Soyer, B. (2012). *Warranties in marine insurance*. Routledge-Cavendish.

suitable for sailing at the beginning of each voyage and that the seaworthiness should be retained throughout the voyage. Specifically, the hull and the machinery, along with any necessary components, fuels as well as staffing of the vessel with a suitable crew[1174], should be observed with diligence during the voyage[1175].

b) Warranty of Illegality: According to English Law, a voyage is deemed legal under the Rules provided for in MIA 1906. On the contrary, the legality of the insurance policy is judged according to the law of each country. Expressly, under the MIA of 1906, it is stated that the breach of a warranty allows the insurer to avoid any claim issued under the insurance policy from the date of violation[1176].

The new amendments to the Insurance Act 2015 stipulate the following: in accordance with Sections 9,10, and 11 of the new Act, the effect of breach of the warranty will be less stringent[1177]. Violating any contractual warranty by an assured suspends (rather than completely exhausts) the insurer's liability until the violation is remedied. In other words, the insurer retains the previous options under MIA 1906, namely to i) trigger the warranty and automatically terminate the contract and claim for damages, ii) avoid the arraignment of the warranty and lose the option of contractual termination[1178]. In addition, a third option was installed to report the violation to the assured and suspend the contract until the violation is remedied. The insurer will not bear any responsibility for any claims that arise if the insurance is suspended[1179]. Still, once the violation is remedied, the insurance bears its effects with full force and effect. This new option prevents an insurer from evading an insurance policy if the warranty ceases to be valid, subject to the contractual clauses, due to a change in material facts

[1174] *Pratt v Aigaion Insurance Co SA* [2008] EWCA Civ 1314; [2009] Lloyd's Rep IR 149.
[1175] *GE Frankona Reinsurance Ltd v CMM Trust No 1400 (The Newfoundland Explorer).* [2006] EWHC 429 (Admlty); [2006] Lloyd's Rep IR 704.
[1176] *Suez Fortune Investments Ltd v Talbot Underwriting Ltd (The Brillante Virtuoso)* [2019] EWHC 2599 (Comm); [2019] 2 Lloyd's Rep 485.
[1177] Kendall, D., & Wright, H. (2017). *A practical guide to the insurance act 2015*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315189161.
[1178] *HIH Casualty & General Insurance Ltd v New Hampshire Insurance Co.* [2001] EWCA Civ 735; [2001] Lloyd's Rep IR 596.
[1179] *Brownsville Holdings Ltd v Adamjee Insurance Co Ltd (The Milasan).* [2000] 2 All ER (Comm) 803; [2000] 2 Lloyd's Rep 458.

or case of unlawfulness (e.g. with penalties) or the insurer's waiver[1180].

The new MIA of 2015 removes three clauses "*under the contract*" in non-consumer contracts. These clauses altered all pre-contractual statements into warranties that sometimes use unclear wording for the assured. Those warranties should not push the insurer to enter the contract. Thus, the so-called *'contract-based'* clauses have been abolished[1181].

A further necessary amendment of the existing Law, based on the new regulations, arises from the proposal of the Legal Committee the insurer should not have the right to avoid a claim where the assured's breach is not strictly related to the loss. Specifically, Article 11 of the new Act practically introduces a kind of causal link requirement in insurance contracts to ensure that an insurance policy's breach must be linked to that damage. However, no direct causation is required[1182].

It should be stated that Section 11 of the new Act does not apply to terms that *"define risk as a whole"*. This is because the application of such a term is unique in English Marine Insurance Law[1183].

4.3.4.6 Causa Proxima

The insurance policy firmly established the obligation of the insurer to compensate the assured for any damage or even destruction of the insurable object. As mentioned above, loss or damage is always linked with an event that led to this outcome[1184]. Although, in most cases, there is more than one occurrence that led to the loss. At the same time, most marine insurance contracts provide coverage only for elected occurrences and rarely for all. To this end, theories have developed that access an event and evaluate which is the "*causa proxima*"[1185], the most crucial and impactful occurrence to the outcome. The most prominent theories are summarized below:

[1180] *Amlin Corporate Member Ltd v Oriental Assurance Corp.* [2014] EWCA Civ 1135; [2014] 2 Lloyd's Rep 561.

[1181] Kim, J. W. (2019). The Duty of Disclosure under the Doctrine of Utmost Good Faith in Marine Insurance Contract: In Connection with the UK Insurance Act in 2015. *Korea Trade Review*, **44**(3), 137-154. DOI: 10.22659/KTRA.2019.44.3.137

[1182] Gurses, O., & Merkin, R. (2016). Insurance contracts after the Insurance Act 2015. *Law Quarterly Review*, **132**(3), 445-469. https://ore.exeter.ac.uk/repository/handle/10871/20256.

[1183] Merkin, R., Hjalmarsson, J., Bugra, A., & Lavelle, J. (2014). *Marine insurance legislation*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315816678.

[1184] Hodges, S. (2012). *Cases and materials on marine insurance law*. Routledge-Cavendish. DOI: https://doi.org/10.4324/9781843142324.

[1185] Sahu, M. K. (2014). The Rule of Causa Proxima as a Principle of Insurance. *Kathmandu Sch. L. Rev.*, **4**, 154.

a) Theory of nearest cause: In this theory, the "causa proxima" is the occurrence in close interaction with the outcome, the final act before the incident. Being the final act does not necessarily mean that this act is immediately the last act before the incident; instead, that is the latest "important" act, and should this act didn't occur, the incident might not have even occurred.
b) Theory of appropriate cause: Under this theory, the most vital cause is the original act that the outcomes of which have successively and uninterruptedly led to the incident.
c) Theory of independent cause: This theory dictates that should a novus actus be deemed adequate to interrupt the order of causality by preventing the final occurrence, this action should be considered the most critical cause of action.

Nevertheless, in all cases, the *onus of proof* lies with the assured, who needs to prove that the insurance policy covers the event that led to the loss or damage[1186]. Additionally, Article 55 of MIA 1906[1187] dictates that the insurers can refuse to compensate the assured if it proves that the nearest cause of the event resulted from a malicious act or gross negligence of the assured[1188].

4.3.4.7 Indemnification

According to the Marine Insurance Act of 1906, compensation is the amount that the insured can recover in connection with a loss or destruction of the ship (occurrence of the risk). For this to occur, the necessary action is i) the valuation of the insured good, which includes its commercial value, and ii) the insurer's subrogation to the assured's rights, i.e. if a third party causes the damage[1189]. In this case, the insurer can exercise the rights of the insured to claim and receive compensation for himself. After the risk occurrence, the insurer must pay the compensation he has received under the insurance policy. A specific procedure is imposed when collecting compensation. First of all, it is necessary to inform the insurers and then an expert is appointed to

[1186] Velayudan, R. (2021). The Applicability of Proxima Causa Rule in Insurance Contracts, **3**(4), *Int'l JL Mgmt. & Human.*, **4**, 5510.
[1187] Marine Insurance Act, (1906). Included and excluded losses, Article 55. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
[1188] *Samuel v. Dumas, 1924 A.C. 431* (1924).
[1189] *Yorkshire Insurance Co Ltd v Nisbet Shipping Co Ltd* [1961] 1 Lloyd's Rep 479.

assess the causes and circumstances of the accident and the compensation amount[1190]. The inspection of the ship follows this by the classification societies, and finally, the insurers draw a report. In case additional costs arise, they are paid by the owner, who also has the burden of proving the correctness and sequence of the actual events through the written procedure[1191].

4.3.4.8 Limitation of liability

According to the International Convention of London of 1976[1192], the cause of the existence of the principle of limitation of liability derives from an ancient quasi-institution of Maritime Law[1193]. The shipowners are always deemed liable regardless of fault but have the right to limit their liability, subject to the duty of care evidenced. This concept of the shipowner being "always liable" has been established to impose the obligation to the ship owner to take all possible measures to avoid an incident.

The limited liability facilitates the insurance coverage of the risks by the "marine contractor". In essence, the distribution of losses is facilitated by the occurrence of risks or, more correctly, the distribution of the cost of insurance coverage of these risks; that is, the system of limitation of liability consists mainly of the fact that it defines the maximum amount of liability, i.e. the maximum amount of money for the establishment of a limitation fund[1194]. Additionally, both the insurer and the assured are aware of the maximum limit of their exposure to the risk insured and, consequently, of the obligation to indemnify. The direct legal consequence of the recommendation of the limitation of liability is that the person who has a claim against, for example, the owner, is not entitled to act against his other assets[1195].

4.3.4.9 Timeframe for Loss or Damage

All losses or damages on behalf of the insurer are paid within thirty (30) days from submitting all relevant documentation that allows the insurer to make a payment against the assured or the beneficiary with any assignment or transfer of rights. If the

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[1190] *Kosmar Villa Holidays Plc v Trustees of Syndicate 1243* [2008] EWCA Civ 147; [2008] Lloyd's Rep IR 489.

[1191] *Great American Insurance Company v. Bureau Veritas, 338 F. Supp. 999* (S.D.N.Y. 1972).

[1192] IMO, (2022). Convention on Limitation of Liability for Maritime Claims (LLMC). Available at: Convention on Limitation of Liability for Maritime Claims (LLMC) (imo.org), last assessed: 29-8-2022.

[1193] Dubais, B. A. (1977). The 1976 London Covention on Civil Liability for Oil Pollution Damage from Offshore Operations. *J. Mar. L. & Com.*, **9**, 61.

[1194] Gauci, G. (1995). Limitation of liability in maritime law: an anachronism?. *Marine Policy*, **19**(1), 65-74. DOI: https://doi.org/10.1016/0308-597X(95)92573-P.

[1195] Griggs, P., Williams, R., & Farr, J. (2020). *Limitation of liability for maritime claims*. Taylor & Francis.

insurers do not pay the compensation within the period mentioned above, the assured may claim interest on the compensation[1196].

When the loss or damage is compensated, all premiums paid by the assured up to the settlement time are set off against the compensation, even in case of bankruptcy or insolvency of the assured[1197].

4.3.4.10 Policy Assignment

Unlike other types of indemnity insurance, Marine insurance is assignable unless there are explicit conditions to oppose this action. The assignment can be executed before or even after the loss, with approval from the insurer. If the insurable interest of the assignor is lost, the insurance ceases to fulfil its purpose, and there is no policy to be assigned[1198]. In the reverse case, where the assured assigns the insurance claim without the subject matter of insurance being available, the assignee has no insurable interest and is, therefore, not in a position to bring an action against the insurance contract. The result of the assignment is if a maritime insurance company has assigned a claim to transfer the insurance interest, the assignee must file a complaint in his name to enter the insured's rights (for example, in a standard cargo declaration)[1199].

The defendant (the insurer) has the right to put forward any evidence or means appropriate for his defence arising from the insurance contract, as he would have acted if the action had been brought in the name of the person by whom or on whose behalf the insurance was conducted[1200].

In addition, there is the possibility of paying compensation to a person or entity other than the assured. For example, according to the "*damage payable*" clause, one or more goods are insured and compensated through a single insurance company. Thus, the compensation will be paid, covering only the actual loss. In other words, subject to

[1196] *Bayview v Mitsui* [2002] EWCA Civ 1605; [2003] 1 Lloyd's Rep 131.
[1197] Merkin, R., Hjalmarsson, J., Bugra, A., & Lavelle, J. (2014). *Marine insurance legislation*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315816678.
[1198] *New Hampshire Insurance v MGN* [1996] CLC 1692 (Potter J); *Youell v Bland Welch & Co* (No. 1) [1992] 2 Lloyd's Rep 127.
[1199] Merkin, R., Hjalmarsson, J., Bugra, A., & Lavelle, J. (2014). *Marine insurance legislation*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315816678.
[1200] *Eagle Star v Spratt* [1971] 2 Lloyd's Rep 116.

Sections 50-51 of MIA 1906[1201], the loss resulting from the conversion, disqualification, or abuse by the assured is not covered[1202].

4.3.5 Clauses related to insurance categories.

Marine insurance does not cover only the loss or damage of a vessel but also other goods that can be damaged or lost during an occurrence. Specifically, insurance is divided into three categories and an additional category for extraordinary circumstances, usually installed while trading in specific regions. Subject to each insurance category, particular clauses have been created to facilitate specialised issues[1203].

The specific types of maritime insurance clauses are divided into three main categories and one additional as follows[1204]:

a) Hull & Machine insurance
b) Cargo Insurance
c) Third-Party Liability
d) Additional Insurance against war risks

4.3.5.1 Hull & Machine (H&M) Insurance

The "Hull & Machinery" (H&M) or traditional Maritime Insurance provides coverage to the assured vessel's hull and machinery in case of loss or damage as an outcome of an event covered by the insurance policy. Precisely, Hull & Machinery insurance compensates the assured from damages or losses caused by common hazards suffered by vessels, such as collisions, fires and explosions, groundings and other events, usually described as maritime perils or "perils of the sea"[1205].

Many factors affect the amount of insurance coverage of H&M insurance[1206]. Still, the insurers are relying upon the claim records of the assured until the occurrence of the event and the total claims arising by the estimation of the present value of the

[1201] Marine Insurance Act, (1906). Assignment of Policy, Article 50-51. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
[1202] Rose, F. (2013). *Marine insurance: law and practice*. CRC Press. DOI: https://doi.org/10.4324/9781315874357.
[1203] Thomas, R. (Ed.). (2015). *The Modern Law of Marine Insurance: Volume Four*. CRC Press.
[1204] Hudson, G., Madge, T., & Sturges, K. (2013). *Marine Insurance Clauses*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315874364.
[1205] Vessel's hull, machinery and other equipment, Salvage and Salvage charges (The rescue and its charges), Sue and labour, Proportion of Liability for collision with another vessel (3/4ths or 4/4ths), Loss of Hire , General average
[1206] Hecht, W. H. (1966). Hull Policy: Interrelationship of Hull and P. and I. *Tul. L. Rev.*, **41**, 389.

ship. The value of the vessel may vary, subject to the market cycle in conjunction with the type, age, unique characteristics and the vessel's condition (in case there is only damage to the vessel)[1207].

However, to be compensated for damages, the assured must prove that he exercised his duty of care during the event that led to loss or damage. Specifically, to prove that he satisfied his duty at the exact time of the occurrence, he must prove that he exercised due diligence during the voyage and that the occurrence emerged despite his continuous compliance[1208].

4.3.5.1.1 Increased Value Clause (IV Clause)

The most distinct clause, incorporated only into insurance contracts of H&M[1209], is the Increased Value Clause (IV Clause). Specifically, according to the MIA 1906, the H&M insurance covers the vessel's market value, which is mentioned in the "*Insurable Interest*" of shipowners. These characterised as total loss events require the evaluation of the vessel's market value, which is usually drafted in the insurance policy, to clarify the compensation amount. The readjustment of the vessel's market value (and, as an outcome, the premium) is one of the most prominent reasons the H&M insurance policies require an annual renewal. But, while the H&M is renewed annually, the market value of a vessel is "renewed" (without exaggeration) daily; thus, there are instances when the ship owners predict that the actual market value of the vessel will become substantially higher during the execution of the marine insurance contract. Therefore, to be protected and fairly compensated in case of an occurrence, the ship owners may elect to incorporate the IV Clause into their marine insurance policy[1210].

Specifically, Increased Value Insurance was established as supplementary coverage, known as "disbursement", which ensures an additional 20% to 25% against

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[1207] *Insurance Co of Africa v Scor (UK) Reinsurance Co Ltd* [1985] 1 Lloyd's Rep 312.

[1208] To this point, a slim but important distinction should be stated. It seems that the duty of care is a duty that should be complied only during the assessed period. The failure to exercise the duty of care outside the assessed timeframe is of little importance. On the other hand, the concept of due diligence is different in two aspects. First, due diligence is a process, not a duty and the process should be followed and as an outcome of the compliance with the rules of the process, the duty of case can be (not surely but more easily) evidenced while assessing an exact timeframe. Secondly, duty of care is a momentary duty while the due diligence process has continuity.

[1209] Gurses, O., & Merkin, R. (2016). Insurance contracts after the Insurance Act 2015. *Law Quarterly Review*, **132**(3), 445-469. https://ore.exeter.ac.uk/repository/handle/10871/20256.

[1210] Merkin, R., Hjalmarsson, J., Bugra, A., & Lavelle, J. (2014). *Marine insurance legislation*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315816678.

the assured value of the ship in case of an event leading to a total loss of the vessel. In addition, *"Increased Value"* insurance provides lower premiums; therefore, many shipowners use "IV" insurance to cover a part of the value of the ship's purchase[1211].

4.3.5.1.2 Institute Time Clauses

The London Market Joint Hull Committee (Lloyd's Underwriters' Association and IUA) is responsible for updating the Clauses adopted and drawn up by I.U.A. In cooperation with shipowners' associations, insurers and brokers, formulate the international clauses incorporated in the International Hull Clauses and subsequently to Institute Time Clauses (hereinafter referred to as the IHC and ITC clauses)[1212].

These clauses were introduced and entered into force on 1 November 2002, with no significant variations from the original "Institute Time Clauses"**,** clauses of the Institutes of 1983 and 1995. In particular, the ITC clauses support the ISM (International Safety Management) Code, the flag states of the ship and the classification societies. In addition, they contain standard clauses and provisions for processing claims by determining insurers' and policyholders' rights and responsibilities[1213].

The Clauses help both parties accept standard terms regarding cargo insurance or Hull and Machinery insurance and establish a uniform standard in the insurance policy.

In particular, the Institute Time Clauses are separated into the below categories[1214]:

a) the Joint Cargo Clauses
b) the Joint Excess of Loss Clauses
c) the Joint Hull Clauses (Common Clauses for the Hull of the ship)
d) The Joint Liability Clauses
e) The Joint Rig Clauses (Common Rig Clauses)

[1211] Seltmann, A. (2019). Global marine insurance report 2019. *In International Union of Marine Insurance (IUMI) Conference.*

[1212] Mutenga, S., & Parsons, C. (2012). *Marine Insurance*. The Blackwell Companion to Maritime Economics, 452-470. DOI: 10.1002/9781444345667.

[1213] Merkin, R., Hjalmarsson, J., Bugra, A., & Lavelle, J. (2014). *Marine insurance legislation*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315816678.

[1214] Park, S. K., Kim, J. R., & Shin, Y. R. (2012). A Study on the Institute Warranties in the Institute Time Clauses-Hulls 1/10/83. *Journal of Navigation and Port Research*, **36**(5), 329-338. DOI: https://doi.org/10.5394/KINPR.2012.36.5.329.

f) The Joint Specie Clause

g) The Joint War Clauses (Common War Clauses)

4.3.5.1.3 Excluded Risks

Subject to the abovementioned, the risks excluded in hull and machinery insurance are as follows[1215]:

a) War Risk: excluding the coverage of damage from acts of war, including damage from a torpedo off the sea. An additional policy is needed for this risk to be included in the H&M insurance coverage.

b) Strikes Risk: excluding the coverage of damage from work stoppages, including damage caused by strikes and terrorist risks. In particular, wars and strikes (War & Strikes) are insurable risks. They are often purchased as an extension of the main maritime insurance without being covered by the main insurance of Hull & Machinery.

c) The risk of malicious acts: the coverage of damages from harm caused by malicious human action is excluded.

d) The risk of Nuclear Damage: excluding the coverage of damage from military weapons using atomic or nuclear responses.

4.3.5.2 Cargo Insurance

The traditional insurance of Hull & Machinery, examined above, does not provide insurance coverage for cargo. Cargo insurance is provided only for the cargo loaded on the vessel, and the compensation arising from it is bound only for the loss or damage of the cargo. There should be no confusion between H&M and Cargo insurance, and there are cases where the vessel suffered no damage, but the cargo was destroyed or the opposite[1216]. Both objects are under different insurance policies and should be assessed separately. Some cases, such as the US's "both to blame collision clause" or the "unlimited liability" of OPA 1990, may correlate the two insurance policies. Still, these instances should be regarded as exceptions[1217].

4.3.5.2.1 Institute Cargo Clauses

Cargo insurance is offered to the stakeholder that will suffer from the loss or

[1215] Rose, F. (2013). Institute Time Clauses (Hulls) 1/11/95. *In Marine Insurance* (pp. 819-828). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315874357.

[1216] Dunt, J. (2015). *Marine cargo insurance*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315758794.

[1217] *Glencore International AG v Ryan (The Beursgracht) (No 1)* [2001] EWCA Civ 2051; [2002] 1 Lloyd's Rep 574.

damage of the cargo. This stakeholder is the vessel's charterer, who initiates the cargo insurance in most cases[1218]. It should be stated that cargo insurance covers the damage done directly to cargo or the loss of cargo as property and the pollution caused by the cargo, in case of transferring pollutive or explosive cargo, such as oil or gas[1219]. The principal clauses utilised for cargo insurance are the Institute Cargo Clauses[1220] , last updated in 2009 in a joint effort by the Institute of London Underwriters and the Lloyds Underwriters Association.

These institute cargo clauses are separated into three categories, each providing more advanced protection than the previous; thus, these categories are the "A, B and C", where[1221]:

a) Institute Cargo Clauses (A) offer coverage against all maritime risks, including weather conditions or damage caused by other extenuating factors, as long as those factors can be considered maritime peril or perils of the sea[1222]. There are also some exceptions to these clauses which, if proven, exclude the liability of the insurer, such as i) misconduct or gross negligence of the master or the assured, ii) defective packing during the loading or damages or loss during flawed unpacking, iii) inherent vice, iv) wear and tear, v) any kind of weapons, drugs or illicit trade, vi) war event and vii) any kind of strikes. All other usual sources of maritime perils, such as general average, salvage claims, collision damage and other fortuitous losses, are absent from the above.

b) Institute Cargo Clauses (B) offer coverage from distinct maritime perils that can lead to a general average event with the inclusion: of i) fire from any source, ii) vessel sinking or grounding, iii) collision with another vessel, iv) derailment, v) cargo unload due to force majeure, vi) entry of water and vii) natural event such as extreme weather conditions, earthquakes, lightning, etc.

c) Institute Cargo Clauses (C) offer the basic coverage from events that mainly

[1218] *Nima SARL v Deves Insurance. [2002] EWCA Civ 1132;* [2003] 2 Lloyd's Rep 327.
[1219] *Leyland Shipping Company Ltd v Norwich Union Fire Insurance Society Ltd* [1918] AC 350.
[1220] Lloyd's Market Association (2022) Joint Cargo Committee (JCC). Available at: Cargo Clauses Page (lmalloyds.com), last assessed: 29-8-2022.
[1221] Soyer, B., & Tettenborn, A. (2016). –Institute Cargo Clauses 2009 (A),(B) and (C). In *International Trade and Carriage of Goods* (pp. 433-442). Informa Law from Routledge.
[1222] Strathy, G. (2005). Maritime Law. *Dalhousie Law Journal*, **28**(1), 261.

can cause a general average, such as i) vessel grounding or sinking, ii) stranding, iii) jettison[1223].

4.3.5.2.2 Additional Clauses

There are also additional clauses that refer to specific conditions or events, and it is up to the assureds' intention to include those clauses in the insurance policies[1224]:

a. Explosion clause: this clause extends insurance coverage to include losses or damage by any explosion, except for outbreaks due to war events covered in war insurance clauses.
b. Inchmaree Clause: This clause provides cover for loss of or damage to cargo from technical malfunctions, such as the rupture of a vessel's boilers, the breakage of the shafts or any latent defect in the ship's hull or machinery or from navigation or management errors of the vessel by the master[1225].
c. Storage clause and stowage of cargoes lost during Loading: provides cover for the loading, storage and shipment of cargo. Also, it provides for the payment of the insured value of any cargo that can be completely lost during loading, transhipment or unloading.
d. Shore clause: provides coverage to docks during land transport, including the risks of collision, overturning, derailment, or other transport accident, such as fire, lightning, sprayer leaks, cyclones, floods (i.e. increase in waterborne water) and/or collapse or subsidence of ports or docks.
e. Collision Clause: No cover is payable when the cargo owner has to compensate the vessel's owner pursuant to the "both to blame" collision clause[1226].

4.3.5.2.3 Free on Board (FOB), Cost Insurance Freight (CIF) and Cost Freight (CF) agreements

It is appropriate to consider first the concepts of standard contracts "FOB", namely "Free on Board", and CIF, namely Cost Insurance Freight. The above

[1223] Dunt, J., & Melbourne, W. (2015). The Impact of the CENDOR MOPU on the Institute Cargo Clauses. *In The Modern Law of Marine Insurance* (pp. 205-234). Informa Law from Routledge.
[1224] Hudson, G., Madge, T., & Sturges, K. (2013*). Marine Insurance Clauses*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315874364.
[1225] *Thames & Mersey Marine Insurance Co v Hamilton, Fraser & Co, The Inchmaree* [1887] 12 App Cas 484.
[1226] Mahafzah, Q. A. (2010). The Legal Effectiveness of the Both-to-Blame Collision Clause under Bills of Lading and Charterparties. *J. Mar. L. & Com*., **41**, 263.

agreements are commercial terms where the buyer or seller of the cargo bears the responsibility for the goods which have been destroyed or damaged during the duration of the transport contract. The liability moves from the seller to the buyer to establish who is responsible and who gains rights to the goods up to loading them on board[1227].

In FOB, the seller is responsible for paying all costs related to cargo and arranging transit until the goods are loaded onto the ship. Thus, he is responsible for taking care of the insurance up to this point. The insurance liability is transferred to the buyer as soon as the goods' loading is completed. At this point, the buyer acquires all rights and assumes the responsibilities, including the payment of freight and the arrangement of insurance. Additionally, the seller undertakes to arrange and pay for all the delivery and insurance costs at the destination if the buyer has paid for them at the sale price. In FOB contracts, the finalisation of cargo loading is an important milestone, not only for the transfer of liability but also for the termination or alteration of the insurance policy[1228].

A similar contract in which the buyer prefers to organize his own insurance is the C&F contract, which means Cost and Freight. The consignee bears no responsibility until he receives the goods. The insurer usually insures the goods from the market price while removing them from the supplier's warehouse. When the goods are sold under the CIF contract, the insurance policy is transferred to the consignee, and he is substituted for the rights and obligations as if he had taken over the insurance. Lastly, the buyer signs an insurance policy when the cargo leaves the origin warehouse in the Ex-Work contract[1229].

4.3.5.2.4 Duration of Cargo Coverage

The goods are insured from the moment they leave the point of dispatch, at the risk of the assured, and the coverage continues during their transit until they are presented to the final destination warehouse[1230].

In the case of "Delivered Duty Paid" transfer or the supplementary insurance

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[1227] Lorenzon, F., Sassoon, D. M., Baatz, Y., Skajaa, L., & Nicoll, C. (2012). *CIF and FOB contracts* (Vol. 5). Sweet & Maxwell.

[1228] Bridge, M. (2019). *CIF and FOB contracts in English law: current issues and problems*. Research Handbook on International and Comparative Sale of Goods Law, 213-239. DOI: https://doi.org/10.4337/9781786436153.00019.

[1229] Evans, P. D. (1993). FOB and CIF contracts. *Australian Law Journal*, **67**(11), 844-858. DOI: https://search.informit.org/doi/10.3316/agispt.19934643.

[1230] Hudson, G., Madge, T., & Sturges, K. (2013). *Marine Insurance Clauses*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315874364.

clauses, including time deviations, delays, retransfers, transshipments or any other fluctuations, when the assured is the buyer, he has no control over the regular transport of the cargo[1231].

4.3.5.3 Protection and Indemnity Insurance - P&I Clubs

The concept of "Protection & Indemnity" insurance coverage provided by the P&I Clubs, as detailed in the next chapter, insures and focuses on the prevention and coverage of the unpredictable[1232], such as third-party liability and more minor risks and claims, such as the coverage to initiate legal actions to compensate for the loss of hire or freight, FD&D insurance (Freight, Demurrage and Defence)[1233].

The term "Protection" refers to incidents and obligations arising from the ship's ownership. In contrast, the term "Indemnity" refers to the obligation of all members to indemnify the affected party by providing coverage from their financial participation, named call, to compensate for any raising claims[1234].

Specifically, P&I insurance incorporates all the insured risks, as opposed to the traditional form of maritime insurance, where it does not assume such risks[1235]. Thus, when standard insurance doesn't offer coverage, P&I insurance covers civil liability against the claims of third parties and small claims, such as compensation for crew expenses and cargo insurance[1236].

The main reason for Protect & Indemnity insurance is to satisfy third-party claims against shipowners[1237]. The owner assumes the risk of facing a large number of claims from third parties, so he needs to insure himself for these claims. Presently, P&I Clubs have extended their coverage even to aspects always covered by traditional

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[1231] Dunt, J. (2015). *Marine cargo insurance*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315758794.

[1232] Bennett, P. (2001). Mutual risk: P&I insurance clubs and maritime safety and environmental performance. *Marine Policy*, **25**(1), 13-21. DOI: https://doi.org/10.1016/S0308-597X(00)00029-4.

[1233] Henriques, D. G. (2019). Arbitrating Disputes "in" Third-Party Funding. Arbitration: *The International Journal of Arbitration, Mediation and Dispute Management*, **85**(2). Available at: https://kluwerlawonline.com/journalarticle/Arbitration:+The+International+Journal+of+Arbitration,+Mediation+and+Dispute+Management/85.2/AMDM2019028.

[1234] *Firma C-Trade SA v Newcastle Protection & Indemnity Association (The Fanti) and Socony Mobil Oil Inc and Others v West of England Shipowners Mutual Insurance Association (London) Ltd* (No 2) (The Padre Island) [1990] 2 Lloyd's Rep 191.

[1235] Kimball, J. D. (2012). The Central Role of P&I Insurance in Maritime Law. *Tul. L. Rev.*, **87**, 1147.

[1236] Rose, F. (2013). The Nature of Insurance. *In Marine Insurance* (pp. 77-92). Informa Law from Routledge.

[1237] Reynardson, W. R. (1968). History and Development of P & I Insurance: The British Scene. *Tul. L. Rev.*, **43**, 457.

insurance, such as H&M insurance[1238].

4.3.5.4 Additional types of insurance: War Insurance

Open insurance against war risks is usually supplementary, mainly for cargo insurance[1239]. While it covers most of the dangers arising from hostilities, it excludes losses caused by the use of nuclear weapons[1240].

The need to insure against significant war risks arises in regard to the ship or the cargo only when the ship is in another country where there is political instability that can lead to social uprisings or insurrections or there is an open conflict between neighbouring nations, such as the present case of Russo-Ukrainian War[1241]. In general, it is necessary to receive cover for war risks from the same insurers to protect against any controversies as to the real cause of the loss of the ship and cargo[1242].

4.4 Maritime Arbitration

Traditionally, the only method for the resolution of a dispute was the initiation of court procedures[1243]. However, over the years, when claims started to increase and court procedures delayed in providing a final decision upon a dispute, other dispute resolution methods emerged[1244].

The adoption of new dispute resolution methods continues to increase as the newly introduced methods, such as arbitration, prove their effectiveness. In this section, the most prominent method of alternative dispute resolution will be assessed; namely, that of arbitration and its impact on the maritime litigation system will be evaluated[1245].

[1238] Semark, D. (2013). *P&I Clubs: Law and Practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9780203720936.

[1239] James, A. P., & Van Dell, H. G. (2002). The Impacts Of The War On Terrorism On Maritime Shipping. *International Business & Economics Research Journal (IBER)*, **1**(8). DOI: https://doi.org/10.19030/iber.v1i8.3962.

[1240] Hirshleifer, J. (1953). War damage insurance. *The Review of Economics and Statistics*, **35**(2) 144-153. DOI: https://doi.org/10.2307/1925800.

[1241] Mitnick, E. R. (1983). Admiralty-Insurance-War Risk Underwriters Liable for Insured Value of Vessels Seized by Sandinista Rebels, Ope Shipping, Ltd. v. Allstate Insurance Co. *Suffolk Transnat'l LJ*, **7**, 391.

[1242] Woods, D. W., & Weinkle, J. (2020). Insurance definitions of cyber war. *The Geneva Papers on Risk and Insurance-Issues and Practice*, **45**(4), 639-656. DOI: https://doi.org/10.1057/s41288-020-00168-5.

[1243] Athanasiou L. & Antapasis A. (2020). *Maritime Law*. Law Library, Athens. (in Greek)

[1244] NYPE 1946, cl 17; NYPE 1993, cl 45; NYPE 2015 cl 54(b); Gencon 1994, cl 19; Shelltime 4, cl 46.

[1245] Baatz, Y. (Ed.). (2020). *Maritime law*. Taylor & Francis. DOI: https://doi.org/10.4324/9781003046943.

4.4.1 Definition of Arbitration

There is no definition of arbitration in the Arbitration Act 1996 (AA 1996), though there are requirements for an arbitration agreement. The provisions of the Arbitration Act 1996, which regulates the process of arbitration, govern only arbitration and not the other forms of alternative dispute resolution (ADR)[1246].

On the other hand, the UNCITRAL Model Law has been adopted in many countries.[1247] It the following definition in Art 2(a):

" 'arbitration' means any arbitration whether or not administered by a permanent arbitral institution."

This definition confirms the position of maritime law practitioners that arbitration should not be confined under rules and institutional regulation. Instead, it should be evaluated on his merits, that of offering a hasty and compromising dispute resolution. Merkin[1248] distinguishes between ad hoc and institutional arbitration conducted by bodies[1249]. Institutional arbitration tends to be formalised, slow, expensive, and (incidentally) nearly always international.

Ad hoc arbitration includes anything else but the particular trade or industry rules, e.g., GAFTA, FOSFA, LMAA, and UNCITRAL.[1250]

There are judicial definitions of arbitration because the Arbitration Act 1996 applies only to arbitration and arbitration agreements, not to other types of dispute resolution. During the assessment of a case[1251], Cooke J referred to the Oxford English Dictionary definition of "arbitration" as:

[1246] Harris, B., Planterose, R., & Tecks, J. (2008). *The Arbitration Act 1996: A Commentary*. John Wiley & Sons.

[1247] United Nations Commission On International Trade Law, (2022). UNICITRAL LAW. Available at: http://www.uncitral.org/uncitral/en/uncitral_texts/arbitration/1985Model_arbitration_status.html, last assessed: 29-8-2022.

[1248] Merkin, R., Seriki, H., Fox, D. P., Flannery, L., & Harwood, S. (2014*). Arbitration act 1996*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315819150.

[1249] International Chamber of Commerce, the London Court of International Arbitration, the American Arbitration Association, the Permanent Court of Arbitration and the International Centre for the Settlement of Investment Disputes.

[1250] Merkin, R., Seriki, H., Fox, D. P., Flannery, L., & Harwood, S. (2014). *Arbitration act 1996*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315819150.

[1251]. *England and Wales Cricket Board Ltd v Danish Kaneria* [2013] EWHC 1074 (Comm). The case concerned the status of disciplinary regulations. It was relevant as to whether a witness summons could

"The settlement of a question at issue, by one to whom the conflicting parties agree to refer their claims to obtain an equitable decision."

This is not a complete definition, and later, during the court process, Cooke J referred with approval to an earlier judicial definition:

"To my mind, the hallmark of the arbitration process is that it is a procedure to determine the legal rights and obligations of the parties judicially, with binding effect, which is enforceable in law, thus reflecting in private proceedings the role of a civil court of law."

From the definitions mentioned above, the most essential principles established for arbitration are[1252]:

a) Arbitration is binding, and
b) The process should be of judicial nature

4.4.2 The other forms of ADR

Prof. Merkin contrasts arbitration with conciliation and mediation, observing that the latter: [1253]

"differ from arbitration in a number of respects, the most important of which is that the parties are not obliged at the outset to abide by any view adopted by the conciliator or mediator as to the best outcome, given that the purpose of those procedures is to establish a dialogue rather than to propose a result."

By contrast, arbitration is a binding dispute resolution process, so the parties are bound by an arbitration award. Arbitration is also not simply a preliminary stage. It resolves arbitrable disputes. In addition to arbitration, the other forms of dispute resolution are[1254]:

a) Negotiation
b) Mediation

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be issued under s. 43 of the Arbitration Act 1996. However, it is clear at [13] that it also determines the basis upon which there might be "proceedings and rights of appeal or recourse to the court".

[1252] Andrews, N. (2015). Arbitration and Contract Law. *Ius Gentium: Comparative Persepctive on Law and Justice*, **54**.

[1253] Merkin, R., & Flannery, L. (2019). *Merkin and Flannery on the Arbitration Act 1996*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315692616.

[1254] Blake, S. H., Browne, J., & Sime, S. (2016). *A practical approach to alternative dispute resolution.* Oxford University Press.

c) Evaluative Mediation
d) Early Neutral Evaluation
e) Mini Trial
f) Expert Determination
g) Adjudication
h) Litigation

Arbitration is close to litigation because both are binding on the involved parties and both are judicial, as opposed to the majority of the other dispute resolution methods.

There are also several cases involving tiered dispute resolution, where arbitration is the final but not the only process. It has been observed that while there might be difficulties over positive enforcement of mediation and other such requirements, there is no problem over staying other action until whatever has been agreed upon has been completed[1255].

In addition, Prof. Merkin contrasts arbitration (which alone falls within the Arbitration Act 1996) with valuation.[1256] Principal differences are:

a) Arbitrators have immunity from suit;[1257]
b) Arbitration resolves whereas valuation precedes a dispute;
c) An arbitrator acts on the evidence presented, whereas a valuer uses their expertise.

What is being emphasised here is the judicial nature of arbitration, but it is also the resolution of a dispute, which suggests that it is binding.

Apart from the 1996 Act, there are other differences in the law's attitude towards expert valuers, as against arbitrators, not least in recognising that the role of

[1255] *Channel Tunnel Group Ltd v Balfour Beatty Construction Ltd.* [1993] AC 334. Foreign tiered arbitration, but arbitration agreement subject to English law. Dispute arose. X threatened to stop work. Y sued for injunction. X sued to stay action. HL held stay could be granted, though foreign arbitration and though preceded by mediation. (Now entrenched in AA 96, s. 9.) Either inherent jurisdiction or statute. Also, in principle, injunction could be granted.
[1256] Merkin, R., Seriki, H., Fox, D. P., Flannery, L., & Harwood, S. (2014). *Arbitration act 1996*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315819150.
[1257] Merkin, R., & Flannery, L. (2019). *Merkin and Flannery on the Arbitration Act 1996*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315692616.

arbitrators is likely to be much more comprehensive. In contrast, a valuer will determine only little matters within their aegis.[1258]

4.4.3 International Commercial Arbitration

The idea that separate provisions should be made for international commercial arbitration is enshrined in the UNCITRAL Model Law, initially in 1985 and revised in 2006 (adopted in many states but not part of UK law - though many of the ideas have been adopted here)[1259].

In the UK, there is not currently any legislation in force on international commercial arbitration as such. However, the AA 1996 defines domestic arbitration, and the law treats consumer arbitration differently[1260]. Nevertheless, there are types of disputes that are inevitably international in character.

To this end, the UK signed the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958). Specifically, Art. 1 of the said convention provides for the recognition and enforcement of awards of different contracting states. This is incorporated in the UK in AA 1996, s. 100[1261], which begins:

> (1) In this Part, a "New York Convention award" means *an award made, in pursuance of an arbitration agreement, in the territory of a state* (other than the United Kingdom) *which is a party to the New York Convention.*

This also emphasises the place of the award. Also, Part II of the Arbitration Act 1950, which is still in force, applies to enforce "*foreign awards*". These are awards made in a Contracting State to the Geneva Convention 1927[1262]. It follows that there are respects in which foreign arbitrations are accorded separate treatment in English law. Also, State parties to arbitrations may enjoy State immunity.

[1258] Eg, *Barclays Bank plc v Nylon Capital LLP* [2011] 2 Lloyd's Rep 347 (CA), refusing to extend to the jurisdiction of an expert the wide interpretation, ignoring fine distinctions, adopted in Fiona Trust & Holding Corporation v Privalov [2008] 1 Lloyd's Rep 254 (HL) (arbitration) (the bribery separability case).
[1259] Andrews, N. (2015). Arbitration and Contract Law. *Ius Gentium: Comparative Persepctive on Law and Justice*, **54**.
[1260] Merkin, R., & Flannery, L. (2019). *Merkin and Flannery on the Arbitration Act 1996*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315692616
[1261] Arbitration Act, (1996). Recognition and enforcement of New York Convention awards. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.
[1262]. Details are set out in the Second Schedule to the Act.

English law has also recognised the idea of domestic arbitration. The NYC 58 was initially given effect in the Arbitration Act 1975, the precursor to the present law. This provided for the enforcement of Convention awards, and by s. 1(2) applied "*to any arbitration agreement which is not a domestic arbitration agreement*".

Additionally, ss. 85 - 87 of the AA 1996 defines a domestic arbitration agreement. Essentially, this requires (under the arbitration agreement)[1263]:

a) the seat to be in the UK; and
b) the arbitration to be in the UK; and
c) the parties to be in the UK.

Those sections refer to the award's place and the nationality and/or habitual residence of the individuals concerned. Also, whether or not anything technically turns on the concept, most institutional arbitration provisions make sense only in an international context. For example:

a) Disputes as to the seat.
b) Recognition of foreign awards.
c) Anti-suit injunctions (because the stay of action works where the court is within the jurisdiction).[1264]

4.4.4 The UNCITRAL Model Law

Many jurisdictions have adopted the UNCITRAL Model Law, which applies exclusively to international commercial arbitration. Many UNCITRAL Model Law principles have also been adopted in UK Arbitration Act 1996. UNCITRAL defines international arbitration in cl. 1(3)[1265], a definition which, like the UK, looks to the identity of the parties, the place of the arbitration, and the place of performing the commercial obligations. Also, regarding the wording of "commercial", there is no

[1263] Arbitration Act, (1996). Domestic arbitration agreements. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.
[1264]. Eg, arbitration agreement governed by English law; one party chooses, in breach of agreement, to litigate in China, avoiding the arbitration provision; English court cannot stay action in China but can issue injunction against individual to restrain taking such litigation.
[1265] Arbitration Act, (1996). General principles. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.

formal definition in English legislation. The UNCITRAL Model Law[1266] indirectly refers to what is defined as "commercial"[1267].

4.4.5 Advantages and Disadvantages of Arbitration

Several advantages led to the adoption and presently to the extensive utilization of commercial arbitration, namely:[1268]

a) Privacy.
b) Choice of procedure - institutional rules can be as complex as court procedures.
c) Choice of judge and forum

Additionally, speed and cost can also be an advantage, but this depends on the type of arbitration chosen and the arbitration agreement. For example, institutional arbitration can be slow and costly.

The 18-year delay in *The Antclizo* (No. 2) is perhaps extreme[1269] and unlikely to occur under AA 1996. Still, in *Enercon GmbH v Enercon (India) Ltd*[1270], Eder J observed that "The author of Bleak House would be appalled by this story. And rightly so." The underlying dispute was about intellectual property royalties. By the time the case reached Eder J, it had already dragged on for four years. He observed that:

"... although the parties appear to have spent considerable amounts of time and money on procedural matters, the determination of the substantive merits appears somewhere in the far distance."

[1266] United Nations Commission On International Trade Law, (2022). UNCITRAL Model Law on International Commercial Arbitration (1985), with amendments as adopted in 2006. Available at: Status: UNCITRAL Model Law on International Commercial Arbitration (1985), with amendments as adopted in 2006 | United Nations Commission On International Trade Law, last assessed: 29-8-2022.

[1267] "The term 'commercial' should be given a wide interpretation so as to cover matters arising from all relationships of a commercial nature, whether contractual or not. Relationships of a commercial nature include, but are not limited to, the following transactions: any trade transaction for the supply or exchange of goods or services; distribution agreement; commercial representation or agency; factoring; leasing; construction of works; consulting; engineering; licensing; investment; financing; banking; insurance; exploitation agreement or concession; joint venture and other forms of industrial or business cooperation; carriage of goods or passengers by air, sea, rail or road."

[1268] Merkin, R., & Flannery, L. (2019). *Merkin and Flannery on the Arbitration Act 1996*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315692616

[1269] *The Antclizo (No. 2)* [1992] 1 Lloyd's Rep 558.

[1270] *Enercon GmbH v Enercon (India) Ltd* [2012] 1 Lloyd's Rep 519. The seat was not the only issue, but was the main bone of contention between the parties, though not ultimately the issue around which the case revolved.

This prompted his Bleak House analogy. Namely: there were English proceedings, including an anti-suit injunction to restrain Indian proceedings, and Indian proceedings, including an anti-anti-suit injunction to restrain the English proceedings[1271].

On the other hand, because arbitration can only be enforced by and benefit parties to the agreement, third parties can be affected only by court action - so both court and arbitration proceedings might be needed;[1272] Also, a significant disadvantage is that the development of the law can be impeded, because fewer cases come to court, and because of the confidentiality that the parties often impose.

4.4.6 Arbitration Act 1996

This is a fairly extensive but not complete code of arbitration law. For example, the Departmental Advisory Committee (DAC)[1273] considered it undesirable (and challenging) to attempt to provide privacy and confidentiality.[1274] It also felt that the courts had to decide on the principles applicable to incorporating arbitration clauses from one agreement into another. Also, enforcement of foreign awards under the Geneva (as opposed to New York) Convention remains governed by the Arbitration Act 1950. Much of the English arbitration law has been codified in the Arbitration Act 1996 (AA 96)[1275].

Unusually for an English statute, section 1 displays the general principles of AA 96, stating the concept for the utilisation of arbitration and the relationship of stakeholders:

[1271] Dowers, N. A. (2013). The anti-suit injunction and the EU: legal tradition and Europeanisation in international private law. *Cambridge International Law Journal*, **2**(4), 960-973. DOI: 10.7574/cjicl.02.04.138.

[1272] The lead non-party case is *Dallah Real Estate and Tourism Holding Co v The Ministry of Religious Affairs, Government of Pakistan* [2010] 2 Lloyd's Rep 691.

[1273] Saville, L. J. (1997). Departmental advisory committee on arbitration law 1996 report on the arbitration bill. *Arbitration International*, **13**(3), 275-316. DOI: https://doi.org/10.1093/arbitration/13.3.275.

[1275] Harris, B., Planterose, R., & Tecks, J. (2008). *The Arbitration Act 1996: A Commentary*. John Wiley & Sons.

a) The object of arbitration is to obtain the fair resolution of disputes by an impartial tribunal without unnecessary delay or expense[1276];
b) the parties should be free to agree on how their disputes are resolved, subject only to such safeguards as are necessary for the public interest;
c) in matters governed by this Part, the court should not intervene except as provided by this Part.

Subsection (a) is fairly obvious, and (b) is the principle of party autonomy. In particular, subsection (c) has not been interpreted in quite the straightforward manner one might have expected. Part of the motivation for (c) was to make English arbitration more competitive since the interventionist stance of the courts put off parties.

Subsections (b) and (c) are also among UNCITRAL's principles, and jurisdiction competence is also provided for by AA 96, s. 30[1277].

4.4.7 Arbitration Clauses

Evidently, the basis of all arbitration is ultimately contractual - an agreement to arbitrate. Because of the advantages of arbitration, it is prevalent for standard forms to provide for arbitration. For example, NYPE (standard form dry cargo charterparty) provides for New York arbitration, or alternatively[1278]:

"All disputes arising out of this contract shall be arbitrated at London and, unless the parties agree forthwith on a single Arbitrator, be referred to the final arbitrament of two Arbitrators carrying on business in London who shall be members of the Baltic Mercantile & Shipping Exchange and engaged in Shipping, one to be appointed by each of the parties, with power to such Arbitrators to appoint an Umpire. No award shall be questioned or invalidated on the ground that any of the Arbitrators are not qualified as above unless objection to his action be taken before the award is made. Any dispute arising hereunder shall be governed by English Law."

[1276] *HC Trading Malta Ltd v Tradeland Commodities SL* [2016] EWHC 1279 (Comm); [2016] 2 Lloyd's Rep 130 and *Dreymoor Fertilisers Overseas PTE Ltd v Eurochem Trading GmbH* [2018] EWHC 909 (Comm); [2018] 2 Lloyd's Rep 523.
[1277] Arbitration Act, (1996). Competence of tribunal to rule on its own jurisdiction, Article 30. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.
[1278] Todd, P. (2016). NYPE 2015: Wholesale reform or an invitation to cherry-pick?. *Lloyd's Maritime & Commercial Law Quarterly*, 2016(May), 306-319.

This is just an example, but it is from a commonly-used form. However, the arbitration provision is not universal. BPTIME3[1279], cl. 36 provides:

"... The High Court in London shall have exclusive jurisdiction over any dispute arising out of this Charter."

This is effectively an anti-arbitration clause. BP prefer their disputes to create precedents, requiring they go to court. Historically, they were also, as charterers of vessels, worried about security, particularly the right to arrest the vessel. This last issue has been resolved by AA 1996, s. 11.

4.4.7.1 Assessing the nature of a dispute.

Also, to elect which is the most efficient method of dispute resolution, the nature of the dispute should be explored to evidence if it can be attached to the scope of arbitration agreements within the Arbitration Act 1996. In particular, it should be assessed:

a) the actual need for a dispute;
b) if the dispute is arbitrable;
c) what is the best method of dispute resolution;
d) Do clauses cover this dispute in arbitration agreements?

Subject to the above, the definition of a dispute within AA 1996, s. 6, but also noting the definition in s. 82(1). It can be said that the definition is wide enough to include "*submission agreements*", such as in *F. & G. Sykes (Wessex) Ltd v Fine Fare Ltd*[1280], a decision of the Court of Appeal, where Danckwerts LJ contrasts the definition of a dispute with the broader term, difference. Since s. 82(1) defines "dispute" as including any difference, stated to be "*In this Part*", thus s. 82(1) indicates what s. 6 applies to.

4.4.7.2 Need for a dispute.

The stay of action provided for in AA 1996, s. 9 is mandatory, subject only to the conditions in s. 9(4). There is no discretion (note the words: "shall grant a stay").

[1279] Marrella, F. (2004). Unity and Diversity in International Arbitration: The Case of Maritime Arbitration. *Am. U. Int'l L. Rev.*, **20**, 1055.
[1280] *F. & G. Sykes (Wessex) Ltd v Fine Fare Ltd* [1967] 1 Lloyd's Rep 53.

The stay of action needs to be contrasted with dismissing the action and referring the parties to arbitration (as in New York Convention, and UNCITRAL, Art. 8)[1281].

Stays, and the related anti-suit injunction, are described in that both have their origins in equitable jurisdiction, acting in personam. Still, actions can be stayed only in English courts - to restrain actions in foreign courts; the anti-suit injunction is the appropriate remedy.

There is, however, a problem with the compulsory stay. The MacKinnon Report referred to in *Channel Tunnel Group Ltd v Balfour Beatty Construction Ltd*[1282] observes that:

"It is said that cases have already not infrequently arisen, where (e.g.) a writ has been issued claiming the price of goods sold and delivered. The defendant has applied to stay the action on the ground that the contract of sale contains an arbitration clause, but without being able, or condescending, to indicate any reason why he should not pay for the goods or the existence of any dispute to be decided by arbitration."

In other words, the compulsory stay can be used wholly unmeritorious to delay an indefensible action - except for the requirement that there be a genuine dispute. This was one of the issues discussed in Channel Tunnel Group Ltd v Balfour Beatty Construction Ltd[1283] [1993] AC 334, which is quite a complicated case, obviously on the law as before the 1996 Act. Specifically, there were two disputes essentially. The underlying dispute was about payments for work, and the defendants/respondents threatened to suspend work (on building the channel tunnel), alleging that the plaintiffs/appellants were in breach of contract. The plaintiffs/appellants claimed an injunction to prevent the stoppage, and the defendants/respondents sought to stay the action for the injunction. The contract contained a tiered dispute resolution clause, which the action for the injunction would have avoided (since it was brought directly to the High Court). The plaintiffs/appellants (unsuccessfully) argued that there was no

[1281] Caron, D. D., & Caplan, L. M. (2013). *The UNCITRAL arbitration rules: a commentary.* Oxford University Press.
[1282] *Channel Tunnel Group Ltd v Balfour Beatty Construction Ltd* [1993] AC 334.
[1283] ibid

dispute since the defendants/respondents' threat to suspend work was so unjustified (i.e., beyond dispute)[1284]. The stay was granted.

4.4.7.3 Is the dispute arbitrable?

In the second stage, the type of dispute that can be submitted to arbitration must be considered. Some disputes, for example, over criminal matters, are unsuitable for arbitration. The problem is that issues with a criminal element, such as fraud or bribery, might also apply to a contractual claim, which ought to be arbitrable.

To this end, an important case is the Court of Appeal decision in The Prestige (No. 2)[1285]. This 2015 case related to an extensive oil spillage that occurred as long ago as 2002 - shades of Bleak House that was colourfully referred to in *Enercon GmbH v Enercon (India) Ltd*[1286].

4.4.7.4 Defining the arbitration.

There should be a distinction between the process of arbitration and the other types of dispute resolution, where the provisions of AA 1996 do not apply (though there might still be judicial control). There are two distinct cases, the proceedings of both of which were held to constitute arbitration: i) *Walkinshaw v Diniz*[1287] and ii) *England and Wales Cricket Board Ltd v Danish Kaneria*[1288]. Both cases establish the criteria for determining whether proceedings have the character of arbitration[1289].

4.4.7.5 Dispute Coverage.

The next step is to consider the interpretation of the arbitration clause to see which disputes are covered. Thus, the parties may as well decide to submit all disputes arising from a contract to arbitration or limit themselves to particular disputes. Based on Fiona Trust & Holding Corp v Privalov[1290].

As described in a later case:

[1284] Murphy, D. G., Teitz, L. E., Mullen, D. K., & Mirmirani, N. (2001). International Litigation. *In Int'l L.*, **35**, p. 491.
[1285] *The Prestige (No. 2)* [2015] 2 Lloyd's Rep 33.
[1286] [2012] 1 Lloyd's Rep 519.
[1287] *Walkinshaw v Diniz* [2000] 2 All ER (Comm) 237.
[1288] *England and Wales Cricket Board Ltd v Danish Kaneria* [2013] EWHC 1074 (Comm).
[1289] Paulsson, J. (2013). *The idea of arbitration*. OUP Oxford.
[1290] Altaras, D. (2007). Bribery and Separability: Who Decides, the Tribunal or the Courts? Fiona Trust & Holding Corp v Yuri Privalov. Arbitration: *The International Journal of Arbitration, Mediation and Dispute Management*, **73**(2).

"The rationale for the approach in Fiona Trust is that parties should normally be taken, as sensible businessmen, to have chosen one forum for the resolution of their disputes."

Another case where a wide interpretation of an arbitration clause was adopted was The Alexandros T [2014][1291], in all of which the clause was interpreted to cover tort as well as contract disputes. Not all tort actions will be covered, however. In contrast, the case of *Ecobank Transnational Inc v Tanoh* [2015] [1292] , where the claim in tort had no actual link with the contract, is to be incorporated in the arbitration clause.

As it is also established, Fiona Trust[1293] applies to arbitration disputes and has also been used for settlement disputes. But for other types of dispute resolution, a better inference might be that the parties intend the range of disputes to be limited. Such was the case in Barclays Bank plc v Nylon Capital LLP[1294] [2011], where Thomas LJ refused to apply the same principles to an expert determination clause, commenting that

"... expert determination clauses generally presuppose that the parties intended certain types of dispute to be resolved by expert determination and other types by the court (or if there is an arbitration clause by arbitrators). The rationale of Fiona Trust does not therefore apply, ...".

4.4.8 Juristic basis of Arbitration

Arbitration agreements are contractual and, even in the absence of any legislation, could be enforced. This fact is crucial, given that there are agreements to which the legislation does not apply (for example, oral arbitration agreements). However, legislation is necessary to support the arbitration process and control it[1295].

The arbitrators' powers ultimately derive from the arbitration agreement and, hence, the contract. Perhaps because of this, most disputes arbitrated are contractual, though (subject to public policy and arbitrability issues) any dispute between the parties can, in principle, be covered. For example, the claims in *The Alexandros T* were in

[1291] *The Alexandros* T.2 Lloyds Rep 544 (CA) Confirming *The Playa Larga* [1983] 1 Lloyd's Rep 171 (CA), *The Angelic Grace* [1995] 1 Lloyd's Rep 87 (CA).
[1292] EWHC 1874 (Comm).
[1293] *Fiona Trust & Holding Corp v. Privalov*, 2007 U.K.H.L. 40 (2007).
[1294] *Barclays Bank plc v Nylon Capital LLP* [2011]. 2 Lloyd's Rep 347 (CA).
[1295] *Trygg Hansa Insurance Co Ltd v Equitas Ltd* [1998] CLC 979; [1998] 2 Lloyd's Rep 439.

tort[1296] but covered by a contractual settlement agreement (the same reasoning applies to an arbitration agreement[1297]).

Thus, the parties can establish arbitration agreements, such as:

a) The parties can agree to pay whatever damages the arbitrator awards, which the courts can enforce in the contract.
b) There can also be an express or implied agreement not to bring court actions, at least until the arbitration's conclusion. These are enforced by a stay of action (English courts) or an anti-suit injunction (where the person but not the court is within the jurisdiction).

This juristic basis for the stay is described in the old decision of *Scott v Avery*,[1298] where the House of Lords held that though the parties could not agree to oust the jurisdiction of the courts altogether, they could decide to suspend court action until the end of the arbitration process. Notice, therefore, that in English law, efforts are stayed and not dismissed.

More recently, Thomas LJ observed in The Amazon Reefer that: [1299]

"Enforcement of an award by action is an ordinary action brought in the High Court. The procedure is not subject to any statutory provision, but it has long been established at common law as an action founded upon the implied promise to pay the award."

The AA 1996 (s. 66)[1300] has provided a simplified procedure, but enforcement could be installed, even without legislation. In addition, contractual enforcement through the courts is not always ideal. Thus, it would be difficult to force a party to arbitrate who refused to do so. Unless the contract provides, it will be

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[1296]. *Starlight Shipping Co v Allianz Marine & Aviation Versicherungs AG (The Alexandros T) [*2014] 2 Lloyds Rep 544 (CA). Also *Aggeliki Charis Compania Maritima SA v Pagnan SpA (The Angelic Grace)* [1995] 1 Lloyd's Rep 87.

[1297] Ritter, M. J. (2012). Disputing Arbitration Clauses in International Insurance Agreements: Problems With the Self-Execution Framework*. Pace Int'l L. Rev*. Online Companion, i.

[1298] Scott v Avery (1856) 10 ER 1121.

[1299] National Ability SA v Tinna Oils & Chemicals Ltd (The Amazon Reefer) [2010] 1 Lloyd's Rep 222, [5] (CA), cited by Toulson LJ in West Tankers Inc V Allianz SpA (The Front Comor) [2012] EWCA Civ 27; [2012] 1 Lloyd's Rep 398, [33] (CA).

[1300] Arbitration Act, (1996). Enforcement of the award, Article 66. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.

impossible to ensure that the arbitration process proceeds quickly and impartially. Whatever the contract says, the usual damages remedy will not be ideal for supporting the arbitration process[1301].

Legislation is, therefore, helping to control the arbitration process (ensure impartiality, etc.), support it (calling witnesses, etc.), and make enforcement easier. For example, without legislation, it has been held that the courts have not even the power to dismiss a claim for want of prosecution.[1302]

In the absence of legislation, the only powers enjoyed by either the arbitrators or the courts are those conferred, expressly or impliedly, by contract or, to some extent, public policy and human rights. In *England and Wales Cricket Board Ltd v Danish Kaneria*, Cooke J commented that if the case before him did not fall within AA 96:[1303]

> "... then the court could act [in respect of serious irregularity] only if there was either:
>
> *a) a breach of human rights or;*
>
> *b) a breach of contract in the shape of a breach of some implied term as to the conduct of those proceedings, in the absence of some overriding public policy element such as unreasonable restraint of business or trade or;*
>
> *c) some form of judicial review was found to be available.*"

Conclusively, arbitration could operate (in principle) without legislative intervention, but it is essential to appreciate this because there are arbitrations (or other ADRs) to which AA 1996 does not apply. Moreover, continued use of the inherent jurisdiction has also been evidenced in situations where AA 1996 might not apply today[1304].

[1301] Harris, B., Planterose, R., & Tecks, J. (2008). *The Arbitration Act 1996: A Commentary*. John Wiley & Sons.

[1302]. *Bremer Vulkan Schiffbau und Maschinenfabrik Respondents v South India Shipping Corporation Ltd* [1981] AC 909 (HL). There might also be problems about even appointing an arbitrator, in the absence of a provision such as AA 1996, s. 18. (One of the claims in Enercon, above, was under AA 18.)

[1303] *England and Wales Cricket Board Ltd v. Kaneria*, 2013 E.W.H.C. 1074 (2013).

[1304] Merkin, R., & Flannery, L. (2019). *Merkin and Flannery on the Arbitration Act 1996*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315692616.

4.5 Research Outcomes

Regarding the **legal landscape of the maritime sector**, which was often criticised for its **reactivity**, the Covid-19 pandemic **exposed many of its weaknesses**. While it **was not the first time that the shipping industry encountered such an incident**, the global scale of the virus and the distinct characteristics of the illness **challenged the reflexes** of the maritime sector. Specifically, from a legal perspective, Covid-19 **heavily impacted i) port safety, ii) some subsequent clauses, such as the right to deviate from the course, and iii) issues related to crew health and safety and the proving the exercise of the duty of care**.

Over the last twenty years, the maritime sector encountered two major pandemics, namely **Ebola and SARS**. During the outbreak of 2015, BIMCO adopted the **Infectious or Contagious Diseases (IOCD) Clauses**, setting the foundations for **an effective counter to pandemics as soon as they emerge**. In general, the clauses developed for battling the Covid-19 pandemic included **proactive measures** to minimise the spread of the virus and **specific measures to counter the spread while on a climax**. The IOCD clauses initially established the terms **'Disease' and 'Affected Area'**, and then they regulated the **right and limitations of the parties** affected by the outbreak.

The BIMCO clauses, upon their creation in 2015, **were supposed to be generic**, to **encounter all similar pandemics effectively**, but specific issues such as the **exclusion of the ship owner from costs and liability**, should **he prove the exercise of due diligence**, proved **unfair and problematic** for the shipping practice. Thus, BIMCO **amended** the clauses of IOCD 2015 by **adding subsections** to the relevant provisions **for voyage charter** parties and adopting **a new set of BIMCO's "Infectious or Contagious Diseases Clauses for Time Charter Parties 2022"**, which establish the shared liability between the parties. While with quite a few flaws, these new clauses have helped the shipping practice **distribute the financial costs of the necessary actions** to counter the virus and have **minimised concealing the outbreak of the illness** onboard vessels.

Regarding the issue of "**wet liabilities**" (as they are called in U.K. maritime practice), the instalment of new technologies will effectively force the legal community to adopt new sets of legislation, considerably enhancing marine safety and security

concepts. Specifically: i) **COLREGs should be restructured entirely** to facilitate the new navigational systems that will be installed, ii) **salvage will be utterly professionalised**, with the merchant vessels unable to offer assistance absent of crew, and new methods of salvage will emerge, such as helicopter assistance with tech experts to board an unmanned vessel and repair system malfunctions, iii) **general average is likely to be extinct,** or unique options may be inserted to unload the cargo to save the vessel, iv automatically) **other liabilities, such as towage, will be professionalised absent of crew**, such as salvage, and v) **"remote" pilotage of the vessel by a local operator may be installed to all vessels**, to effectively operate the unmanned vessels to navigate into demanding circumstances, as it is the entrance, the mooring and the exit from a port of call. As evidenced in other transportation sectors, those developments will undoubtedly **shift the liability from the ship owners to the manufacturers** of the newly installed systems. As OPA 1990 proved in the end, this is an effective shift of liability that effectively enhances the safety processes.

With regard to marine insurance, the present amendments with the adoption of **MIA 2015** were focused upon specific points, namely: i) the restructuring of the duty of **fair presentation**, installing new duties to the insurer, and assured relating to the knowledge of all relevant circumstances of the contract, ii) the **abolishment of "the draconian effect"** from warranties, to offer the insurer a third option, to temporary avoid the contract and its subsequent obligations, until the assured amends the violated clauses, iii) new **sets of remedies for no-disclosure**, iv) the assessment of **fraudulent claims**, installing stringier penalties, v) the new **"transparency" requirement** of the contracts and vi) amendment of the third parties' rights against the insurer.

Specifically, the establishment of the third option **related to the implementation of warranties,** with the termination of the automatic resolution of the contractual relationship when a clause is triggered, evidences **a substantial turn of marine insurance legislation towards the market's needs**. Namely, this new option greatly helps insurers **maintain their contractual relationships** while providing the assured adequate time to amend any sudden issues while protecting against emerging liabilities.

This new option, if fact, moves the marine insurance warranties closer to the possibilities and effects of conditions of charter parties, namely in case of a violation,

to i) effectively terminate the contract, ii) claim for damages, iii) set a reasonable time limit to amend the violation (for marine insurance) or to have a time bar of two to three years (for charter parties- exact time bar depends of the type of charter party) to make a claim or be compensated iv) practically avoid the activation of the contract. Also, the new option for marine warranties **resembles the practices of classification societies**, to regard a vessel with severe defects **as "sub-standard",** thus providing time for the shipping company to amend those issues while the classification society renders the ship "**unclassified**" and until the vessel undergoes a **detailed inspection** after the **vessel's repairs have been executed**.

Concerning the issues related to the resolution of disputes, many new options have emerged besides the judicial process. The most prominent and similar to court processes is that of **arbitration.** Much new legislation sets have been established to regulate the newly emerged dispute resolution system and its variations effectively. The maritime practice has effectively established arbitration as the **primary option for dispute resolution**, leaving only the most complicated conflicts for court processes.

Specifically, the advantages of arbitration and its variations compared to the court processes are: **i) lower costs, unless it is institutional or international arbitration), ii) speed of settlement, unless the parties are unsatisfied with the outcome and they elect to appeal to courts, iii) choosing the judicial authority and the forum, iv) election of the procedure, which can be equally complex comparing to court processes, v) flexibility of the process, vi) confidentiality, vii) protecting the contractual relationship of the parties, adopting a problem-solving approach**.

On the other hand, the disadvantages of arbitration, in comparison to court processes, are: **i) the importance and validity of court order, ii) the complexity of a case, including many parties, iii) when there is a power imbalance between parties and the transparency of the courts is beneficial for the weaker party, iv) disputes relied upon evidential facts and primarily when a party does not provide willingly relevant information and, most importantly v) need of a strong president for the court decision to be established as the rule of law**.

It is presumed that the last point is the most **crucial weakness of the arbitration process, creating substantial legal gaps in the U.K. legal system**. Specifically, as established, the U.K. legal system is based upon case law to evolve.

This is why legislation like the Marine Insurance Act may stay in effect for more than one hundred years. To this end, the **courts gathered a substantial number of claims yearly**, most of which had already been resolved (practically) by adopting previous court decisions upon identical issues. Thus, **the judges even supported the initiation of the concept of arbitration**, aiming to **soften their workload** and the repetitive ruling over exact issues, claiming the more complicated and crucial decisions for the court ruling. However, while, at the start, **the establishment of arbitration was a success** and the **courts ruled over the most significant cases**, presently, it has been evidenced that the establishment of arbitration, while beneficial, has also proved entirely parasitic for the court ruling.

As is evidenced by **P&I Clubs**, which **were established to insure** the third-party liability, which was the only liability that the insurance companies **refused to insure** presently, P&I Clubs **dominate the insurance market**; it is quite the same with **the courts and arbitration**. Namely, the arbitration **emerged to counter the issue of court delay** due to their immense workload by confirming previous court orders (and small claims) and leaving the significant cases to the courts. Presently, however, a considerable shift in the market's preference has been evidenced, **electing arbitration tribunals instead of courts**. The reasons that have led to this phenomenon are all those mentioned above. In contrast, **the flaws of arbitration** have been countered with the **instalment of more complex arbitration processes** that are identical to the court processes, and parties can elect that.

The last "front" where the courts have "barricaded" themselves is that of **the precedent of the court decision**. Even in court rulings, the "strength" of a case is based upon the degree of the court's jurisdiction, namely High Courts, Court of Appeal, and finally Supreme Court, with the last ruling over the most important of cases and (as it is said in the U.K.) creating law. **The arbitration courts, regarded as "private" and not as transparent and objective as the traditional courts, cannot provide such impactful decisions as Supreme Court**. Thus, this **weakness of arbitration tribunals**, along with a **profound preference** of maritime practice to arbitration in conjunction with the **rapid development of technology** and the instalment of new processes, new materials, and trends (such as sustainability) and even new types of ships and facilities, **creates a legal gap into the evolution of U.K. legal practice, with fewer precedents**.

Two paths can resolve this issue; namely, the first option is the establishment of an **authority which will filter the claims and decide which disputes should be determined by court orders**. However, this option is impractical and, most importantly, violates the principle of freedom of contracts, the most paramount principle upon which the international market has been established. The other option is to **promote the decisions of arbitration tribunals** by **enhancing the status of arbitrators and installing processes that improve the transparency and objectivity of their rulings**. Many steps have been made towards that path, with the enhancement of operations and the publication of judgments with the parties' names veiled. Nevertheless, as long as the traditional courts are not convinced to take into consideration those arbitration rulings and the tribunals effectively are enforced to take into consideration mainly court precedents, which are still primarily utilised by the advocates of both parties, the gap in the U.K. legal precedents will continue to increase. It remains to be seen how this conflict will be resolved.

Finally, it is essential to state the impact of cases like ***The Seaflower*** to clarify the effect of chartering clauses by selecting the so-called **"Waller Test"**. Specifically, this test, initiated by **Judge L.J. Waller**, is an **effective method of classification of charter party** clauses, which first sets unclassified clauses **as innominate terms** and then, throughout stages, a clause is assessed to **be regarded as a condition or a warranty**. This test is of **paramount importance** because **it boosts the development of the legislation** relating to the charter party clauses and ascertains the outcomes of violating those terms. **Specifically, the incorrect termination of a contract from a party, presuming that the violated clause is a condition, while after a legal dispute, this clause is established as a warranty, offering him only the right to compensation but not terminating the contract, can prove catastrophic**. It can be said that **the execution of the Waller test is similar to the performance of systems such as TMSA**. At the same time, as TMSA adds to the self-assessment, self-correction and self-development of a safety system, this is the same case with the Waller test, by **utilising previous judicial decisions to establish firm rules and strengthen the efficiency of charter parties**. The U.K. legal system was based upon this principle to develop its legal tradition, and as an outcome, it is established as a **dominant force** in maritime legislation. Thus, it is not uncommon that most charter parties incorporate a clause that the jurisdiction for all claims is given to the U.K. courts or legal processes

and that the English Maritime Law is solely assessed by this Ph.D. research, along with the international maritime framework.

From all the above mentioned, it can be safely presumed that the national and the international legal framework is at the **crossroads of evolution** in light of **unprecedented technological developments**. Resolute steps have been taken towards the adoption of a **more business-oriented stance**, and it remains to be seen if the legal framework will also **adopt a more proactive stance** towards the creation and development of **new legislation** and **the amendment of the existing**, in light of emerging issues, which were unimagined a few years ago[1305].

[1305] Boviatsis M. Title: The Ever Given: Legal assessment of the causes and the consequences of the accident. *WIT Transactions on The Built Environment* (Conference Paper). **212**, pp. 185- 196. doi:10.2495/UMT220161.

Chapter 5

Enforcement of maritime legislations through controlling bodies: The new dominant force of the market

The fifth and final chapter focuses on the maritime control systems and the competent stakeholders. Thus, the analysis involves the recent developments in vessel registration, the status of classification societies, the evolution of P&I Clubs, and the adoption, development, and current status of port state controls. In addition, to this chapter, there is also a part evaluating the current developments of Covid-19 pandemic, including information from all chapters. Finally, this analysis aims to provide a systematic evaluation of the Covid-19 pandemic, which was utilised in various parts of the thesis to demonstrate the efficiency and the impact of each legislation and system upon countering, minimising, or handling extenuating occurrences.

Research Layout

Chapter 5: Controlling Bodies: Performance & Enforcement Issues

Made by author.

5.1 Vessel Registration

The election of a vessel's registration is a strategic decision, affected by various internal and external factors, such as the type of the vessel, the trading area, the chartering agreements, and many other factors. The vessel's registration can only be initiated in one country, except for the bareboat charter, where the vessel can technically acquire up to two flags (1986)[1306]. The acquisition of a flag automatically provides nationality to a vessel, installing rights, such as the right of innocent passage and obligations to abide by the maritime legislation, which the flag state has incorporated into its legal system[1307].

The vessel's relationship with the flag state is established by the existence of the "genuine link" between the ship and the nation whose flag the ship is flying. Initially, in the case of *Muscat Dhows* (1905)[1308], where France allowed the subjects of the Sultan of Muscat to raise the French flag[1309], the Arbitral Tribunal ruled it is an inalienable right of each state to whom it grants the right to raise its flag and determine the rules governing this relationship[1310]. This approach seems to be followed by the United Nations Geneva Convention (1958)[1311], where the State must effectively exercise its control and jurisdiction in matters of an administrative, technical and social nature over ships bearing its flag (Article 5), but without explaining the term 'genuine link'. Finally, it should be noted that a ship that has raised two or more flags is considered, according to International Law, to have no nationality, with the already stated exception of a bareboat charter (Articles 6, 92, respectively)[1312].

[1306] United Nations Conference on trade and development, (1986) United Nations Convention on Conditions for Registration of Ships. Available at: United Nations Convention on Conditions for Registration of Ships 1986 (unctad.org), last assessed: 28-8-2022.

[1307] Watt, E., & Coles, R. (2013). *Ship registration: law and practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9780203722091.

[1308] Carlisle, R. (2014). The Muscat Dhows Case in Historical Perspective. *The Northern Mariner/Le marin du nord*, **24**(1), 23-40. DOI: https://doi.org/10.25071/2561-5467.248.

[1309] Li, K. X., & Wonham, J. (1999). New developments in ship registration, *Int'l J. Marine & Coastal L*. **14**, 137. DOI: https://doi.org/10.1163/157180899X00066.

[1310] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (In Greek).

[1311] Tuerk, H., & Hafner, G. (2022). The United Nations Convention on the Law of the Sea, 1982: Reflections after 40 Years. *Ocean Yearbook Online*, **36**(1), 1-47. DOI: https://doi.org/10.1163/22116001-03601002.

[1312] Mossop, J. (2018). Can We Make the Oceans Greener: The Successes and Failures of UNCLOS as an Environmental Treaty. *Victoria U. Wellington L. Rev.*, **49**, 573.

Regarding the issue of the genuine link between the vessel and the flag state, it can be established in three ways: i) the vessel's owner has the same nationality as the flag state[1313], ii) the vessel's operations be "de facto" implemented in the flag state and iii) the management of the vessel, practically the offices that the shore personnel is situated, to be in the country of the flag state. Considering the first option as extinct or very rare, from the two options left, the second is impossible to establish a genuine link for ships invested in international trade. The second option is a significant obstacle for many onshore companies who wish to be taxed in other countries, but the "de facto" operation of, e.g., their factories in one country enchain them[1314]. With regard to the vessels, this issue is evidenced in ships operating mainly in one country, thus establishing a genuine link with it. In practice, these shipping companies are invested in cruise or passenger lines or manage smaller vessels, such as "feeders" or supportive vessels[1315].

On the contrary, a vessel invested in international trade cannot be linked with any country because the primary operation of the vessel, being the navigation while carrying cargo, is executed mainly on open seas or throughout passing different countries[1316]. Thus, the only option for merchant vessels is the third option, to have their managing activities in one country to establish a genuine link[1317]. However, this option seems to chain the vessels with their onshore operations practically. Moreover, it makes the election of changing a vessel's flag very problematic because, practically, the onshore office will need to relocate. Therefore, in the subsections below, the "de

[1313] Many years ago, many Greek shipowners were literally collecting nationalities of underdeveloped countries, to have more options when setting a flag to their vessels. This phenomenon was minimized and gradually extinct with the initiation of the dual citizenship and many other legislations that practically forbade this practice.

[1314] Abibo, I. M. (2020). The Intrigues and Intricacies of the Twin Concepts of Flag State Jurisdiction and the Requirement of a Genuine Link under International Maritime Law (February 05, 2022). DOI: http://dx.doi.org/10.2139/ssrn.4044120.

[1315] Gadžo, S. (2018). The principle of 'nexus' or 'genuine link'as a keystone of international income tax law: A reappraisal. *Intertax*, **46**(3). DOI: https://doi.org/10.54648/taxi2018022.

[1316] Ermal, X., & Krisafi, K. (2013). INTERNATIONAL IMPLICATIONS CONCERNING THE LEGAL REGIME AND POLICY OF SHIP REGISTRATION. *Analele Universitatii Maritime Constanta*, **14**(19), 323-330.

[1317] Carlisle, R. P. (1981). *Sovereignty for sale: the origins and evolution of the Panamanian and Liberian flags of convenience*. Naval Institute Press.

facto" avoidance of this rule by Flags of Convenience and Open Registries will be assessed[1318].

5.1.1 United Nations Convention on the Registration of Ships (1986)

Pursuant to the United Nations Convention on the Registration of Ships (1986)[1319], the necessary attention should be paid to formulating and interpreting the powers and responsibilities of national maritime authorities on merchant ships flying their flags. The Convention on the Registration of Ships resulted from an initiative by the UNCTAD Maritime Commission, which prepared a report "Economic Consequences of the Existence or Lack of a Genuine Link between Vessel and Flag Register"', 1977, because it considered that the general rules could not properly attribute the dimension of the problem of the registration of merchant ships to states which do not have the possibility of exercising effective control (at that time, the status of flags of convenience had been emerged and was rapidly developing)[1320].

The said convention adopted many new sets of rules related to the management and the operation of the vessel, and special mention is made upon specific instructions concerning the conditions under which the ship is chartered, the organisation and administration of shipping registries, the required certification, and the protection of the interests of states providing services[1321]. The crucial question, however, is under what conditions the EU will proceed with the signing and ratification of the Convention, given that specific provisions of the Convention are contrary to the Treaty of Rome and, therefore, to European Community law. In particular, Article 8 of the Convention, which relates to the ownership of shipowners, is contrary to Articles 7 (non-discrimination in matters of nationality), Articles 52-58 (freedom of establishment) and Articles 67-73 (free movement of capital) of the Treaty of Rome[1322].

[1318] Li, H. (2020). Letter to the Journal Coastal State Jurisdiction in the "Norstar" Case at the ITLOS. *Chinese Journal of International Law*, ***19***(1), 177-182. DOI: https://doi.org/10.1093/chinesejil/jmaa010.

[1319] United Nations Conference on trade and development, (1986) *United Nations Convention on Conditions for Registration of Ships.* Available at: United Nations Convention on Conditions for Registration of Ships 1986 (unctad.org), last assessed: 28-8-2022.

[1320] Xhelilaj, E., Lapa, K., & Danaj, L. (2017). Legal Issues Concerning the UN Convention on the Conditions for Registration of Ships (1986). In *Safety of Sea Transportation* (pp. 397-402). CRC Press.

[1321] Yu, Y., Zhao, Y., & Chang, Y. C. (2018). Challenges to the primary jurisdiction of flag states over ships. *Ocean Development & International Law*, **49**(1), 85-102. DOI: https://doi.org/10.1080/00908320.2017.1370919.

[1322] EUR-Lex, (2022). *Treaty establishing the European Community* (Consolidated version 1997). Available at: EUR-Lex - 11997E/TXT - EN - EUR-Lex (europa.eu), last assessed: 28-8-2022.

Another article that raises strong contrasts is Article 9 of the convention concerning the recruitment of crews[1323]. Specifically, reference is made to officers and crews who are natives or have the possibility of permanent and legal establishment in the ship's flag state, to the bilateral agreements of the registry state with other countries and the possibility of employing foreign crews in the national fleets. It is argued that this provision contradicts Articles 48-51 (freedom of movement for workers) of the EEC Treaty[1324].

However, there is also a third article which is not in line with Community law (Article 10) and which refers to the role of the State in the management of shipping companies. In other words, the convention provides that the State of registry, even before the ship is included in the national register, is obliged to ensure that the shipping company or its subsidiary is established or maintains its headquarters in its territory and complies with its domestic legislation. The Commission of the European Communities considers this provision incompatible with Articles 52-58 (freedom of establishment) of the Treaty of Rome[1325].

As a result, the Commission considered that the Member States do not have the freedom, in accordance with Community law, to sign and ratify the Convention unless there is provision for a provision requiring a convention "compatible" with the EEC Treaty or there is another desired solution. Moreover, for the Convention to apply to Community territories and waters and to comply with the obligations arising from the Communities' law, the Member States must maintain a common position, a common reservation, when they sign the Convention[1326].

This reservation should be a unilateral declaration of the will of a State at the time of signing the ratification and approval of a treaty, and this is because some of its provisions cannot be accepted by all the contracting States. In the Law of Treaties, 1969)[1327] in Articles 19-23 gives priority to the will of the Contracting States as to how

[1323] United Nations Conference on trade and development, (1986) *United Nations Convention on Conditions for Registration of Ships.* Available at: United Nations Convention on Conditions for Registration of Ships 1986 (unctad.org), last assessed: 28-8-2022.
[1324] Also referring to Council Regulation (EEC), No. 4055/86; Council Regulation (EEC), No.4056/86; Council Regulation (EEC), No. 4057/86 and Council Regulation (EEC), No. 4058/86.
[1325] Ibid.
[1326] Lost-Siemińska, D. (2020). Implementation of IMO treaties into domestic legislation: Implementation and enforcement as the key to effectiveness of international treaties. In *Maritime Safety in Europe* (pp. 3-21). Informa Law from Routledge.
[1327] Dörr, O., & Schmalenbach, K. (2018). *Vienna convention on the law of treaties*. Springer.

they will deal with any reservations. Still, the latter must not be incompatible with the purpose and subject matter of the treaty[1328]. However, where the Treaty cannot function without the approval of the contracting States, reservations are prohibited, e.g., the conditions of the economic integration of the EEC[1329].

5.1.2 Flags of convenience and Open registries

The change from one flag to another is an ancient phenomenon, older than the creation of modern states[1330]. As long as vessels existed, they bore credentials to be distinguished from other vessels. Many times, even during navigation, vessels changed their flags to enter ports, to evidence a change in loyalty, or even to mislead their enemies[1331]. Over the years, traditional flags were established, reflecting the crew composition. After the 1950s, the flag was prospectively developed as a tool for economic benefits. The vessel owners were trying to lure clients relying on the flag's quality and impact while simultaneously minimising the operational expenses and utilising flags of a lower class[1332].

Thus, the flags were distinguished into two categories, the traditional flags, evidencing high quality with the incorporation of stringent rules but at the same time costly. The flags of a lower class, called flags of convenience, evidence inferior quality but are also inexpensive. Another issue was established with traditional flags, which proved their "Achilles' heel", namely the apparent want of genuine link, as described above[1333]. The Flags of Convenience (FoCs) took advantage of this issue and developed the concept of "off-shore" in conjunction with "one-vessel companies[1334]". The concept

[1328] Ulfstein, G. (2020). Interpretation of the ECHR in light of the Vienna Convention on the Law of Treaties. *The international journal of human rights*, **24**(7), 917-934. DOI: https://doi.org/10.1080/13642987.2019.1598055.

[1329] Bowman, M. J., & Kritsiotis, D. (Eds.). (2018). *Conceptual and contextual perspectives on the modern law of treaties*. Cambridge University Press.

[1330] Feldman, N. (2022). Rallying around the "flag of convenience": Merchant fleet flags and sanctions effectiveness. *Marine Policy*, **143**, 105129. DOI: https://doi.org/10.1016/j.marpol.2022.105129.

[1331] Christy, J. (2019). The Almost Always Forgotten, Yet Essential Part of Our World: An Examination of the Seafarer's Lack of Legal and Economic Protections on Flag of Convenience Ships. *USF Mar. LJ*, **32**, 49.

[1332] Boczek, B. A. (2013). Flags of convenience. In *Flags of Convenience*. Harvard University Press. DOI: https://doi.org/10.4159/harvard.9780674188396.

[1333] Petrossian, G. A., Sosnowski, M., Miller, D., & Rouzbahani, D. (2020). Flags for sale: An empirical assessment of flag of convenience desirability to foreign vessels. *Marine Policy*, **116**, 103937. DOI: https://doi.org/10.1016/j.marpol.2020.103937.

[1334] Single-vessel companies have been developed mainly for reasons of exclusion of liability, namely to establish a corporate veil and during an occurrence, even if the shipowner is found liable, the liability would be untransferable to the other company vessels.

is plain and straightforward, a shipowner wanting to register his vessel to a country without moving his offices in that country rents an office (presently it has become a mailbox) in that country and creates a ship-owning company with headquarters the rented offices, where the onshore personnel will be supposedly situated[1335].

When the vessel is transferred to the shipping company, it becomes its primary asset, and the ship can automatically utilise this country's flag. But the secret lies with installing a managing company in any place the shipowner elects and the "de facto" outsourcing of the vessel's operation to the managing company offshore. This concept was prohibited in many traditional flags (until recently), requiring the physical presence of the onshore personnel operating the vessel. In contrast, the flags of convenience didn't need such a thing[1336]. The FoCs required only the renting of a small space, namely that of a mailbox, to satisfy the fundamental limits of international company law that "a company should have headquarters and an address to receive communication", and personnel inside that space was irrelevant for them[1337]. Thus, the concept of offshore companies was created and presently dominates the "vessel nationality market", and the absence of physical presence in the rented space (a mailbox in practice) established the concept of a weakened genuine link. Despite their many uses, the establishment of the above-mentioned offshore system is regarded as the main reason for the existence of the FoCs[1338].

The other reasons for the FoCs' utilisation are relevant to the policy of a nation, where shipping companies register their ships to increase their net profits and reduce their operating expenses by avoiding: i) economic and other regulations and ii) the conditions of employment installed by the national legal framework, which would

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[1335] Mitroussi, K., & Arghyrou, M. G. (2016). Institutional performance and ship registration. *Transportation Research Part E: Logistics and Transportation Review,* **85**, 90-106. DOI: https://doi.org/10.1016/j.tre.2015.10.004.

[1336] Venkadasalam, S., Mohamad, A., & Sifat, I. M. (2020). Operational efficiency of shipping companies: Evidence from Malaysia, Singapore, the Philippines, Thailand and Vietnam. *International Journal of Emerging Markets*, **15**(5), pp. 875-897. DOI: https://doi.org/10.1108/IJOEM-07-2019-0493.

[1337] Tenold, S. (2019). Onshore and Offshore: The New Maritime Norway. In *Norwegian Shipping in the 20th Century* (pp. 259-274). Palgrave Macmillan, Cham. DOI: https://doi.org/10.1007/978-3-319-95639-8_9.

[1338] Harlaftis, G. (2019). Shipping. In *The Routledge Companion to the Makers of Global Business* (pp. 438-454). Routledge.

be applied if their ships were registered in the registers of the countries of the company's national origin[1339].

Open registers are considered being the national flags of those countries whose laws allow and facilitate the registration under their flag of foreign-owned ships, as opposed to those in traditional maritime countries where the right to use their flag is granted under strict restrictions and with inflexible obligations. In practice, the difference between the FoCs and Open registries is that FoC countries incorporated only those legislations deemed mandatory into their legal system and recognised only the maritime regulations from IMO, thus excluding MLC as a convention of ILO[1340]. This was not the case with Open Registries, which incorporated most international legislation into their national systems, including ILO, as a traditional country would. Still, they were allowing the concept of offshore as an FoC country[1341]. Incorporating ILO's MLC is impactful because it adopts most measures related to the crew onboard. Thus, avoiding this legislation would enable shipping companies to reduce their expenses significantly. However, at the same time reduce the quality of life and the salaries of the onboard personnel[1342].

According to Boczek[1343], the flag of convenience is defined as that in which the State allows the registration of foreign-owned and controlled ships under conditions that favour and serve the persons performing the registration. Other definitions mention open registry flags, the flags of countries that provide highly flexible conditions to foreign ships, limited regulations and tax-free profits[1344].

[1339] Hessevik, A. (2022). Green shipping networks as drivers of decarbonization in offshore shipping companies. *Maritime Transport Research*, **3**, 100053. DOI: https://doi.org/10.1016/j.martra.2022.100053.

[1340] Mantoju, C. D. (2021). Analysis of impact of the maritime labour convention, 2006: A seafarer's perspective. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **5**(3), 107-119. DOI: https://doi.org/10.1080/25725084.2021.1955475.

[1341] Baumler, R., Bhatia, B. S., & Kitada, M. (2021). Ship first: Seafarers' adjustment of records on work and rest hours. *Marine Policy*, **130**, 104186. DOI: https://doi.org/10.1016/j.marpol.2020.104186.

[1342] Chua, J. Y., Foo, R., Tan, K. H., & Yuen, K. F. (2022). Maritime resilience during the COVID-19 pandemic: impacts and solutions. *Continuity & Resilience Review*, **4**(1) DOI: https://doi.org/10.1108/CRR-09-2021-0031.

[1343] Boczek, B. A. (2013). Flags of convenience. In *Flags of Convenience*. Harvard University Press. DOI: https://doi.org/10.4159/harvard.9780674188396.

[1344] Ertürk, E. (2022). A PRELIMINARY STUDY ON CHALLENGES FACED BY SHIP MANAGEMENT COMPANIES DURING THE COVID-19 PANDEMIC. *Scientific Journal of Gdynia Maritime University*, (122), **23**. DOI: 10.26408/122.02.

The "flags of convenience" have existed since the Renaissance era. Later with the treaty of Kioutsouk-Kainartzi (1774), initially Russian and later English, French and Austrian flags appeared on Greek-owned ships. This phenomenon occurred again in a new modern form after the Second World War. The leading states were Panama, Honduras, Costa Rica, Liberia and Marshall Islands, which conceded flags of convenience[1345].

5.1.3 Basic features of open registry flags

The basis of the concept of open registry flags is the absence of a "genuine link" between the flag and the managing company that executes the vessel's operation[1346]. Other points that distinguish the Open registries from other traditional flag states are[1347]:

a) The registration process is simplified, and the vessel registration is usually executed in a consulate of the flag state situated in the region of the managing company.
b) The taxation is very low to non-existent. The only requirement for registration is the deposit of an annual fee levied in relation to the ship's tonnage.
c) Foreigners are allowed to register their merchant ships to the registry with no additional certification[1348].
d) Those states have no (or minimal) requirements regarding the vessel state, age, condition or other defects, as long as the minimum standards of international legislation are kept. Their only interest is in the submission of the deposit fee (revenues from the registers) that they will have, depending on how large the registered tonnage is.
e) The open register does not have the capacity or necessary administrative mechanisms to impose or exercise any control over the companies (national or international legislation).

[1345] Metaxas, B. N. (1974). Some thoughts on flags of convenience. *Maritime studies and Management*, ***1***(3), 162-177. DOI: https://doi.org/10.1080/03088837400000006.
[1346] Sloane, R. D. (2009). Breaking the genuine link: The contemporary international legal regulation of nationality. *Harv. Int'l LJ*, **50**, 1.
[1347] Churchill, R. R., & Hedley, C. (2000). The meaning of the" genuine link" requirement in relation to the nationality of ships. At: https://orca.cardiff.ac.uk/id/eprint/45062/1/ITF-Oct2000.pdf.
[1348] Tache, S. W. (1982). The nationality of ships: the definitional controversy and enforcement of genuine link. *The International Lawyer*, 301-312. At: https://www.jstor.org/stable/40706615.

f) Manning by foreign seafarers is allowed freely, while no national legislation protects labour rights.

g) Salaries, wages, leave, and allowances are extremely low since they are usually directly related to labour law and the economic conditions existing in the country providing the flag[1349].

5.1.4 Problems related to the functioning of the institution.

It is argued that in the absence of the flags of convenience: a) the marine environment would not have suffered such damage, and b) maritime accidents would be substantially lower compared to the present status[1350]. This assessment, of course, is not accidental since the establishment of FoCs has brought about higher social costs than that caused by merchant ships of traditional flags[1351]. In light of this, it would be reasonable to wonder how it is possible to provide high-quality services and simultaneously be faced with minimal operating expenses[1352].

By executing a fundamental analysis of the social costs of the vessels' crew employed under an FoC or an Open Registry flag, it is evidenced that the principal social costs are[1353]:

a) Marine pollution: creating severe environmental destructions on a regional or international scale, lead to the destruction of aquatic environments, decrease in the quality of life in the affected areas and severely affecting economic activities related to the marine environment.

[1349] Bettink, H. W. (1987). Open registry, the genuine link and the 1986 convention on registration conditions for ships. *Netherlands Yearbook of International Law*, **18**, 69-119. DOI: https://doi.org/10.1017/S0167676800001689.

[1350] Van Panhuys, H. F. (1968). The "Genuine Link Doctrine" and Flags of Convenience. *American Journal of International Law*, **62**(4), 942-943. DOI: https://doi.org/10.1017/S0002930000043128.

[1351] Alcaidea, J. I., Piniella, F., & Rodríguez-Díaza, E. (2016). The "Mirror Flags": Ship registration in globalised ship breaking industry. *Transportation Research Part D: Transport and Environment*, **48**, 378-392. DOI: https://doi.org/10.1016/j.trd.2016.08.020.

[1352] Galley, M. (2013). Flagging interest: ship registration, owner anonymity, and sub-standard shipping. *Mountbatten Journal of Legal Studies*, **14**(1/2), 87-109. DOI: https://doi.org/10.1007/978-3-319-04699-0_4.

[1353] Li, K. X., & Wonham, J. (1999). Registration of vessels. *The international journal of marine and coastal law*, **14**(1), 137-154. DOI: https://doi.org/10.1163/157180899X00066.

b) Maritime accidents: It has been proved that the decrease in safety levels and processes is the primary factor of naval accidents, especially those related to human factors[1354].

c) Loss of life: Mortality rates are probably higher on ships with flags of convenience since accident rates are higher[1355].

d) Crew training and mental health: When trained, a sailor is prepared to withstand the physical and psychological pressure of being secluded in a vessel for many months. The decrease in crew training requirements directly affects the inexperienced crew when boarding a vessel. The untrained crew will be "less fit for service" and is more likely to be affected by anxiety and other mental issues that often affect the crew[1356].

5.1.5 Double Registers.

The "Parallel" or "Double" registers were created so countries with traditional flags could compete with other low-cost registers. Parallel registers are based on the relationship between the state and (mainly former) colonial territories or possessions, and their purpose is to attract ships of specific countries. Their modus operandi consists of allowing a merchant ship to fly the national flag while simultaneously being able to gain partial enjoyment of the advantages of an open registry (e.g., low-paid crews)[1357].

Many shipowners, for their part, seem to show their preference for such registers because they directly ensure a set of privileges, e.g., crew selection, sometimes officers, tax incentives, etc. Still, they retain the right to fly their country's flag[1358]. Typical examples of this category are Bermuda[1359], the Cayman Islands, the Isle of

[1354] Zhang, A., Boardman, A. E., Gillen, D., & Waters, I. I. W. G. (2004). Towards estimating the social and environmental costs of transportation in Canada. *Report for Transport Canada*, **7**.
[1355] Toth, J. (2014). The Genuine Link Principle in Nationality Law. *Hungarian YB Int'l L. & Eur. L.*, **45**.
[1356] Van Panhuys, H. F. (1968). The "Genuine Link Doctrine" and Flags of Convenience. *American Journal of International Law*, *62*(4), 942-943. DOI: https://doi.org/10.1017/S0002930000043128.
[1357] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).

[1358] Kutner, A., & Wilensky, M. (2014). Flag State Regulation of Greenhouse Gas Emissions: Regulatory Authority of Flags of Convenience and Franchised Registries. at: https://scholarship.law.columbia.edu/sabin_climate_change/138.
[1359] Bermuda has been a british crown colony since 1612 and is the seat of many insurance companies, having one of the world's largest merchant fleets under a flag of convenience. The Cayman Islandshave been a British dependent territory since 1670, and companies based on their territory are attracted by the absence of income tax and exchange controls. it is located between England and Northern Ireland

Man, Gibraltar and the Channel Islands used by Britain (e.g., Guernsey, Jersey, etc.), the Kerguelen Islands used by France, and the Netherlands Antilles, which are connected to the Netherlands, and Luxembourg, whose register is used by Belgian shipowners[1360].

However, the practices applied by each country (acquisition) differ to a large extent from another parallel register (e.g., some registers place restrictions on the age limits of the ships they accept)[1361]. In addition to the obvious advantages offered by parallel registers, there are also relatively few obstacles (problems in the conditions of operation of ships by the various states and in the conditions of competition between EU shipowners, which does not fit in the spirit of the European Union), the main one of which is considered being the possibility of a boycott[1362]. Agreements on crew salaries will play an essential role while working conditions on board ships are identical to those laid down by the ITF (International Transport Federation)[1363].

However, the legal status of parallel registers for EU law remains doubtful. After a question from the Union of Greek Shipowners, the Commission indicated that the beneficiaries of the standard maritime policy's first phase are ships registered in a Member State. This term does not cover registers operating in territories outside the EU Community, to which the Treaty of Rome does not apply. Based on these criteria, Community law does not cover the registers of Kerguelen, Channel Islands, Isle of Man, the Netherlands Antilles, Bermuda, Cayman, etc[1364].

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and is a tax haven. Gibraltar as a colony of Britain since 1713 has developed significant offshore banking activities, however doubts are expressed about its status, because while it is not part of the territory of the UK, the Treaty of Rome applies to it. The Channel Islands, which have been British possessions since 1066 (the main ones being Guernsey and Jersey) have taken advantage of their autonomy and have their own legislative andtax-reasonable system (tax havens). compensation for the services they provide. At the same time, Spain (Canary Islands) and Portugal (Madera's) have registers.

[1360] Thanopoulou, H. A. (1998). What price the flag? The terms of competitiveness in shipping. *Marine Policy*, **22**(4-5), 359-374. DOI: https://doi.org/10.1016/S0308-597X(97)00043-2.

[1361] Matlin, D. F. (1990). Re-evaluating the status of flags of convenience under international law. *Vand. J. Transnat'l L.*, **23**, 1017.

[1362] Toh, R. S., & Susilowidjojo, H. (1987). Flags of convenience shipping in the 1980s: The American perspective. *Transportation journal*, 34-42. At: https://www.jstor.org/stable/20712925.

[1363] Some parallel registers are considered by the ITF as flags of convenience, e.g. Bermuda, Netherlands Antilles, and are therefore a primary objective of the international community (e.g. IMO, MOU, UNCTAD) to address them in cases of infringements.

[1364] Barrett, G. (2017). Contract or code? Determining the reach of European Union employment law and the effect of flags of convenience: Stroumpoulis. *Common Market Law Review*, **54**(3). DOI: https://doi.org/10.54648/cola2017066.

Although the phenomenon of parallel registers is seen as the main threat to the future of EU Community shipping, in view of the current conditions in shipping on a global spectrum, these options are proving increasingly popular with shipowners at the expense of the traditional registers of the EU Member States[1365].

5.1.6. International Registries

Another remarkable phenomenon of recent decades is the development of the "International" or "Second" registers (International registries)[1366]. International registers allow registered ships to fly the flag of the national register; e.g., a merchant ship registered in the Danish International Ships Register may retain the Danish flag but is subject to specific national regulations usually relating to shipping management, ownership, manning and operation. Norway (NIS) primarily, followed by Germany (GIS) and Denmark (DIS), have created international registers that provide opportunities to employ foreign crews with low wages, combined with a significant reduction in employer and labour contributions[1367].

In particular, Norway established a second registry in the port of Bergen (1987). This register received several ships that left the national register (due to high operating costs), but the control mainly for ship safety and maintenance issues remained with the Norwegian authorities[1368].

The NIS accepts ships of almost all categories. The owners can be of Norwegian or foreign nationality under certain conditions, e.g. a part of the management should be entrusted to local ship management companies (representative office). However, under pressure from the seamen's associations, the Community has argued that international registers contradict the Treaty of Rome (discrimination in crews' salaries)[1369].

[1365] Marlow, P., & Mitroussi, K. (2008). EU shipping taxation: the comparative position of Greek shipping. *Maritime Economics & Logistics*, **10**(1), 185-207. DOI: https://doi.org/10.1057/palgrave.mel.9100198.

[1366] Bergantino, A. S., & O'SULLIVAN, P. (1999). Flagging out and international registries: main developments and policy issues. *International Journal of Transport Economics/Rivista internazionale di economia dei trasporti*, 447-472. At: https://www.jstor.org/stable/42747413.

[1367] Nistor, F. (2013). The Importance Of International Registries For Naval Transport. In *International Scientific Conference dedicated to European Maritime Day of 20th of May*, **1**, pp. 100-104.

[1368] Norwegian Maritime Authority, (2014). Registration of ship in the NIS. Available at: Registration of ship in the NIS - Norwegian Maritime Authority (sdir.no), last assessed: 30-8-2022.

[1369] BIMCO, (2016). PARIS MOU PSC - NEW INSPECTION REGIME. Available at: Paris MoU PSC - New Inspection Regime (bimco.org), last assessed: 28-8-2022.

Evidently, international registries and double registries, while opposed to the United Nations Convention on the Registration of Ships (1986) and the EU maritime policies, seem to attract a gradually increasing number of vessels and are established among the main options of the shipping community at present[1370].

5.1.7 Present Trends

Presently, most shipowners were utilising flags of convenience; the majority upgraded to whitelisted flags, incorporating the majority of international legislation while maintaining the concept of offshore registries. To counter this phenomenon, the traditional flag stated adopted the concepts of double or international registries, which established a secondary FoC as an option to the same registry, besides the initial option of a traditional flag. The services and the facilitation of flags, while still having some differences, have started to merge, thus making all flags in quite a few years almost identical. From the author's perspective, the flag market will evidence changes when vessels of new technology start to emerge. Until their dominance, the required quality will gradually increase, pressing the flags to adopt even more regulations related to safety, thus continuously increasing the level and the severity of stringency until all flags are rendered almost identical[1371].

Another significant change was introduced to many FoC and Open Registries in 2018, namely the instalment of the Economic Substance Report. Subject to this report, an economic substance test should be executed to evidence the financial substance of a registered company[1372].

Through that test, the core-income generating activities of the company are checked, all required information should be stated in a provided form, and penalties will be installed upon the test's failure. In addition to penalties, the registry can elect to exchange information with the competent state authorities to be further informed of a case. The main practical issue that this test created is the establishment of economic transparency and clarity upon company information which until recently was deemed

[1370] Kavussanos, M., Strandenes, S. P., & Thanopoulou, H. (2022). ends of eras and new beginnings: twenty-first century challenges for shipping. *Maritime Economics & Logistics*, 1-21. DOI: https://doi.org/10.1057/s41278-021-00207-5.
[1371] Ibid.
[1372] Marshal Islands, (2018), Economic Substance Regulations. Available at: Economic-Substance-Regulations-2018-courtesy-copy-published-by-the-Registrar-of-Corporations-through-29-August-2019-amendments.pdf (register-iri.com), last assessed: 28-8-2022.

private and confidential. More importantly, the instalment of intrusive legislation upon company issues renders the competent authorities more flexible and predisposed to inspections[1373].

5.2 Classification Societies

5.2.1 Classification Societies

The concept of classification societies appeared about two centuries ago to satisfy the need for evidence of whether the international rules regarding the maintenance and construction of vessels are observed and the need for protecting the cargo and the personnel onboard[1374].

During the second half of the 18th century, the shipping insurers at the Lloyd's Coffee House in London developed methods for inspecting and verifying the quality of the vessels' hulls and machinery[1375]. Thus, societies were designed primarily as non-profits, making private technical organisations recognized by the nation and other states. These societies are the so-called classification societies, charged with[1376]:

a) The publication of specific rules for classification, in collaboration with shipbuilding companies and inspectors and the ability to i) apply, ii) maintain, and iii) update the said regulations periodically[1377].
b) The ratification of compliance with those rules during the construction of the vessel and a vessel's survey[1378].
c) Registering classed ships.

[1373] Sletmo, G. K., & Hoste, S. (1993). Shipping and the competitive advantage of nations: the role of international ship registers. *Maritime Policy and Management*, **20**(3), 243-255. DOI: https://doi.org/10.1080/03088839300000016.

[1374] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).

[1375] Hormann, H. (2006). Classification societies. *WMU Journal of Maritime Affairs*, **5**(1), 5-16. DOI: https://doi.org/10.1007/BF03195078.

[1376] Silos, J. M., Piniella, F., Monedero, J., & Walliser, J. (2013). The role of the Classification Societies in the era of globalization: a case study. *Maritime Policy & Management*, **40**(4), 384-400. DOI: https://doi.org/10.1080/03088839.2013.776184.

[1377] Boisson, P. (1994). Classification societies and safety at sea: Back to basics to prepare for the future. *Marine Policy*, **18**(5), 363-377. DOI: https://doi.org/10.1016/0308-597X(94)90033-7.

[1378] Hussein, A. W., & Soares, C. G. (2009). Reliability and residual strength of double hull tankers designed according to the new IACS common structural rules. *Ocean Engineering*, **36**(17-18), 1446-1459. DOI: https://doi.org/10.1016/j.oceaneng.2009.04.006.

d) Evidencing that international standards are kept during the manufacture, the equipment, the maintenance and the performance of vessels[1379].

e) Recognized by a flag state, pursuant to SOLAS Chapter XI-1 and Regulation 1 and listed in Global Integrated Shipping Information System (GIS)[1380].

The jurisdiction of the Classification Societies and their responsibilities are established in rules related to the operation and quality of vessels, classified into classes[1381].

Specifically, the Classification Societies check and verify, during the construction and the operation of the vessel, whether it corresponds to the classification it has received. The principal reasons that can lead to the decrease or the abolishment of a vessel's classification are concerned with quality issues, maintenance, or issues of a more technical nature, such as delayed renewal of certificates[1382] or even non-payment of fees related to audits and inspections[1383].

Another critical issue is the approval of the plans and specifications of the ships to be built. Thus, according to the said plans, the inspectors entrusted with the continuous monitoring of the construction should ensure that the ship fully meets the requirements of the relevant regulations[1384].

Also, the rules establish the need for an extended survey every five years, including a year of extension, where the vessel is thoroughly inspected, maintained, or repaired under the supervision of the responsible inspector of the Classification Society. The specific inspections include extensive checks of the vessel inland to verify that the

[1379] Nitta, A., Arai, H., & Magaino, A. (1992). Basis of IACS unified longitudinal strength standard. *Marine Structures*, **5**(1), 1-21. DOI: https://doi.org/10.1016/0951-8339(92)90032-K.

[1380] Melnyk, O., Onyshchenko, S., Pavlova, N., Kravchenko, O., & Borovyk, S. (2022). Integrated Ship Cybersecurity Management as a Part of Maritime Safety and Security System. *International Journal of Computer Science and Network Security*, **22**(03), 135-140. DOI: https://doi.org/10.22937/IJCSNS.2022.22.3.18.

[1381] Basedow, J., & Wurmnest, W. (2006). *Third-party liability of classification societies: A comparative perspective* (Vol. 2). Springer Science & Business Media.

[1382] Other certificates issued and issued by classification societies are the following: i) Tonnage Certificate, ii) Load Line Certificate, iii) Certificate of Sea Worthiness, iv) Cargo Gear Certificate, v) Certificate of Damages, vi) Other sui generis certificates.

[1383] Glinski, C. (2022). Liability of shipowners and classification societies for environmental damage and unsafe working conditions at recycling yards. *Review of European, Comparative & International Environmental Law*, **31**(3) DOI: https://doi.org/10.1111/reel.12455.

[1384] Begines, J. L. P. (2005). The EU law on classification societies: Scope and liability issues. *J. Mar. L. & Com.*, **36**, 487.

condition of the structure, the engines, the facilities, and the equipment are acceptable, based on international legislation. The scope of the inspection is to determine whether the vessel's structure is intact and to identify the wear and tear of the vessel, the impact of possible damages and the status of the peripheral systems[1385].

As classification societies evolved, the classification of ships into various categories ceased to be applied, except for some cases. Today a ship either complies with the regulations of a classification society or not. In case of non-compliance, the classification society inspector evaluates the importance of the emerging violations and elects, i) either to set the ship as substandard, temporarily remove the vessel's classification and inclusion in the GIS list[1386], rendering the vessel practically inoperable, or ii) completely exclude this vessel from the list of classified vessels under this said classification society. Of the two options, the first is mainly followed for economic reasons to avoid the loss of clientele[1387].

Classification societies of high reputation (for the quality of constructions and inspections, or security standards) perform even more functions[1388]:

a) Development of reports incorporating information from all sections of the maritime industry.
b) Research aimed at optimising the construction of ships or their engines consistently to achieve higher standards of safety in marine transport.

The functions mentioned above evidence the evolution of classification societies from merely providing surveyors and technical guidance to leading stakeholders in the shipping market, with vessel registration for various countries entirely reliant on them[1389].

[1385] Chuah, L. F., Mokhtar, K., Bakar, A. A., Othman, M. R., Osman, N. H., Bokhari, A., ... & Hasan, M. (2022). Marine environment and maritime safety assessment using Port State Control database. *Chemosphere*, **304**, 135245. DOI: https://doi.org/10.1016/j.chemosphere.2022.135245.

[1386] Keradinidis, G., Aidonis, D., & Manikas, I. (2012). Maritime Operations and New Business Models Elaboration. In *2nd International Conference on Supply Chains, Katerini, Greece*.

[1387] Morris, P. (2001). Emerging Issues for Classification Societies. *Australian and New Zealand Maritime Law Journal*, 9-9.

[1388] Hsu, Y. C. (2022). Assessment of criteria of ship classification societies. *Maritime Policy & Management*, 1-25. DOI: https://doi.org/10.1080/03088839.2022.2061061.

[1389] Lagoni, N. I. (2007). *The liability of classification societies* (Vol. 9). Springer Science & Business Media.

As far as their organisational structure is concerned, the executives of the administrative bodies shall come from the shipowners or their associations, insurers or the technical field. This does not include executives from the organisational bodies representing the personnel onboard, i.e. the seafarers' trade unions[1390].

5.2.2 International Association of Classification Societies (IACS)

The competent stakeholder for adopting and developing the policy of classification societies is the International Association of Classification Societies (IACS), which incorporates the most renowned classification societies worldwide. The IACS aims to promote the highest standards continuously with regard to the enhancement of vessel safety and the avoidance of maritime accidents, which result in marine pollution.

Specifically, in terms of capacity, over 90% of the global merchant vessels are covered by ten members of IACS, providing standards for the shipbuilding construction of the ship (hull structure) and its basic mechanical systems, which are constantly updated[1391]. To become a member of the IACS, one must meet the following criteria:

a) Be in operation for at least thirty years,
b) at least 1,500 vessels with over 100 gross tonnages are registered with it, and their total tonnage is at least 8 million and so on,
c) employ at least 150 inspectors and 100 qualified technicians who meet the federation's training criteria.

To continuously improve ship safety and prevent marine pollution, the IACS supports the International Maritime Organisation (IMO) and works closely with the principal maritime industries and other international bodies[1392]. The IACS and the other signatory members continuously promote the adoption of stringent measures to enhance the current fleet's quality[1393]. In addition, IMO and the various international

[1390] Glinski, C. (2022). Liability of shipowners and classification societies for environmental damage and unsafe working conditions at recycling yards. *Review of European, Comparative & International Environmental Law*, **31**(3). DOI: https://doi.org/10.1111/reel.12455.
[1391] IACS, (2022). Safer and Cleaner Shipping. Available at: Safer and Cleaner Shipping - IACS, last assessed: 28-8-2022.
[1392] Wang, J., Zhou, Y., Zhuang, L., Shi, L., & Zhang, S. (2022). Study on the critical factors and hot spots of crude oil tanker accidents. *Ocean & Coastal Management*, **217**, 106010. DOI: https://doi.org/10.1016/j.ocecoaman.2021.106010.
[1393] Yang, Z. L., Wang, J., & Li, K. X. (2013). Maritime safety analysis in retrospect. *Maritime Policy & Management*, **40**(3), 261-277. DOI: https://doi.org/10.1080/03088839.2013.782952.

conventions on security issues are mandatory by all the states that have signed the conventions. Thus, with the multiple certificates that ships should have, they can operate internationally without limitations[1394].

The knowledge and experience of the members of IACS are such that their contribution to the safety of global shipping is substantial. In addition, the IACS is an IMO advisory and the only non-governmental organisation dealing with the emerging issues of international legislation and developing policies regarding vessels' technical standards[1395].

Nevertheless, the need for applying informal standards has been stated by the initial founding Classification Societies since the 1930s. Thus, it is widely said that the time for adopting such unification standards has arrived due to the development of shipbuilding and the operation of ships in recent decades. The first steps to unify technical standards began in the mid-1950s. Thus, the first provisions concerned the following[1396]:

a) Minimum longitudinal strength.
b) Inspection of all types of vessels.
c) Installations of inert gas, and
d) Establishment of fireproof measures in the engine rooms.

The IACS is focused on creating new uniform standards by dedicated working groups. The most paramount issues of concern to those groups are: a) the operation of container vessels, b) machines, c) fire protection systems and mechanisms, d) avoidance of marine pollution, e) materials and welding, f) vessel stability and loading lines, g) certification, h) audits and inspections[1397].

[1394] Gao, Y., Ben Zid, I., Lou, X., & Parekh, M. (2019). Operational Security Modeling and Analysis for IACS. In *INFORMATIK 2019: 50 Jahre Gesellschaft für Informatik–Informatik für Gesellschaft (Workshop-Beiträge)*. Gesellschaft für Informatik eV. DOI: 10.18420/inf2019_ws31.

[1395] Baumler, R., Arce, M. C., & Pazaver, A. (2021). Quantification of influence and interest at IMO in Maritime Safety and Human Element matters. *Marine Policy*, **133**, 104746. DOI: https://doi.org/10.1016/j.marpol.2021.104746.

[1396] Nersesian, R., & Mahmood, S. (2010). International association of classification societies. In *Handbook of Transnational Economic Governance Regimes* (pp. 765-774). Brill Nijhoff. DOI: https://doi.org/10.1163/ej.9789004163300.i-1081.675.

[1397] Peschmann, J., von Selle, H., Jankowski, J., Horn, G., & Arima, T. (2017). IACS common structural rules as an element of IMO goal based standards for bulk carriers and oil tankers. In *Progress in the Analysis and Design of Marine Structures* (pp. 297-304). CRC Press.

The IACS stakeholders, to ensure high standards among themselves, have accepted a Quality System Certification scheme. Thus, quality assurance requirements have been established pursuant to ISO 9001 to maintain the highest quality of their services[1398].

The IACS operation is split between specific bodies, namely[1399]:

a) The Council, including the representatives of all society members, meets twice a year to develop the general policy for the next annum.
b) The General Policy Group meets twice a year to resolve issues and disseminate work to relevant working groups.
c) The Permanent Secretariat of the Agency, established in 1992

The work of the members is focused on the promotion of maritime safety and the minimization of marine pollution. The activities of those bodies include vessel classification, the services related to classification, expansion of research activities, and technical and consulting services[1400]. A classification society practically confirms that a ship has been constructed subject to international standards and should be periodically inspected to maintain its class. The classification of a vessel is particularly important for marine insurers, charterers and the banking organisations with which the shipping company cooperates[1401].

Regarding the services provided by IACS members through its network of offices around the world, there is the most appropriate and specialized staff for ship inspections to ensure all the requirements of the various IMO conventions[1402].

The IACS members inspect nearly 45.000 vessels annually, practically close to 92% of the merchant fleet. Also, every year over 5000 inspectors from more than 100 countries execute several hundred thousand periodic inspections of vessels, in

[1398] Paik, J. K., Kim, B. J., & Seo, J. K. (2007, January). Evaluation of IACS common structural rules in terms of ultimate limit state design and assessment of ship structures. In *International Conference on Offshore Mechanics and Arctic Engineering* (Vol. 42681, pp. 151-161).
[1399] IACS, (2022). *IACS Code of Conduct for Member Societies.* Available at: Code of Conduct - IACS, last assessed: 29-8-2022.
[1400] Horn, G. E., Arima, T., Baumans, P., Bøe, A., & Ocakli, H. (2013). IACS Summary of the IMO GBS and the Harmonised Common Structural Rules. In *TSCF 2013 Shipbuilders Meeting*.
[1401] Kanamaru, H. (2020, September). Requirements for IT/OT Cooperation in Safe and Secure IACS. In *2020 59th Annual Conference of the Society of Instrument and Control Engineers of Japan (SICE)* (pp. 39-44). IEEE.
[1402] Hormann, H. (2006). Classification societies. *WMU Journal of Maritime Affairs*, **5**(1), 5-16. DOI: https://doi.org/10.1007/BF03195078.

addition to inspections for the design and construction of new buildings as well as the inspection and certification of materials and equipment[1403].

As far as research and development are concerned, the organisation's members constantly conduct research programs to further develop the existing regulations and technical standards. This is the direction in which the 31st IACS Council, held in June 1995, has established where important conclusions emerged, many of which have been in force since 1 July 1995[1404]. The positive changes that have taken place in the organisation and operation of the classification societies so far can focus on the following points:

a) When changing the class of a ship from one member of the IACS to another, the Classification Society, with which the vessel is registered, will have to carry out all the current markings and observations of the previous Classification Society.
b) The role of the IACS Secretariat is upgraded, which will now maintain a register of ships. The IACS Secretariat will also make available the information on the approximately 42,000 ships under the class and the supervision of its members to all stakeholders (insurers, shipyards, flag states, ports, etc.)[1405].
c) The class of the ship is revoked if, after the five-year class certification expires, the special survey is not executed in time.
d) Establishing cooperation between port authority inspectors and class inspectors was addressed. For example, the subjective interpretation and execution of class and flag rules had to be eliminated[1406].

The IACS Council also drew up three lists of shortcomings, in accordance with the following, namely[1407]:

a) Faults during the inspection of Port State Control.

[1403] IACS, (2022). Ship/Company Data. Available at: Ship/Company Data - IACS, last assessed: 29-8-2022.
[1404] Safety4Sea, (2014) IACS Council meeting outcome. Available at: IACS Council meeting outcome - SAFETY4SEA, last assessed: 29-8-2022.
[1405] Bargate, Q., & Mumma, A. (1993). Marine Pollution and Safety: Practical Proposals for Action. *Eur. Envtl. L. Rev.*, **2**, 103.
[1406] Mokhtari, S. The legal role and responsibilities of classification societies. *Regulation*, **6**(3), 13.
[1407] Morris, P. (2001). Emerging Issues for Classification Societies. *Australian and New Zealand Maritime Law Journal*, 9-9.

b) Allocation of emerging deficiencies to those of class and those of flag state.
c) Pending deficiencies after the agreement of both inspectors[1408].

Finally, another issue that IACS has faced (but it remains to be seen how it has been addressed in practice) is the criteria for the recruitment of "non-exclusive" inspectors. They should have at least the same qualifications as the sole inspectors. In addition, both sole inspectors and temporary recruits (non-exclusive) should be subject to constant scrutiny regarding their qualifications, which should be increased, and their performance[1409].

5.2.3 Quality Standards and Inspections

In the context of the increased standards that classification societies should follow, there should be an extension of the issues with which IACS members should deal diligently. This is the direction in which the Committee of Experts established by the IMO focuses on the primary occasion of the sinking of the ESTONIA Ferry[1410]. The issues encountered by the said committee concern[1411]:

a) The human factor: the study of this factor aims to identify the cases in which the human element is directly or indirectly involved in an accident and to minimise the tragic consequences as an outcome[1412].
b) Ship stability: the requirements for maintaining the ship's stability during the inlet of water should be revised, with particular emphasis on passenger ships. In this direction, measures such as constructing part of the accommodation areas under the lower deck (vehicle deck) on passenger ships could be a solution[1413].
c) Water inflow: the second line of defence should be established in case water inflow into the lower deck of passenger ships. A review of the drainage

[1408] Wen, F., Pray, J., McSweeney, K., & Gu, H. (2019, April). Emerging inspection technologies–enabling remote surveys/inspections. In *Offshore Technology Conference*. OnePetro.
[1409] Fan, L., Wang, M., & Yin, J. (2019). The impacts of risk level based on PSC inspection deficiencies on ship accident consequences. *Research in Transportation Business & Management*, **33**, 100464. DOI: https://doi.org/10.1016/j.rtbm.2020.100464.
[1410] Björkman, A., & v Goethe, J. W. (1998, January). Lies and Truths about the M/V Estonia Accident. Monaco: EGC.
[1411] Hsu, Y. C. (2022). Assessment of criteria of ship classification societies. *Maritime Policy & Management*, 1-25. DOI: https://doi.org/10.1080/03088839.2022.2061061.
[1412] Kalmre, E. (1998). Legends connected with the sinking of the ferry Estonia on September 28, 1994. DOI: https://doi.org/10.1515/fabl.1998.39.3-4.209.
[1413] Pérez, R., Lamas, M., & Carral, L. M. (2012). Classification and damage stability of flotel ships. *Journal of Maritime Research*, **9**(1), 33-38.

networks should also be performed so that the buoyancy time of the vessel after flooding ensures that occupants and crew escape safely.

d) Catapults: the level of construction resistance of both catapults and interior doors should be revised to ensure absolute standardization between the ship's compartments.

e) Alarm systems: first of all, the occupants (passengers-crew) should be informed both for the understanding of alarm systems and the use and operation of lifesaving means.

f) Training: Training the crew and the master on emergency management or dangerous situations is one of the essential issues to be emphasized. Also, the master should have full knowledge of the operational limits of the vessel as set by its shipbuilders and designers[1414].

g) Communications: a communications system that would allow the ship to be constantly monitored and contacted with a coastal ground station throughout its voyage could guarantee safer transport, at least on long-distance passenger ships.

h) Survival and "SAR" (Search And Rescue) systems: improving and developing existing life-saving equipment is now necessary[1415]. In particular, passenger ships should be equipped with the most modern and effective means for detecting and combating fire and abandoning the ship. Furthermore, the Member Classification Societies of the IACS should show greater rigour during installing and controlling these means. Finally, ground search and rescue (SAR) stations should be organised in such a way as to ensure direct access by air and sea to the scene of the accident.

i) The International Safety Management Code (ISM): the implementation of the Code should take place earlier than the original date of 1-7-1998. The responsibility for properly implementing the Code lies with the competent

[1414] Boisson, P. (1994). Classification societies and safety at sea: Back to basics to prepare for the future. *Marine Policy*, **18**(5), 363-377. DOI: https://doi.org/10.1016/0308-597X(94)90033-7.

[1415] Cloude, S. R., & Pottier, E. (1997). An entropy based classification scheme for land applications of polarimetric SAR. *IEEE transactions on geoscience and remote sensing*, **35**(1), 68-78. DOI: 10.1109/36.551935.

State Authorities and the members of the IACS, who should demonstrate increased rigour when performing the necessary checks[1416].

After studying the regulations imposed by the Classification Societies on the way the special inspections of ships are conducted, it is observed that their institutional framework has changed. A while ago, Special Inspections or Renewal Inspections were executed once per four years to verify that the vessel still meets the class requirements and to renew the vessel's registration certificate. Later, this practice was changed, and a four-year cycle of inspections was followed, which included four inspections on an annual basis, of which the fourth was more extensive and constituted the Special Inspection of the ship[1417]. The first Annual Inspection was conducted yearly, after the date of the vessels' construction or its initial classification survey or its last special inspection. On the second anniversary, the second Annual Review was executed. On the third anniversary, there was the third Annual Review. Finally, on the fourth anniversary, the vessel had to submit to the Special Inspectorate for the renewal of its class. While in the three Annual Reviews, the control is visual and relatively superficial. The ship is examined more comprehensively during the Special Inspection, and the necessary measurements and tests are made[1418].

In exceptional cases and at the request of the shipowner, the class could provide an extension for completing the operations of the Special Inspection, should the conditions allow it. This action was crucial for a more qualitative control of the vessel. Specifically, vessels are subjected to a five-year cycle of inspections to renew their Certificate of Classification. This cycle includes five Inspections conducted on an annual basis[1419]:

a) The first Annual Inspection is conducted during the first anniversary of construction or initial classification of the vessel. The first Annual

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[1416] Maggi, E., & Mazzarino, M. (1999). Support of Maritime Education and Training Systems for the Implementation of the ISM Code. *Promet-Traffic & Transportation*, **11**(4), 203-207. At: http://traffic.fpz.hr/index.php/PROMTT/article/view/1131.

[1417] Rizzo, C. M., & Lo Nigro, A. (2008, January). A review of ship surveys practices and of marine casualties partly due to aging effects. In *International Conference on Offshore Mechanics and Arctic Engineering* (Vol. 48197, pp. 807-818). DOI: https://doi.org/10.1115/OMAE2008-57847.

[1418] Nitta, A., Arai, H., & Magaino, A. (1992). Basis of IACS unified longitudinal strength standard. *Marine Structures*, **5**(1), 1-21. DOI: https://doi.org/10.1016/0951-8339(92)90032-K.

[1419] Nersesian, R., & Mahmood, S. (2010). International association of classification societies. *In Handbook of Transnational Economic Governance Regimes* (pp. 765-774). Brill Nijhoff. DOI: https://doi.org/10.1163/ej.9789004163300.i-1081.675.

Inspection is a visual inspection of the parts of the vessel, and it can be completed a few months earlier or later than the specified date.

b) On the second anniversary, the second Annual Inspection occurs, which is also purely visual and retains the same flexibility for completing the work a few months before or after the date set. Then, approximately two and a half years after the class period, i.e. after the ship's construction date or its classification, the vessel shall be submitted to the Intermediate Survey[1420].

c) The Intermediate Inspection is more detailed and thorough, and it includes many parts and equipment of the vessel that a visual inspection cannot assess. In terms of its importance, the Mid-Term Review is deemed nearly as equal to the Special Inspection, as precise controls and unique measurements are included. Additionally, the dry docking of the vessel is executed; it evaluates the state of the vessel and assesses if the vessel complies with the regulations set by the flag state and that of class. As regards the time of the completion of the Interim Review, its execution can be performed nine months earlier or later than the specified date[1421].

d) On the fourth anniversary, the ship is subject to the fourth Annual Survey, which is also visual. Its procedures should be completed within three months, earlier or later than the predetermined date.

e) Finally, on the fifth anniversary, the ship is submitted to the Special Inspection to confirm that it meets the requirements of the Classification Society for the maintenance of its class. The Special Inspection shall, in any case, include the careful examination of the parts of the ship, unique measurements, strict controls, and tests, as well as the inspection of the vessel in a tank or shipbuilding bed. The aim is for the inspectors to be satisfied with the inspection results and to approve the renewal of the

[1420] Alexandropoulou, V., Johansson, T., Kontaxaki, K., Pastra, A., & Dalaklis, D. (2021). Maritime remote inspection technology in hull survey & inspection: A synopsis of liability issues from a European Union context. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **5**(4), 184-195. DOI: https://doi.org/10.1080/25725084.2021.2006463.

[1421] Peschmann, J., von Selle, H., Jankowski, J., Horn, G., & Arima, T. (2017). IACS common structural rules as an element of IMO goal based standards for bulk carriers and oil tankers. *In Progress in the Analysis and Design of Marine Structures* (pp. 297-304). CRC Press.

Certificate of Classification[1422]. As regards flexibility as regards the time of completion of the Special Inspection procedures, there is the alternative of carrying out the work within fifteen days before the predetermined date[1423].

At the request of the shipowners of each Classification Society, it reserves the right to decide the granting of an extension for completing the Special Inspection procedures of up to three months[1424].

It is evident that the past regime differs considerably from the new inspection system, which has been installed and implemented by all classification societies. Additionally, the Special Inspection, which was visual in the past, presently has as its primary object stringent vessel control, utilising many new methods and equipment. Presently, vessels are subject to four annual inspections; each inspection is executed visually and the final Special Inspection. Nevertheless, the fifth inspection is the most detailed, as well as the Interim Inspection, which is just as important and extensive as the Special Inspection and usually is executed in the interval between the third and the fourth Annual Survey. This Mid-Term Inspection, which is decisive in the ship's renewal class, is the most important difference and modification of the inspection system. During the Interim Inspection, the vessel is subject to the same checks as in the Special Inspection. Usually, it is necessary to dry-dock the ship, and various examinations are implemented on the hull and machinery of the vessel[1425].

This kind of check cannot be initiated by the operational processes of an Annual Inspection. Also, depending on the inspection outcomes, the inspector can recommend the owner to conduct the necessary repairs within a specific time frame so the ship can finally maintain its class. The previous system probably would not have detected these problems during the Annual Inspections. When the Special Inspection was initiated, the instalment of corrective action would be late, resulting in the suspension or even revocation of the ship's class. Therefore, the foundation of the

[1422] Obermeier, S., Schierholz, R., Hadeli, H., Enderlein, R. R., Hristova, A., & Locher, T. (2013, November). Secure management of certificates for industrial control systems. In *39th Annual Conference of the IEEE Industrial Electronics Society* (IECON 2013).

[1423] Ciecko, A., Oszczak, S., & Jarmolowski, W. (2008, January). Official Voluntary Certification of GNSS Instruments and Observers for IACS On-the-Spot Checks. In *Proceedings of the 2008 National Technical Meeting of The Institute of Navigation* (pp. 614-619).

[1424] Cariou, P., & Wolff, F. C. (2011). Do Port State Control inspections influence flag-and class-hopping phenomena in shipping?. *Journal of Transport Economics and Policy (JTEP)*, **45**(2), 155-177.

[1425] Carlsen, H., & van der Geest, M. (2017). Classification and Certification. *Encyclopedia of Maritime and Offshore Engineering*, 1-11. DOI: https://doi.org/10.1002/9781118476406.emoe574.

Interim Inspection proves to be crucial for the renewal of the Ship's Classification Certificate and for preserving its prestige, remaining in the same class[1426].

5.2.4 Present status

Evidently, the implementation of a five-year cycle of inspections has considerably helped the process of vessel inspection. It has effectively helped the shipping practice locate and resolve many issues and malfunctions before negative occurrences emerge.

Additionally, the adoption of the IACS Registry Association establishes the concept of cooperation with each other and shows homogeneity in the regulation they establish for their members. Unsurprisingly, such changes could not only be made by a single classification society but require the collective adaptation of classification societies to the new business environment[1427].

The main reason that led the Classification Societies to make this change is that they are trying to follow the developments and adapt pursuant to the IMO and SOLAS amendments. The main focus of classification societies is promoting marine safety and preserving the marine environment. To this end, classification societies should install stricter measures and controls over the vessels and be in close contact with the other stakeholders to ascertain the quality of the vessel and support the implementation of the control processes[1428].

Lastly, the author evidences a structural power shift in the balance of maritime stakeholders invested in the control process. A few decades ago, the classification societies were notorious for their strictness and the immediate revocation of their certificates in case of severe issues. However, they have a trend towards leniency, establishing the policy of sub-standard.

The main aim of this policy is neither environmental nor related to safety -it is very easy to shift from one class to another. The new policy, which the author suggested

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[1426] Goh, L. B., & Yip, T. L. (2014). A way forward for ship classification and technical services. *The Asian Journal of Shipping and Logistics*, **30**(1), 51-74. DOI: https://doi.org/10.1016/j.ajsl.2014.04.003.

[1427] Lissillour, R., Fernandez, D. B., & Fulconis, F. (2019). *The classification societies, an obstacle or an accelerator to international maritime safety?* (No. hal-02280979).

[1428] Lissillour, R., & Bonet Fernandez, D. (2021). The balance of power in the governance of the global maritime safety: the role of classification societies from a habitus perspective. In *Supply Chain Forum: An International Journal*, **22**(3), pp. 268-280. Taylor & Francis. DOI: https://doi.org/10.1080/16258312.2020.1824533

in the previous chapter that affected the amendments on the warranties clause of MIA 2015[1429], mainly focuses on safeguarding the contractual relationship between the class and the vessel owner, providing the owner time to amend the issues located on the vessel, while at the same time excluding the class from any liability, arising as an outcome or due to an action of the vessel, while deemed substandard.

The above-stated opinion, along with establishing maritime marketing and installing port state control as the most effective and transparent process of vessel control, has installed the utility of class as supportive of maintaining the quality of the vessel and providing certificates to evidence the said quality.

Nevertheless, under any circumstance, the classification societies have the power they used to have and are presently resorting to marketing strategies to increase clientele. This fact even questions the transparency and the nonprofit role they have as objective inspectors and surveyors in pursuit of safety and quality in shipping. Thus, a rhetorical question arises:

"*Has the shipping practice rendered the classification societies substandard?*"

5.3 Protection and Indemnity Clubs

5.3.1 Definition

The P&I Clubs (Protection and Indemnity Clubs) are associations which aim to cover the damages to third parties (establishment of civil liability) that may arise in the event of an accident caused by one of their ships or a member of the crew. They are non-governmental, unprofitable maritime insurance providers, relying upon their members' submission, which "indemnify each other"[1430].

In particular, P&I Clubs cover risks not covered by traditional maritime insurance. In particular, P&I Clubs were established by the stakeholders of the market, namely the shipowners, with the aim to defend their interests more efficiently by establishing a Club that would provide them with protection from the various legal disputes and other related costs to which they may be exposed in the course of their

[1429] Soyer, B. (2012). *Warranties in marine insurance*. Routledge-Cavendish.
[1430] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).

operations[1431]. P&I Clubs have also a specialised department that provides legal advice and covers the costs in cases where claims are made, and investigations are conducted (FD&D). P&I Clubs show significant differences compared to private insurance companies, as they rely on a non-profit basis in order to better serve their members. Their peculiar nature lies in the fact that the shipowners themselves act both as insurers and as policyholders[1432].

5.3.2 The P&I Market

The ability of P&I Clubs to work together to facilitate the requirements is evidenced by the fact that, while each P&I Club holds its policy which variates from the others, the coverage that each P&I Club offers is generally similar. While this partnership was initially limited only to clubs formed in London based in the United Kingdom, it quickly became apparent that since the individual Clubs were working together, it was necessary to join a formal agreement. Thus, a group was formed by the P&I Clubs of the United Kingdom and was called the "International Group Agreement"[1433], hereinafter referred to as IGA[1434]. At the same time, the Scandinavian Clubs and the Japanese Club indirectly entered the group by reinsuring their risks. Therefore, IGA, founded in 1981, also became an observer of the International Maritime Organisation (IMO)[1435].

Currently, there are thirteen P&I Clubs members of IGA, which came to be the present IGP&I (International Group of P&I Clubs). The result of this partnership is the creation of an information and assistance network where a Club ship is in a state of emergency, as the members "*provide marine liability cover (protection and indemnity) for approximately 90% of the world's ocean-going tonnage*"[1436] and over

[1431] Bennett, P. (2001). Mutual risk: P&I insurance clubs and maritime safety and environmental performance. *Marine Policy*, **25**(1), 13-21. DOI: https://doi.org/10.1016/S0308-597X(00)00029-4.
[1432] Semark, D. (2013). *P&I Clubs: Law and Practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9780203720936.
[1433] International Group of P&I Clubs, (2022). *Group Agreements*. Available at: Group Agreements - The International Group of P&I Clubs (igpandi.org), last assessed: 28-8-2022.
[1434] GARD, (1999). The International Group Agreement - A review. Available at: https://www.gard.no/web/updates/content/52427/the-international-group-agreement-a-review, last assessed: 29-8-2022.
[1435] Kimball, J. D. (2012). The Central Role of P&I Insurance in Maritime Law. *Tul. L. Rev.*, **87**, 1147.
[1436] IGP&I, (2022), About the International Group. Available at: About us - The International Group of P&I Clubs (igpandi.org), last assessed: 29-8-2022.

95% of tankers in the world. The current members of IGP&I[1437] provide high-quality services and many of those total coverage against any risks[1438].

Clubs with the most vessels usually attract the most dominant ship-owning companies, which increases the Club's status and capacity for risk coverage. Specifically, the more vessels in a club, the higher the capital accumulation from calls, reducing the need for additional contributions and facilitating the members' needs in case a significant accident emerges[1439]. The majority of the vessels included in the P&I Clubs are tanker vessels, the most demanding regarding the risk of cargo for environmental pollution[1440].

Specifically, the most prominent members of IGP&I are Gard, followed by the Club of North of England and Britannia, focusing on providing services on tanker vessels carrying oil or liquified natural gas[1441]. While unloading oil cargo to the sea is considered the most impactful maritime accident, lead to massive pollution, any occurrence on a ship while carrying LNG, while not as pollutive as oil, can cause catastrophic events and lead to massive damages and loss of life. Of the non-members

[1437] IGP&I, (2022), Group Clubs. Available at: Group Clubs - The International Group of P&I Clubs (igpandi.org) , last assessed: 29-8-2022.

[1438] 1)American Steamship Owners Mutual Protection and Indemnity Association, Inc
2)Assuranceforenirgen Skuld (Skuld Mutual Protection and Indemnity Association) (Bermuda) Ltd
3)Gard P& I (Bermuda) Ltd Assuranceforeningen Gard)
4) The Britannia Steam Ship Insurance Association Limited
5)The Japan Ship Oweners 'Mutual Protection and Indemnity Association'
6)The London Steam- Ship Owners' Mutual Insurance Association Limited
7) The North of England Protection and Indemnity Insurance Association Limited
8)The Shipowners' Mutual Protection & Indemnity Association (Luxembourg)
9)The Standard Club Ltd
10)The Steamship Mutual Underwriting Association (Bermuda) Ltd
11)The Swedish Club
12) The United Kingdom Mutual Steam Ship Assurance Association (Europe Ltd)
13) The West of England Ship Owners Mutual Insurance Association (Luxembourg).

[1439] Anderson, C. B., & de la Rue, C. (2010). The Role of the P&I Clubs in Marine Pollution Incidents. *Tul. L. Rev.*, **85**, 1257.

[1440] Faure, M., & Heine, G. (1991). The insurance of fines: the case of oil pollution. *The Geneva Papers on Risk and Insurance-Issues and Practice*, **16**(1), 39-58. DOI: https://doi.org/10.1057/gpp.1991.3.

[1441] GARD, (2022). An introduction to the International Group of P&I Clubs. Available at: https://www.gard.no/web/content/an-introduction-to-the-international-group-of-p&i-clubs, last assessed: 23-8-2022.

of IGP&I, the most prominent are China and Korea P&I Clubs, which facilitate mainly local fleets and provide specialized services[1442].

5.3.3 Historical Development

There are many examples in the history of early forms of P&I Clubs, where they suggest forms of early risk sharing in maritime trade. A typical example is that of the merchants on the riparian roads of China. In particular, the merchants 'weighed' their losses by dividing their cargo by half of some ships into others; therefore, the risk of loss was shared or interspersed. In this way, since ancient times, guilds had been created in India, Babylonia, and Egypt, which evolved into more organized forms by the Romans and the Greeks[1443].

The early elements of the institution appeared as early as the 18th century as mutual insurance organisations that would cover the losses that could not or were not intended to be covered by the then insurance bodies, among which were dominated by Lloyd's insurers. Thus, at the end of the 18th century and the beginning of the 19th century, the shipowners set up the so-called "Hull clubs", in which they included their ships in order to distribute among themselves the damages of each member[1444]. These were financed based on some initial contributions, covering the operating costs. Then the members were required to pay additional amounts in proportion to each year's financial responsibilities for each of them[1445].

In 1824, the insurance market was liberalized, and new insurance companies entered the field with the final result of the marginalization of these former mutual insurance organisations – cooperatives.

However, the growing need to cover risks beyond those covered by insurance companies (and Lloyd's) gradually led to the Protection and Indemnity

[1442] Marchand, P. (2017). The International Law Regarding Ship-Source Pollution Liability and Compensation: Evolution and Current Challenges. In *International Oil Spill Conference Proceedings* (Vol. 2017, No. 1, pp. 193-210). International Oil Spill Conference.
[1443] Tilley, M. (1986). The Origin and Development of the Mutual Shipowners' Protection & (and) Indemnity Associations. *J. Mar. L. & Com.*, **17**, 261.
[1444] Ronneberg Jr, N. J. (1990). An introduction to the protection & (and) indemnity clubs and the marine insurance they provide. *USF Mar. LJ*, **3**, 1.
[1445] Maitland, I. (2019). Maritime insurance: The establishment of Lloyds of London and the fascinating history of marine insurance. *Bulletin (Law Society of South Australia)*, **41**(10), 23-25.

cooperatives (P&I clubs), which were called upon to meet the needs arising from the repeal of the Act of 1719[1446].

Thus, they started by insuring 1/4 of the liability from a collision of ships for the loss of life and injuries and this coverage was called "Protection Insurance". The remaining 3/4 of the liability was covered by the existing insurance organisations, while the responsibility for the cargo was independent.

After losing the cargo of the Ship Western Hope in 1870 due to "negligent navigation", one of the P&I clubs (the North of England Association) established cargo insurance as a separate – new entity[1447].

After the grounding of the ship Emily and other similar incidents of ship loss along with cargo, the so-called "Indemnity Insurance" was generalized and finally adopted by other relevant organisations[1448].

After the adoption of the Companies Act of 1862, which abolished the monopoly on the insurance market, the so-called "mutual associations" as well as the companies "joint stock companies", which could officially be active in maritime insurance, acquired legal status with the necessary condition of registration of at least twenty members[1449].

In 1874, the Association of Mutual Protection and Compensation of Steamship Owners was founded in Newcastle, officially included in its coverage requirements related to cargo[1450].

[1446] Tilley, M. (1986). The Origin and Development of the Mutual Shipowners' Protection & (and) Indemnity Associations. *J. Mar. L. & Com.*, **17**, 261.
[1447] Merkin, R., Hjalmarsson, J., Bugra, A., & Lavelle, J. (2014). *Marine insurance legislation*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315816678.
[1448] Gürses, Ö. (2015). *Marine insurance law*. Routledge.
[1449] Edwards, J. R., & Webb, K. M. (1985). Use of Table A by companies registering under the Companies Act 1862. *Accounting and Business Research*, **15**(59), 177-196. DOI: https://doi.org/10.1080/00014788.1985.9729264.
[1450] Li, L. (2014). Marine Insurance Law-General Conditions in Hull, Cargo and P&I Covers. *Asian Bus. Law.*, **13**, 129.

This is how the insurance institution "Protection and Indemnity Club" was finally formed, which insures everything that is not covered by the insurance of the ship, the mechanical equipment and the cargo by the insurance companies[1451].

5.3.4 Legal framework

According to the Bubble Act 1720, the Hull Insurance Associations and the later P&I Clubs did not have legal form and legal personality as they were shipowners associations without a corporate structure. In particular, the companies Royal Exchange Assurance and London Assurance Corporation had the exclusive right to offer maritime insurance services, with the result that the shipowners, in order to safeguard their interests better, created the associations of the mutual insurance organisations "P&I Clubs" (but without a corporate legal form) in which each shipowner had a dual role by acting as an insurer and as an insured person[1452].

However, the lack of legal personality gave rise to individual liability for the shipowners, resulting in any action of the Club against a member who did not properly pay its contributions being exercised individually in the name of each member-shipowner. The Companies Act 1862 made it necessary to impose legal personality on mutual societies[1453].

In England, the establishment and operation of Insurance Companies are governed by the Rules of Insurance Companies Act 1982, with the adoption of which the monopoly on the insurance market was abolished, and the so-called "Mutual Associations" (mutual organisations) and the companies "Joint Stock" (the intermediate form between a Société Anonyme and a Partnership) was created. With the Insurance Companies Act 1982, the insurance institution must have a legal form as a company registered society body corporate[1454].

P&I Clubs have the form of limited companies with no share capital limited liability companies. Due to the non-profit-making nature of mutual insurance

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[1451] Ronneberg Jr, N. J. (1990). An introduction to the protection & (and) indemnity clubs and the marine insurance they provide. *USF Mar. LJ*, **3**, 1.

[1452] Harris, R. (1994). The Bubble Act: Its passage and its effects on business organisation. *The Journal of Economic History*, **54**(3), 610-627. DOI: https://doi.org/10.1017/S0022050700015059.

[1453] Pulbrook, A. (1865). *The Companies Act, 1862, with Analytical References and Copious Index.*. Effingham Wison.

[1454] Durham, M. F. (1982). The Companies Act, 1980: Its Effects on British Corporate Law. *Nw. J. Int'l L. & Bus.*, **4**, 551.

organisations, the nature of their legal form imposes the absence of share capital. The members of limited liability companies without share capital do not have the status of shareholder but of guarantor and undertake the obligation to contribute a sum of money symbolic in the event of the dissolution and liquidation of the company. Therefore, modern P&I Clubs do not have share capital but give their members the right to participate in profits. Members are governed by the principle of reciprocity and jointly participate in profits and losses while guaranteeing the claims of third parties (network of reciprocal guarantees)[1455].

5.3.5 Organisational Structure

The status, obligations and other rights of each member of the Club are regulated by the Articles of Incorporation and the relevant statutory framework. First, the executives of each Club are defined at the General Meeting, where the Directors are elected. At the same time, the second hierarchical body is the Board of Directors, which facilitates the Club's activities under the Articles of Incorporation[1456].

In the case of Clubs registered as UK companies, the articles of incorporation are initially defined in the First Companies Scheme 1948, which concerns Limited Companies by guarantee and in the Companies Regulations 1985[1457].

The Clubs' regulations define issues such as the determination of the required qualifications for the entry of members into the Club, the procedures for the deletion and departure of members, the rights of Protection & Compensation, the obligations to pay Contributions, the issues of General Assemblies as well as the Voting Rights[1458].

[1455] In the Greek Legal System, the establishment and operation of mutual insurance organisations is provided for by Law 3567/2007 (Government Gazette 122 / 8.6.2007) on "Cooperatives of maritime mutual insurance" which fills in the legislative gaps of Law 400/1970 "on a private insurance company" and law 551/1970 "on a private company for the insurance of ships and aircraft", as amended by Law N4364/2016 - Government Gazette 13 / A / 5-2-2016 where the Greek Legislation was harmonized with Directive 2009/138 / EC of the European Parliament and of the Council on the taking-up and pursuit of the business of insurance and reinsurance. (Legislative Decree 400/1970). (Law 4364/2016-Government Gazette 13/A/5-2-2016). (Law 3567/2007-Government Gazette 122/8.6.2007).

[1456] Sarkhosh, E. (2019). A legal Study of Nature, Structure and the Establishment Way of the Protection and Indemnity Clubs (P&I Clubs) in Local and International Domain. *Iranian Journal of Insurance Research*, **34**(1), 85-103.

[1457] Thomas, R. (Ed.). (2015). *The Modern Law of Marine Insurance: Volume Four*. CRC Press.

[1458] Sarkhosh, E. (2019). A legal Study of Nature, Structure and the Establishment Way of the Protection and Indemnity Clubs (P&I Clubs) in Local and International Domain. *Iranian Journal of Insurance Research*, **34**(1), 85-103.

The Regulations and Articles may be amended following a relevant Decision of the General Assembly. The appropriate amendments exclude ships that travel until the trip is completed.

As far as voting rights are concerned, these are defined by the Statute. In the case of P&I Clubs, contrary to the principle that the power of a member's vote is linked to the amount of insurance, the vote is related to the net tonnage based on which the level of contributions is calculated[1459].

5.3.5.1 General Assembly

The General Meeting is the highest body of the Club and handles the design of the Regulations. It meets regularly, annually or exceptionally if the Board of Directors requests.

Specifically, the primary responsibilities of the General Assembly are summarized as follows[1460]:

a) Approval of the annual reports and the Balance Sheet
b) Appointment of the members of the Committee
c) Election of Auditors
d) Amendment of Regulations
e) Decisions on matters raised by the Commission
f) Determination of the Articles of Incorporation
g) Setting the remuneration salaries for the Board of Directors
h) Approval of dissolution or merge of the Club

The period of time of the ordinary Meetings is provided for by the Articles of Incorporation, including the voting rights, which are formed as follows[1461]:

a) One vote: up to 20,000 GT
b) Two votes: 20,000- 50,000 GT
c) Three votes: 50,000- 100,000 GT

[1459] Howse, T. (2020). P&I perspectives. In *Autonomous Ships and the Law* (pp. 193-206). Routledge.
[1460] Attard, F. G. (2020). Table of Selected Instruments. In *The Duty of the Shipmaster to Render Assistance at Sea under International Law*. Brill Nijhoff. DOI: https://doi.org/10.1163/9789004438255_005.
[1461] GARD, (2022). Corporate Governance. Available at: https://www.gard.no/web/about-gard/corporate-governance, last assessed: 29-8-2022.

d) Four votes: 100,000 GT- 200,000 GT and an additional one vote for every 100,000 GT

Indicatively, it is mentioned that there is no insurance period less than the one-year insurance period (from February 20 of one year to February 20 of the following year)[1462].

5.3.5.2 Board of Directors

The "Board of Directors" management body and the members of the Board of Directors are managers of companies. The members of the Board of Directors are elected annually by the Annual General Meeting, and the number of members of the Board varies from club to club. All members have the opportunity to stand as candidates, provided that there is a minimum level of 10,000 GT and does not exceed the seventieth year of age[1463].

The voting procedure in the Council is based on the number of ships and not on the tonnage level (e.g. one ship-one vote). The Board of Directors meets every two or three months for issues and decision-making on general policy and management. The specific duties of the directors are divided into issues of a financial nature, revision of the Regulations, approval of claims, resolution of disputes arising between the members and the Club, approval of reinsurance benefits, recruitment and dismissal of administrative staff, settlement of financial debts, determination of the beginning- end of the insurance period and decisions on the distribution of possible profits as well as determination of the amounts of contributions and the frequency of their payment[1464].

5.3.5.3 Management of P&I Club

The management of P&I Clubs is conducted either by special legal management companies or by managers hired exclusively for this purpose. The managers' duties include collecting contributions, keeping claims records, checking members' accounts, issuing a certificate of entry for members, paying receivables and

[1462] Johansson, S. O. (2008). Marine and other types of transport insurance. *Jure Förlag, Stockholm*.
[1463] GARD, (2022). Corporate Governance Manual. Available at: INTRODUCTION (gard.no), last assessed: 26-8-2022.
[1464] Ibid.

deciding who can become members of the Club. In general, their jurisdiction and duties are defined by the articles of association of each Club[1465].

5.3.5.4 Representatives - Correspondents

P&I Clubs operate and provide services at a global level with the help of correspondents who specialize in "P&I" protection and indemnity issues in the world's most important ports. In particular, the list of correspondents does not represent any contractual or agency relationship between the correspondent and the Club[1466]. Correspondents do not act as agents and are not automatically authorized to accept service of any process on behalf of the Clubs or any affiliate or affiliates[1467]. The correspondent usually acts for the shipowner/charterer whose ship is admitted to the Club[1468].

In general, P&I Clubs require agents to be informed in good time when claims are made; otherwise, the Club rejects the right to satisfy the claim. Correspondents must be able to communicate 24 hours a day, inform the Club of any changes, regularly review their listings on websites, operate in accordance with the highest ethical standards and have appropriate systems in place[1469].

5.3.5.5 Penalties

Correspondents should be aware that sanctions and regulations imposed by a state, international organisation or other competent authority affect the services that P&I Clubs offer to their members regarding the sanctions to which they may be subject. In particular, some Clubs may not be able to assist their members with the letter of undertaking or the bank guarantee to secure a claim[1470].

It is the respondent's responsibility to ensure that third parties with claims against the Club are not persons included in any trade or economic sanctions,

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[1465] Howse, T. (2020). P&I perspectives. In *Autonomous Ships and the Law* (pp. 193-206). Routledge.
[1466] International Group of P&I Clubs (2017). International Group Guidelines for Correspondents 2017. Available at: International Group Guidelines for Correspondents 2017 - The International Group of P&I Clubs (igpandi.org), last assessed: 26-8-2022.
[1467] Ibid.
[1468] Semark, D. (2013). *P&I Clubs: Law and Practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9780203720936.
[1469] Kimball, J. D. (2012). The Central Role of P&I Insurance in Maritime Law. *Tul. L. Rev.*, **87**, 1147.
[1470] Christodoulou, D. (2009). Protection & Indemnity Clubs And Competition. In *Competition and Regulation in Shipping and Shipping Related Industries* (pp. 317-336). Brill Nijhoff. DOI: https://doi.org/10.1163/ej.9789004173958.i-404.111.

particularly those published and maintained by the United Nations, the European Union and the United States. The sanctions situation may change, and the correspondent must immediately contact the club concerned for specific advice[1471].

5.3.6 Insured risks covered by P&I Clubs

In P&I Clubs insurance, the insured is covered for standard risks displayed in the P&I Clubs Rules and which are summarised as follows:

a) Environmental Pollution

The issue of environmental pollution was the main reason that led to the creation of the P&I Clubs. As a result, many relevant legislations have been adopted to minimise and counter the damage from pollution or limit the liability (such as CLC, OPA 90, LLMC, etc.)[1472], which have already been mentioned in Chapter 3, or even unique systems such as STOPIA[1473] have emerged.

The Clubs have insured these claims up to a monetary limit in relation to oil pollution claims, currently amounting to 1 billion dollars for each accident corresponding to each ship entering the Club. This limit of oil pollution applies to direct and indirect claims such as those relating to a collision with another ship[1474].

b) Cargo loss or Damage

The coverage extends beyond sea transport, protecting the shipowner throughout the contract of carriage. The part compensated, in addition to the insurance contract, is covered since the vessel owner may be compensated for any costs from unloading any damaged cargo. The Hague, the Hague Visby or the Hamburg Rules apply to the assessment of liability in conjunction with the Clubs' Rules and other relevant legislation[1475].

[1471] Anderson, C. B., & de la Rue, C. (2010). The Role of the P&I Clubs in Marine Pollution Incidents. *Tul. L. Rev.*, **85**, 1257.

[1472] Bennett, P. (2001). Mutual risk: P&I insurance clubs and maritime safety and environmental performance. *Marine Policy*, **25**(1), 13-21. DOI: https://doi.org/10.1016/S0308-597X(00)00029-4.

[1473] IOPC Funds (2022). STOPIA & TOPIA. Available at: IOPC FUNDS | STOPIA and TOPIA, last assessed: 28-8-2022.

[1474] Bennett, P. (2000). Environmental governance and private actors: enrolling insurers in international maritime regulation. *Political geography*, **19**(7), 875-899. DOI: https://doi.org/10.1016/S0962-6298(00)00029-9.

[1475] Li, L. (2014). Marine Insurance Law-General Conditions in Hull, Cargo and P&I Covers. *Asian Bus. Law.*, **13**, 129.

c) Loss of Life

The shipowner shall be exposed to claims relating to injury, illness or death of passengers or crew carried on board the vessel. These requirements in some countries are limited to employment contract conditions or passenger tickets. Still, the owner may be found liable due to gross negligence or misconduct. Also, he may be found liable for committing a tortious act on persons other than the crew, dockers and passengers coming to his ship, including inspectors and customs officers. Coverage of liability towards these individuals is also included[1476].

d) Wreck removal

The Clubs provide cover for the owner's liability in terms of unloading, removal, destruction, lighting or marking of the shipwreck. From the costs for wreck removal, the value of the wreck will be deducted[1477].

e) Damage to fixed or floating objects

The P&I Clubs provide cover for damages caused by the contact of the vessel with property owned by other persons, including docks, yards and other floating or non-floating objects. The shipowner must not insure this risk with the P&I Club when he is covered by the Hull & Machinery insurance as, for example, with the German and Scandinavian Hull & Machinery insurance.

The Club's coverage also covers any damage from the collision caused by the incoming ship to other ships and their cargo, such as in case of damage to an anchored ship due to excessive speed[1478].

f) Collisions with other ships- Collisions with other ships

The traditional Hull & Machinery insurance covers only 3/4 of the assured ship's liability for loss or damage to another vessel or cargo. The remaining 1/4 of this liability is insured by the Club. This 1/4 leads the Club to charge a higher insurance

[1476] Hughes, J. E. (1997). Safety at sea; a P&I perspective. *Risk Management*, **44**(5), 45-48.
[1477] Michel, J., Gilbert, T., Etkin, D. S., Urban, R., Waldron, J., & Blocksidge, C. T. (2005, May). Potentially polluting wrecks in marine waters. In *Annals of the 2005 International Oil Spill Conference, Maio* (Vol. 16, pp. 1-84).
[1478] Ozguc, O. (2021). The assessment of impact damage caused by dropped objects on floating offshore structures. *Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment*, **235**(2), 491-510. DOI: https://doi.org/10.1177/147509022097258.

rate. In practice, the insurers of Hull & Machinery entrust the handling of the entire claim, including the necessary guarantees, to the P&I Club to represent the insurance interests.

Several important exceptions to the coverage of Hull & Machinery are provided for in the Running Down clause. For example, the obligations to remove shipwrecks are excluded, as well as damage to the structures of the coast or the cargo of the insured vessel, in addition to pollution and loss of life or bodily injury to a person on board a ship[1479].

g) Fines

The shipowner pays a wide range of fines, either directly or indirectly, due to the obligation to return the crew members. Most of them are provided for in the Clubs' Rules[1480].

h) Sue & Labour expenses

Court expenses and labour costs are defined as extraordinary costs and expenses related to avoiding or minimising any insured obligations. As with H&M's insurance coverage, the P&I Club Rules are subject to Section 78 of MIA 1906[1481], where three P&I Clubs Rules regulate these costs. First, The Britannia Club Rule 19 provides cover for the policyholder regarding losses and expenses necessarily incurred by a member after a loss-making event. The Rules of the Britannia Club and the Nepia Club contain rules on reducing liabilities for damages[1482].

i) Freight- Demurrage and Defence (FD&D)

This form of insurance, called Freight- Demurrage and Defence (FD&D), provides P&I members with coverage of claims and legal expenses relating to a wide

[1479] Girvin, S. (2018). Collisions at sea: All in the evidence?. *Lloyd's maritime and commercial law quarterly*, **1**, 27-33.
[1480] Faure, M., & Heine, G. (1991). The insurance of fines: the case of oil pollution. *The Geneva Papers on Risk and Insurance-Issues and Practice*, **16**(1), 39-58. DOI: https://doi.org/10.1057/gpp.1991.3.

[1481] Marine Insurance Act 1906 (2022), Suing and labouring clause. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 27-8-2022.
[1482] Bennett, P. (2001). Mutual risk: P&I insurance clubs and maritime safety and environmental performance. *Marine Policy*, **25**(1), 13-21. DOI: https://doi.org/10.1016/S0308-597X(00)00029-4.

range of legal disputes[1483]. Typically, these disputes are unrelated to P&I or H&M insurance and result from the possession, sale or purchase, construction or operation of a registered vessel.

For example, FD&D's insurance covers the costs of processing or defending claims and disputes related to charter agreements, transport contracts, loading bills, contracts for construction, sale, repair, purchase of ships, ship agency, loading and loading and unloading, and towing and rescue contracts[1484]. They also concern insurance mediation, ship brokerage and management services, crew contracts and maritime insurance contracts, the cost of obtaining legal advice and assistance, including the costs of recruiting experts. Therefore, it is sometimes also called "Defence Costs"[1485].

5.3.7 Basic Principles governing the institution of P&I Clubs

5.3.7.1 The Universal Rule

The provision of the universal rule symbolizes the uniqueness of the institution of P&I Clubs, and the principle of reciprocity is emphasized mainly through it. In particular, the Rule with universal effect "against all things," also known as the "Omnibus Rule"[1486], is a provision that conjugates the position of the Club regarding the claims of its members, i.e., the claim of a member must be placed within the insurance coverage, even in the case where it does not fall under one of the explicitly mentioned risks[1487].

The application of the Omnibus Rule is at the discretion of the Club. It is an optional Rule for Administrators to apply only to those members who truly deserve it. An additional feature of this Rule is that each claim submitted for investigation must

[1483] Phillips, B. (1997). The Future of P&I Clubs. *MLAANZ Journal*, **12**, 23.
[1484] Marquais, O., & Grec, A. (2020). Do's and Dont's of Regulating Third-Party Litigation Funding: Singapore Vs. France. *Asian International Arbitration Journal*, **16**(1). DOI: https://doi.org/10.54648/aiaj2020014.
[1485] Exceptions may arise such as: i) Loss or damage to own property, ii) Contractual liabilities unless approved by the Club (Contractual obligations unless approved by the Club), iii) Salvage operations conducted by the entered ship (The rescue operations carried out by the incoming ship), iv) War risks War risks: The 13 CLUBS of IGP&I have established for many years a special insurance to cover war risks for the benefit of their members. The terms of this coverage are communicated to the members each year by a Circular.
[1486] Tilley, M. (1986). Protection and indemnity club rules and direct actions by third parties. *J. Mar. L. & Com.*, **17**, 427.
[1487] Schisel-Meslin, J. M. (2018). Out of the Club: Out of Luck: Complexities Facing Injured Third Parties Seeking Recovery from P&I Clubs. *Tul. Mar. LJ*, **43**, 319.

be examined individually, i.e., each claim must be examined strictly independently based on case-by-case criteria and not based on previous similar cases that may have been submitted for investigation in the past[1488].

5.3.7.2 The Principle of Mutuality

Traditionally, P&I Clubs provide insurance coverage mutually, i.e., on a non-profit basis. Each member contributes to the Club's deposit, matching funds to the risk his vessels may cause. For instance, the risk factor of a company with two vessels is two times higher than a company with one vessel, so it is two times more likely to cause any damages or loss. Thus, the first company's contribution should be double that of the second. Other factors can directly affect a company's risk factors, such as the type or size of the vessel, the area of trade, the age, etc[1489].

In addition to the call, namely the members' subscription to the club, which is submitted annually and replenishes the costs of operation, there is also the supplementary call, which is utilised when the deposit of the club is nearly spent due to an increased amount of expenses arising from many or one major liability. The submission of the supplementary call is an extenuating measure, and the distribution of percentages for the submission of the fees by each company is equal to the percentage of the annual call[1490].

In 2016, while their degree of flexibility was considerably limited, the Solvency II Regulation concerning insurance companies in Europe was initiated, along with introducing similar regulations in other countries, such as Bermuda. Expressly, it is stipulated that most P & I Clubs that are members of IGP&I are subject to provisions regulating the solvency and distribution of contributions based on the type of risk. This ensures that the Club has an adequate reserve for any future claims and, as a result, greater control is gained while at the same time limiting the degree of arbitrariness of

[1488] Ebrahimi, S. N., Keshavarzi, G., Keshavarz Bahadori, N., & Sharifi, S. (2017). The Role of P & I Clubs in Indemnifying Oil Pollution Damages. *Journal Of Researches Energy Law Studies*, **3**(2), 169-192. DOI: 10.22059/JRELS.2018.251052.179.

[1489] Bennett, P. (2001). Mutual risk: P&I insurance clubs and maritime safety and environmental performance. *Marine Policy*, **25**(1), 13-21. DOI: https://doi.org/10.1016/S0308-597X(00)00029-4.

[1490] Bennett, P. (2000). Mutuality at a distance? Risk and regulation in marine insurance clubs. *Environment and Planning A*, **32**(1), 147-163. DOI: https://doi.org/10.1068/a3215.

the P&I Clubs that traditionally decide for themselves on the strength of their balance sheet and the supplementary contributions of their members[1491].

5.3.7.3 The principle of Pooling Risk

Nevertheless, despite the allocation of the percentages for assessing each member's contribution, the concept of P&I clubs was structured around the indemnity of each member from the other members. To this end, despite each member's contribution and power inside the P&I Club, when a claim emerged, the resources of the P&I Club were at the liable party's disposal to counter or minimise the claim, and this member withdrew from the Club's deposit the required capital to cover the claim[1492]. The amount of capital spent was equal to the required amount, regardless of the company's size, vessel type, etc. This operation was based on the fact that the P&I was precisely created for the ship owners to share the burden when environmental disasters emerge and based on the impossibility of such disaster's extinction, regardless of the measures taken[1493].

5.3.8 Operational Issues

5.3.8.1 Entry and exit of Members.

The procedure for the entry of shipowners into the Club requires the submission of an application, which is essential for starting the negotiation process until the signing of an agreement incorporating the rules, the rights and the obligations of the member while joining the club. Specifically, upon the application, the requested details of the vessel are: the name, the type, the class and the age of the vessel, along with the gross tonnage and crew nationality, the port of registry, certificate of the ISM Code, full details of Hull& Machinery insurance and details of brokers and managers. During the finalisation of the entrance to the Club, the new member is provided with an entry certificate, a copy of the club's regulations and an official letter of acceptance. Finally,

[1491] Christofilou, A., & Chatzara, V. (2020). The Internet of Things and Insurance. In *InsurTech: A Legal and Regulatory View* (pp. 49-81). Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-27386-6_3.
[1492] Liu, J., & Faure, M. (2018). Risk-sharing agreements to cover environmental damage: theory and practice. *International Environmental Agreements: Politics, Law and Economics*, **18**(2), 255-273. DOI: https://doi.org/10.1007/s10784-018-9386-0.
[1493] Tilman, A. R., Levin, S., & Watson, J. R. (2018). Revenue-sharing clubs provide economic insurance and incentives for sustainability in common-pool resource systems. *Journal of theoretical biology*, 454, 205-214. DOI: https://doi.org/10.1016/j.jtbi.2018.06.003.

the vessels of the new member undergo inspection to be classified, and their risk factor is assessed and checked if they are seaworthy[1494].

The exit of the members from the Club occurs either with the voluntary departure of the member, or his bankruptcy, with the non-payment of his contributions or with the total loss of the ship. In any case, the Club may terminate the insurance at any time, as long as it notifies the member in writing within seven days, while the member must declare his departure in writing within a period of 30 days[1495].

5.3.8.2 The contributions - Calls

One of the hallmarks of P&I Clubs' insurance and reciprocity is the "calls" contribution system. It is not about paying "premiums" premiums as is the case with Hull& Machinery insurance. Instead, the contribution of the members is provided for by the Marine Insurance Act 1906 section 85§2 as follows:

"*The provision of the law on the payment of premiums does not apply to mutual insurance but may be replaced by the guarantee or other arrangements that can be agreed*" (Marine Insurance Act, 1906)[1496].

It has been said that contributions are 'equivalent to premiums', but in essence, a more precise approach to the nature of contributions is that they bear a 'kinship similarity to premiums'. This is because the contribution members pay for their insurance is not just the general amounts of money but their commitment to taking responsibility and complying with the rules of the Club[1497].

The amounts of the advance or deferred contributions payable must be notified to the members before January 20, i.e., one month before the beginning of the insurance year. For each ship entering during the insurance year, the member must pay a number of deferred contributions, depending on various risk factors[1498].

[1494] MacDonald, P. (2018). Direct Action Against Insurers and P&I Clubs. In *Marketing and Managing Tourism Destinations* (pp. 168-186). Informa Law from Routledge.

[1495] Puscaciu, V., & Odubo Ebiere, S. (2019). Current Trends in Maritime Insurance. *EIRP Proceedings*, **14**(1).

[1496] Marine Insurance Act 1906 (2022), *Modification of Act in case of mutual insurance*. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 27-8-2022.

[1497] Schisel-Meslin, J. M. (2018). Out of the Club: Out of Luck: Complexities Facing Injured Third Parties Seeking Recovery from P&I Clubs. *Tul. Mar. LJ*, **43**, 319.

[1498] Aalberg, A. L., Bye, R. J., & Ellevseth, P. R. (2022). Risk factors and navigation accidents: A historical analysis comparing accident-free and accident-prone vessels using indicators from AIS data and vessel

The total premium paid by the members for each insurance year consists of the Advance and deferred contributions. Their sum is the estimated total contribution or ETC (Estimated Total Call). Contributions related to the insurance coverage of P&I Clubs and Defence cover, respectively, are calculated separately[1499].

5.3.8.3 The Insurance Year

The insurance year begins on February 20 and continues until February 20 of the following year. The insurance year in P&I Clubs differs from traditional naval insurance, starting on January 1 and ending on January 1 of the following year. In particular, the insurance year of the P&I Clubs historically, temporally, and semantically is marked by the melting of the ice in the Baltic Sea, which frees the passage of ships and maritime transport, which also entails the opening period of maritime accidents[1500].

During the insurance year in each P&I Club, an estimation of the number and size of claims of each of its members is recorded. In this way, an insurance year can be closed, although the claims are still pending after they have at least been notified and estimated[1501]. Therefore, completing a year without investigating and compensating each claim is possible. The Committee of P&I Clubs may decide to close an insurance year even if there are uncalculated claims relating to the current insurance year or the exact amounts have not been determined. However, most P&I Club rules set the precise conditions for closing an insurance year and the requirement of additional contributions from its members[1502].

P&I Clubs must exercise extreme diligence and caution when assessing pending claims to hold sufficient reserves to pay for any "surprise claims" that arise.

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databases. *Maritime Transport Research*, **3**, 100062. DOI: https://doi.org/10.1016/j.martra.2022.100062.

[1499] Gürses, Ö., & Hjalmarsson, J. (2020). Marine Insurance. In *Maritime Law* (pp. 465-529). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781003046943.

[1500] Ibid.

[1501] Gayer, S. Y. (2020). Admiralty and Maritime Law Committee. *The Brief*, **49**(3), 6-7.

[1502] Hunter, G. (2020). Standard forms–the BIMCO experience. In *Legal Issues Relating to Time Charterparties* (pp. 1-15). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781003122838.

Insurance years in some Clubs may be closed after the end of a certain period of time, from 15 months to four years. In any case, any such decision is left to the discretion of the Commission or the Directors of the respective P&I Club[1503].

5.3.8.4 Categories of Contribution

The contributions of the members consist of many factors, which differ from one Club to another, but their main distinction is as follows:

5.3.8.4.1 Advance Contributions

The advance or initial calls for any insurance year are expressed as a fixed percentage of the estimated total call (ETC) and apply to all ships entering the Club. The advance payment represents a part of the total estimated contribution and amounts to 70%. It is paid in three instalments to achieve the member's cash flow[1504].

5.3.8.4.2 Deferred Contributions

Deferred calls are, in fact, premiums, the payment of which is deferred until the following year or subsequent insurance years. Deferred contributions are a prerequisite for a member to enter the Club. Essentially, the only postponed element is the time of payment of each amount. As a result, the Club gets a better idea of the overall financial result of an insurance period before the payment of each member's Deferred contribution. Therefore, if the financial result for an insurance period is substantially better than expected, the Club may decide to waive the claim of the Deferred contribution in its entirety or, most likely, for a part of it. Although provision is made for the contribution reimbursement, the Club may redefine the amount of the initially estimated total contribution by quantifying the level of deferred contribution[1505].

The Club seeks to collect the deferred contribution during the first twelve months before starting the following insurance year. Still, it can also be collected later, but it cannot be collected after the end of the insurance year to which it relates.

[1503] Osuji, O. K. (2019). Club Theory and Directors' Performance Evaluation. In *Enhancing Board Effectiveness* (pp. 151-183). Routledge. DOI: https://doi.org/10.4324/9781315169477.

[1504] Levantesi, S., & Piscopo, G. (2022). Mutual peer-to-peer insurance: The allocation of risk. *Journal of Co-operative Organisation and Management*, **10**(1), 100154. DOI: https://doi.org/10.1016/j.jcom.2021.100154.

[1505] MacDonald, P. (2018). Direct Action Against Insurers and P&I Clubs. In *Marketing and Managing Tourism Destinations* (pp. 168-186). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781351028141.

In particular, the deferred contribution is calculated as a percentage of the advance received for the year in question, i.e. it may amount to 1/4 of the advance contribution. In another case, if the advance payment constitutes eighty percent (80%) of the total estimated contribution (ETC), the deferred contribution will amount to twenty percent (20%) of the total estimated contribution (ETC). However, the deferred contribution ultimately paid may be less than initially provided for[1506].

Ships entering after the start of the insurance year must pay the percentage of the Advance and Deferred contributions for the entire current insurance period regardless of the financial correspondence of the time the ship was admitted to the Club. This tactic is applied because each ship carries a risk from the moment of entering the Club and must proportionally share the risk of all other vessels that have entered. Finally, when the entry of a ship is terminated or interrupted during the year, the Member remains responsible for advances and deferred contributions according to the proportional application of its contributions. The proportional liability of the Ships relates to all claims that arose during the insurance period, regardless of whether the events were caused before or after the entry of the ships[1507].

5.3.8.4.3 Additional and Refundable Contributions

At the end of the insurance year, the Club takes into account the costs of the claims that arise and are pending, along with other related costs. Any excess expenses against revenues are then collected by the members through the additional contributions-calls known as "supplementary calls," which are calculated according to the payable percentage of advance payment corresponding to each member. If the income exceeds the expenses, the reimbursement can be made either through the refund of the contribution to the members, also known as "return calls", or alternatively invested in various funds held by each Club in many ways, such as[1508]:

a) Transferring the surplus or any part of it to the Reserves of the Club.

[1506] Liu, J., & Faure, M. (2018). Risk-sharing agreements to cover environmental damage: theory and practice. *International Environmental Agreements: Politics, Law and Economics*, **18**(2), 255-273. DOI: https://doi.org/10.1007/s10784-018-9386-0.

[1507] Levantesi, S., & Piscopo, G. (2022). Mutual peer-to-peer insurance: The allocation of risk. *Journal of Co-operative Organisation and Management*, **10**(1), 100154. DOI: https://doi.org/10.1016/j.jcom.2021.100154.

[1508] Aydin, M., Camliyurt, G., Akyuz, E., & Arslan, O. (2021). Analyzing human error contributions to maritime environmental risk in oil/chemical tanker ship. *Human and Ecological Risk Assessment: An International Journal*, **27**(7), 1838-1859. DOI: https://doi.org/10.1080/10807039.2021.1910011.

b) Using the reported surplus for any deficiencies that arise at the end of an insurance period.
c) Returning the surplus or part of it to members who entered the Club that year.

5.3.8.4.4 Renewal Contributions

The problem that arises at the end of the insurance year lies in the renewal of the members' participation for the following insurance period. In practice, due to the complexity of the cost of claims, which is usually a time-consuming process, it is not easy to evaluate all the records of claims that correspond to each member of the Club. In particular, at the time of a renewal, it is difficult to calculate the amounts of contributions of each member required in the future[1509].

The result is that changes in insurance contributions, regardless of whether they are upwards or bearish, deviate from the corresponding changes related to the economic valuation of claims by about three years back. In any case, if a member is concerned and considers that he is wronged by incorrect assessments of the Club Administrators regarding premiums, he has the right to submit a request for dispute to the Commission or the Directors for further investigation and evaluation. P&I Clubs, unlike hull &machinery's traditional insurance, do not examine recent claims' records as they are a time-consuming process, and it is, therefore, difficult to extract a reliable record of claims before four or more years have elapsed[1510].

5.3.8.4.5 Exemption Contributions

When a member's entry and participation in the club to which they belong is terminated, the club usually sets an additional premium as an exemption contribution known as "release calls" based on the expected contribution rate for the following year.

[1509] Benamara, H., Hoffmann, J., & Youssef, F. (2019). Maritime transport: The sustainability imperative. In *Sustainable Shipping* (pp. 1-31). Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-04330-8_1.
[1510] Snowdon, A. L. (2022). Investigating losses occurring during shipment: forensic aspects of cargo claims. In *Postharvest Handling* (pp. 469-484). Academic Press. DOI: https://doi.org/10.1016/B978-0-12-822845-6.00016-6.

The payment of this contribution obliges the retired member to be released from his obligations for future contributions related to the period of his entry[1511].

Release calls are the ex-ante payable percentage of the contribution share of each owner-member, which must be paid upon departure and is calculated in proportion to the estimated total contribution that will arise in the future within the framework of the policy followed by the P&I Clubs for the respective years. In the absence of this mechanism, the Club would bear the burden of paying its former members' contributions for five or more years after they departed from the Club[1512].

5.3.8.4.6 Refund of Contributions for Decommissioned vessels or vessels under repair

Most Clubs, in the case of decommissioning or repair of the ship, make the proportional reimbursement of part of the advance premiums (lay-up calls), provided that there is no cargo on the vessel while it is decommissioned. There are two cases of decommissioning. First, decommissioning for a short time where there is cargo and crew on board. Secondly, decommissioning for a long time where there is neither cargo nor crew on board. In the first case, there is a possibility of a refund of up to 50% of the amount of the premiums; in the second case, the refund can reach a rate of up to 95%. Based on the P&I Clubs regulation, the reimbursement of premiums is possible if there is a written notification of the member within six months. Finally, the Club must conduct an inspection of the ship before reimbursing the premiums[1513].

5.3.8.5 The Letter of Guarantee of P&I Clubs

The P&I Clubs provide a helpful service regarding the monetary satisfaction of claims against the ship and the shipowner through a letter of guarantee known as the "letter of undertaking", hereinafter referred to as LOU. The letter of guarantee is issued if the ship has been captured or threatened with arrest, minimizing subsequent financial losses, such as loss of future fares, deterioration of the ship's condition and any cargo inside the ship. It is a form of guarantee issued by the Club that it will pay the plaintiff the amount decided by the court or the settlement amount. This is a private insurance

[1511] MacDonald, P. (2018). Direct Action Against Insurers and P&I Clubs. In *Marketing and Managing Tourism Destinations* (pp. 168-186). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781351028141.
[1512] Ibid.
[1513] Aydin, M., Camliyurt, G., Akyuz, E., & Arslan, O. (2021). Analyzing human error contributions to maritime environmental risk in oil/chemical tanker ship. *Human and Ecological Risk Assessment: An International Journal*, **27**(7), 1838-1859. DOI: https://doi.org/10.1080/10807039.2021.1910011.

contract between the contracting parties - plaintiff and defendant - between the Club and the other party (be it a third party or another Club or insurance company). Only the Club and not the Club's administrators, agents, agents or local correspondents have the authority to issue a letter of guarantee[1514].

The plaintiffs fear that when the ship is captured, the chances of recovering the damages caused by the vessel's operation are proportionally reduced. Claims resulting from damage may concern the crew's health, the environment and the property and usually come from individual stakeholders, the business sector and government entities. The vessel reservation entails additional costs for the defendant members of the Club, such as crew maintenance, port fees, agency fees, and rental costs. When claims fall under the coverage of P&I Clubs, the International Group of P&I Clubs (IGP&I) can proceed to the ship's rescue through the letter of guarantee (LOU)[1515].

In essence, the letter of guarantee (LOU) is a written coverage offered by the Club. It verifies that it will comply with a court or an arbitration ruling upon the claim or immediately compensate the affected party for the claim.

In particular, the terms of the letter of guarantee are now standardised and understandable and are not subject to any negotiations. The letter of guarantee (LOU) is essential for the current shipping market, where the capital is invested in expanding, and the continuous maintenance of the vessels and liquidity is an issue. The LOU immensely helps the shipowners if they face the threat of vessel capture. The LOU is universally recognised in most maritime disputes and effectively indemnifies the ship owner and the P&I Club, thus being a powerful security tool[1516].

5.3.8.5.1 The necessary elements of the LOU

The letters must include the following features: the name of the captured ship, the name of the plaintiff, the description of the event that led to the creation of the claim, and the maximum amount of money guaranteed by the Club (which includes interest

[1514] Myburgh, Paul, P & I Club Letters of Undertaking and Admiralty Arrests (June 19, 2018). NUS Law Working Paper No. 2018/015, NUS - Centre for Maritime Law Working Paper 18/04, Published in (2018) 24 *Journal of International Maritime Law* 201-212. DOI: http://dx.doi.org/10.2139/ssrn.3199592.

[1515] MacDonald, P. (2018). Direct Action Against Insurers and P&I Clubs. In *Marketing and Managing Tourism Destinations* (pp. 168-186). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781351028141.

[1516] Buffalow, G. C. (2006). Maritime: Letters of Undertaking in the Courts. *Journal of Transportation Law, Logistics and Policy*, **73**(1). At: http://worldcat.org/oclc/31144651.

and costs), the applicable law and the choice of the jurisdiction of the Courts as competent to deal with the examination of the claim; the method of payment and finally the reservation of exercise of all the defence rights of the defendant side.

5.3.8.5.2 Conditions for issuing an LOU.

The ship must be imported when the event in need of insurance protection occurs[1517]. Secondly, all premiums must have been paid and not be outstanding. Third, the terms formulated must be commonly accepted, the amount of money payable on the guarantee must be reasonable, and the fact for which an insurance guarantee is requested must constitute an insurable risk from the Club.

5.3.8.5.3 Advantages of an LOU

An essential and comparative advantage of the letter of guarantee is the speed of the procedure in relation to the bank guarantee. In addition, the insured does not pay a fee for issuing the letter to the Consultant, unlike the bank guarantee, which entails financial exemption from various charges. Finally, the digital way of administering the letter of guarantee is expected to establish faster electronic facilitation of a claim, stating that a digital copy of an LOU is equally treated as an original copy and, in practice, has the same effects[1518].

5.3.8.5.4 Disputes between the Letter of Guarantee and the Bank Letter of Guarantee (LOU-BLG)

Bank letter guarantee (BLG) has a long tradition of securing receivables. But due to the high cost and the time-consuming process of issuing a bank guarantee, especially when more than one bank is involved[1519].

The issuance of a letter of guarantee provides more advantages. In particular, unlike a letter of guarantee, the issuing of a bank letter guarantee often requires several working days in order to be issued. In addition, banks will not agree to such "open" deals, and bank letter guarantees have a set expiry date[1520]. Finally, the issuance cost of

[1517] Ronneberg Jr, N. J. (1990). An introduction to the protection & (and) indemnity clubs and the marine insurance they provide. *USF Mar. LJ*, **3**, 1.
[1518] Toh, K. S. (2021). Admiralty and shipping law. *Singapore Academy of Law Annual Review of Singapore Cases*, **38**, 59-86.
[1519] Bercea, L. (2019). A Rule as a Standard: The Behavior of the Bank in the Execution of the Autonomous Guarantee Letter. *Romanian Rev. Priv. L.*, **448**.
[1520] Guo, Z. (2021). Bank of Communications Co., Ltd. Guizhou Branch v. Guizhou Jinchi Hongye Trading Co., Ltd., Guizhou Yinyuan Financing Guarantee Co., Ltd., Guizhou Zhiyi Real Estate Development Co.,

bank letter guarantees varies from 0,25% to 1% yearly. At the same time, LOUs do not pose such costs to the issuers and thus are preferred over bank letter guarantees[1521].

5.3.9 Evaluation of P&I CLUBS

The insurance institution "*Protection and Indemnity Club*" insures anything not covered by the ship's traditional maritime insurance (Hull & Machinery) and cargo by the insurance companies, which clearly differs. With risk-sharing in marine trade, early forms of P&I Clubs are found in China, India, Babylonia and Egypt. The Romans and the Greeks transformed these. In the 18th, the first mutual insurance organisations appeared to cover the losses that the then-insurance bodies could not or were not intended to cover.

They started by insuring 1/4 of the liability from a ship collision for loss of life and injuries, and this coverage was called "Protection Insurance". However, after the grounding of the ship Emily and other similar incidents of ship loss along with cargo, the so-called "Indemnity Insurance" was generalized. Finally, the insurance institution "Protection and Indemnity Club" was formed.

Due to the non-profit nature of mutual insurance organisations, P&I Clubs have the form of limited companies with no share capital. Members are governed by the principle of reciprocity and participate jointly in profits and losses. The thirteen most prominent P&I Clubs have joined the international group of P&I Clubs (IGP&I) as members of a wider group[1522].

Their organisational structure is governed by four main bodies: the General Assembly, the Committee men, the Managers and the Correspondents. The insurance risks covered by P&I Clubs are: Loss or damage of cargo, Pollution from the ship or its cargo, Loss of life or injury to crew members or passengers, Removal of a wreck, damage to fixed or floating objects, Collisions with other ships, Fines, Court costs, and

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Ltd., and Lin X (Dispute over Financial Loan Contract): The Creditor Not Entitled to Claim Guarantee Liability Directly against the Sub-guarantor. In *Selected Cases from the Supreme People's Court of the People's Republic of China* (pp. 201-210). Springer, Singapore. DOI: https://doi.org/10.1007/978-981-15-9136-5_19.

[1521] Karamikolmoti, F., & Malaekehpour Shoshtarai, S. M. H. (2022). Comparative study of the guarantee of violation of the condition of opening the documentary credit contained in international commercial sale from the perspective of Iranian law and the Convention on the International Sale of Goods. *Journal of Comparative Law*, **5**(2). DOI: 0.22080/LPS.2022.22679.1286.

[1522] Song, L. (2018). International Group of P&I Clubs/BIMCO Revised Himalaya Clause. *Journal of International Maritime Law*, **24**(1), 11-15.

FD&D. The fundamental principles that govern P&I Clubs are the following: the Omnibus Rule, the principle of Mutual sharing and the principle of Pooling Risk.

Essential elements of P&I Clubs' operation are the concept of the insurance year, the process of entry or exit of a member and contributions. Seven types of contributions can be distinguished: advance/initial calls, deferred calls, supplementary calls, return calls, renewal calls, release calls and lay-up calls. In addition, the letter of guarantee that differs from the bank guarantee is an essential element of the operation of P&I Clubs[1523].

The advantages of P&I Clubs are considered being: Transparency and substantial profit achievement, the possibility for additional contributions from members, the provision of security, the broad scope of coverage, the experienced and highly qualified staff, and the opportunities provided by the letters of guarantee and their general flexibility as a disadvantage can be considered their exclusive dependence on the contributions of their members.

Thus, it is concluded that ship registration evidences a stalemate with the ESR and the ever-increasing need for quality. While classification societies need to repurpose their aims and be reminded of their scope and origins, P&I Clubs are distinguished from the rest. Specifically, P&I Clubs concentrate the required flexibility on a mostly fluctuated market, along with high-quality services and facilitation of risks.

If we compare the P&I Clubs with the traditional Marine Insurance, H&M and Cargo, they considerably outweigh it because i) they have the "Omnibus Rule", thus trying to facilitate the client even if a claim is not directly covered where traditional insurance tries to systematically avoid any claim, ii) the management is functioned by the members, consolidating transparency and fairness while traditional insurance consists of profit-making companies, iii) while traditional insurance companies can go bankrupt, the P&I Clubs can be sustained through the supplementary calls, iv) after the insurance annum is concluded, all remaining premiums are capitals become the net profit for the insurance companies, whereas all remaining capitals in P&Is from calls remain to the P&I's deposit and the member call of the following year is decreased accordingly, v) the facilitation of Letter of Guarantee exceeding even the Bank Letter

[1523] Howse, T. (2020). P&I perspectives. In *Autonomous Ships and the Law* (pp. 193-206). Routledge.

Guarantee. Bearing all those in mind and also the fact that they cover even the most challenging liabilities, such as the third party from environmental damages, it can be said that over the years, the P&I Club will dominate the insurance market and will be considered as the most helpful tool against port state controls, which will be assessed above[1524].

5.4 Port State Control

At an international level, all states, considering the accidents that have occurred, have intensified and upgraded the rigour of port controls to prevent and avoid accidents. Port control is divided into stages, with the main one being the initial inspection. The port control stops with zero or minimal comments/observations if no particular offences are found during the initial inspection. However, suppose during the initial inspection, several irregularities are found. In that case, the simple port inspection will be upgraded to a detailed inspection with the possible result of a multitude of observations to be corrected or even later in detention of the vessel[1525].

Specifically, the Port State Control (PSC) is the inspection executed by port state control officers of other coastal states to confirm that the certification and the training of the master and crew are up to the coastal state's standards and to evaluate the condition of the hull, machinery and the rest of the vessel's equipment and to overly to evidence that vessel and crew comply with the national and international legislation and that the vessel is seaworthy and the crew is fit for service[1526].

5.4.1 Paris Memorandum of Understanding (Paris MOU)

The concept of creating stringent port controls with uniform standards was enacted in 1978 during the initiation of the first agreement called "The Hague Memorandum of Understanding"[1527], which was developed by the competent European maritime stakeholders. It is presumed that this action of developing strict

[1524] Boviatsis, M., Alexopoulos, A.B. & Vlachos, G.P. (2020) An economic perspective of P&I Clubs' evolution as the dominant source of Insurance in the Shipping Market. *IAME 2020.*
[1525] Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).
[1526] Özçayır, O. (2018). *Port state control*. Taylor & Francis.
[1527] Kasoulides, G. (1990). Paris Memorandum of Understanding: a regional regime of enforcement. *Int'l J. Estuarine & Coastal L.*, ***5*,** 180.

port controls was enacted by the destruction of the "Amoco Cadiz"[1528], which led to catastrophic pollution of the regional marine environment[1529].

The grounding of the Amoco Cadiz in March 1978 gave rise to solid political and social concerns in Europe, particularly in France, about stricter regulations on ship safety[1530].

At the ministerial conference in January 1982 in Paris, the Memorandum of Understanding, upon developing strict processes relevant to port control by the port authorities, was adopted. The Paris MOU was signed by fourteen states and entered into force in July 1982. By then, Poland, Canada, Russia and Croatia had joined the MOU agreement[1531].

The sign of this memorandum led to the adoption of more regulations relevant to marine safety. While the initial concept of this memorandum is to set the ground for more provisions for the port security process and to enable each country to develop and enforce security processes and checks at their discretion, quite some primary aims were provided. Thus, the initiation of Port State Controls aims to[1532]:

a) The protection and safety of life at sea.
b) The preservation of the marine environment
c) The crew welfare and the conditions of employment

It is evident that the Paris MOU's principal aims are identical to the significant maritime conventions, such as SOLAS, MARPOL, STCW and MLC. Although, the perspective of PSC is to verify and, if needed, enforce those rules on the vessels that violate them[1533].

Today Port State Control as a concept is incorporated in SOLAS, Chapter I, General Provisions, within Reg. 19, with reference to the Resolution of IMO A.1052. The said legislation establishes the basis of the status of employment of the PSCOs

[1528] *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279 (7th Cir. 1992).
[1529] O'Sullivan, A. J. (1978). The AMOCO CADIZ oil spill. *Marine Pollution Bulletin*, **9**(5), 123-128. DOI: https://doi.org/10.1016/0025-326X(78)90586-6.
[1530] Grigalunas, T. A., Anderson, R. C., Brown Jr, G. M., Congar, R., Meade, N. F., & Sorensen, P. E. (1986). Estimating the cost of oil spills: lessons from the Amoco Cadiz incident. *Marine Resource Economics*, **2**(3), 239-262.
[1531] Paris MoU, (2022). Organisation. Available at: Organisation | Paris MoU, last assessed: 29-8-2022.
[1532] Ibid.
[1533] Mantoju, C. D. (2021). Analysis of impact of the maritime labour convention, 2006: A seafarer's perspective. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **5**(3), 107-119. DOI: https://doi.org/10.1080/25725084.2021.1955475.

(Port State Control Officers)[1534].

With the C.O. 95/21 begins the intervention of the European Community in the field of the PSC, which initially concerns only the incorporation into Community law of the provisions of the Paris MOU until then[1535]. The most crucial regulation comes with the 2001/106 C.O., which, by amending 95/21, set specific, measurable quantitative targets in the Member States and, most notably, limited for the first time the previous regime of complete discretionary choice of ships, introducing "Mandatory Inspections" and other binding rules[1536].

In general, the Memorandum aims to inspect vessels with decreased safety standards through a uniform PSC system, to proactively avoid emerging threats and force the vessels to comply with international legislation. Vessels flying the flags of states that have not adopted the said memorandum are obliged to comply with the PSC criteria[1537]. The vessel election to be inspected is subject to many factors. Thus, the PSC authorities have installed specialised targeting systems that enable them to assess the most dubious vessels. The importance of PSC also stands to harmonising the PSC processes and setting an equilibrium between the PSC processes in various countries[1538].

5.4.2 Tokyo MOU

The Tokyo Memorandum of Understanding was concluded on 1 January 12/1993, in Tokyo, with an implementation date of 1 January 4/1994 and was signed by the maritime authorities of 18 countries[1539].

[1534] Paris MoU, (2022). PSCO. Available at: PSCO | Paris MoU, last assessed: 29-8-2022.

[1535] Chung, W. H., Kao, S. L., Chang, C. M., & Yuan, C. C. (2020). Association rule learning to improve deficiency inspection in port state control. *Maritime Policy & Management*, **47**(3), 332-351. DOI: https://doi.org/10.1080/03088839.2019.1688877.

[1536] Since January 1, 2011, the new K.O. 2009/16 has entered into force, ratified in the national legislation of Greece by the Presidential Decree 16/2011 (Government Gazette 36 A΄)25. The Directive applies to all types of ships flying a foreign flag, regardless of their tonnage, which calls at a port or anchorage of a Member State, in order to perform an interface - interconnection of a ship/port. However, fishing vessels, warships, auxiliary vessels, wooden ships of primitive construction, vessels under the state's authority and utilised for non-profit purposes and pleasure craft not used for commercial purposes are excluded from the scope.

[1537] Ozcayr, Z. O. (2008). The use of port state control in maritime industry and application of the Paris MoU. *Ocean & Coastal LJ*, **14**, 201.

[1538] Rodríguez, E., & Piniella, F. (2012). The new inspection regime of the Paris MOU on port state control: improvement of the system. *Journal of Maritime Research*, **9**(1), 9-16.

[1539] Xiao, Y., Wang, G., Lin, K. C., Qi, G., & Li, K. X. (2020). The effectiveness of the new inspection regime for port state control: Application of the Tokyo MoU. *Marine policy*, **115**, 103857. DOI: https://doi.org/10.1016/j.marpol.2020.103857.

According to the provisions of the Memorandum, the Authorities that have signed and legally accepted the Memorandum become full members. Today the MoU includes 19 full members, with the Solomon Islands Authority, the Democratic People's Republic of Korea and Macau of China participating simply as Observer. At the same time, Peru is an associate member of the memorandum[1540].

This Memorandum has similar aims to the Paris MOU, namely to establish a uniform and transparent system of controls in the region of Asia-Pacific, through cooperation and harmonization, in order to put pressure on ships that do not comply with the necessary measures, to enhance the concept of maritime safety, to preserve the marine environment, to improve the employment conditions and living conditions at sea[1541].

Specifically, in the category of Members, there are the countries that have signed up for each Memorandum. It can be said that the main criterion of the distinction of the memorandum is locality since, as can be seen from the name of each Memorandum, they concern a specific area of application, and the countries in the region subscribe to each memorandum as members of it. The locality criterion is also based on the differences between one memorandum with the other, as each region has its own commercial peculiarities, laws and conditions. This results in the formation of particular rules that affect the Memoranda that are analyzed[1542].

In addition to the members, each memorandum has observers who participate in the process of proposing, negotiating and finalizing it. The concept of the observer has a dual purpose as, although they do not have substantive jurisdiction over any part of the procedure, they either tacitly agree with the drafting of the Memorandum, or during the process, they do not exercise any formal or informal objection, or they formulate even without complaints which are recorded in the minutes of the procedure[1543].

[1540] Tokyo MoU, (2022). Member Authorities. Available at: Contact us | Organisation | Memorandum of Understanding on Port State Control in the Asia-Pacific (tokyo-mou.org), last assessed: 29-8-2022.
[1541] Li, K. X., & Zheng, H. (2008). Enforcement of law by the Port State Control (PSC). *Maritime Policy & Management*, **35**(1), 61-71. DOI: https://doi.org/10.1080/03088830701848912
[1542] McDorman, T. L. (2000). Regional port state control agreements: some issues of international law. *Ocean & Coastal LJ*, **5**, 207.
[1543] Im, M. H., & Sin, H. S. (2017). A Study on the Port State Control Inspection Results of Tokyo MOU-Focused on Detentions of Tokyo MOU. *Journal of Fisheries and Marine Sciences Education*, **29**(2), 333-342. DOI: http://dx.doi.org/10.13000/JFMSE.2017.29.2.333.

The inspection rate is relevant to the percentage of inspection per type or flag of a vessel entering the Ports-Members of the Memorandum. Furthermore, the International Maritime Conventions under consideration are mentioned, and finally, special attention is evidenced in specific categories of vessels that are regarded as more pollutive than other vessels. The different categories examined, such as the amendments, the information center, the committee, the date of signature and the official languages of introduction, are a formal part of each Memorandum, which has semantics[1544].

5.4.3 Development of PSC

As already stated, in 1978, some European Countries adopted the "The Hague Memorandum of Understanding" to evidence that the quality of vessels' operation and manning was up to IMO's and ILO's standards. Furthermore, during the same year, after the incident of Amoco Cadiz, it was suggested that effective port checks to increase environmental safety should also be installed. Thus, in 1982, pursuant to Paris MoU, 26 countries agreed to establish effective port state control processes in European Countries and Canada[1545].

The establishment of such control inspections was evidence of the failure of flag states, especially FoC, to enforce measures of compliance with international rules and regulations. Even more so, many flag states have entrusted their obligation for inspection to classification societies, substituting the flag states in many aspects that fell out of their aim and scope. Thus, port state control was installed to close the gap that had been created between flag states and the registered vessels[1546].

After its initiation by the Paris MoU, quite a few other memoranda have been signed, considering the unique conditions that exist in their regions, including the Tokyo MoU (Pacific Ocean). Specifically, the Tokyo MoU, since January 1, 2014,

[1544] McDorman, T. L. (1997). Port state control: a comment on the Tokyo MoU and issues of international law. In *Asian Yearbook of International Law,* **7***,* pp. 229-241. Brill Nijhoff.
[1545] Kasoulides, G. C. (1993). Port state control and jurisdiction: evolution of the port state regime. In *Port State Control and Jurisdiction*. Brill Nijhoff.
[1546] Schiferli, R. W. (1991). The Memorandum of Understanding on Port State Control: its History, Operation and Development. *The Marine Environment and Sustainable Development: Law, Policy and Science*, **448**.

established a new inspection regime (New Inspection Regime (NIR)) for flags that meet the low-risk criteria)[1547].

Necessary steps are being taken for the impact of the MOU on the degraded categories of ships. For each ship that enters a port where the MOU agreement applies, an independent stakeholder shall be selected to become the target of an inspection[1548].

Until 1991, checks by the port authorities were limited to the ship's mechanisms (as it is typically referred to as hardware). However, it did not take long to realise that the crew is also involved in maritime accidents (the crew was named as software). Therefore, the combination of hardware and software is very important for the security of the ship.

In 1993, for the first time, a list of flags of states that were above average in listed criteria was published. It was then decided that these ships flying the flag with above-average reservations should be inspected with priority[1549].

In 1994, the next step was categorising ships with poor safety levels. As a result, a list known as the "black list" containing vessels with more than 12 months of detention was published in the press, international organisations and other interested parties. To date, this list is published monthly. Since 1999, however, it has been replaced by a Black, a Grey and a White list[1550].

In 1997 Paris MOU opened a page on the Internet where all the details and lists of reservations are available.

The control of ships from coastal countries when approaching ports (Port State Control) is becoming stricter daily. As a result, the MOU (Memorandum Of Understanding) in Greece was extended, in addition to the equivalent of Paris, to that of Tokyo (Tokyo MOU – Region of Asia Pacific Ocean), Latin America (Acuerdo de Vina del Mar – Region of Latin America), the Caribbean (Caribbean MOU – Region of the Caribbean), the Mediterranean (Mediterranean MOU – Region of the

[1547] Yang, Z., Yang, Z., & Teixeira, A. P. (2020). Comparative analysis of the impact of new inspection regime on port state control inspection. *Transport Policy*, **92**, 65-80. DOI: https://doi.org/10.1016/j.tranpol.2020.04.009.

[1548] Kim, C. H. (2014). A Study on the Preparedness of Port State Control for the Enforcement of NIR. *Journal of Navigation and Port Research*, **38**(2), 141-146. DOI: https://doi.org/10.5394/KINPR.2014.38.2.141.

[1549] Kasoulides, G. C. (1993). Port state control and jurisdiction: evolution of the port state regime. In *Port State Control and Jurisdiction*. Brill Nijhoff.

[1550] Özçayır, O. (2018). *Port state control*. Taylor & Francis.

Mediterranean), the Indian Ocean MOU (Indian Ocean MOU), Africa (Abuja MOU – Region of West and Central Africa), and the Black Sea (Black Sea MOU –Black Sea Region)[1551].

In accordance with NIR procedures, an updated list is demonstrated and constantly updated and uploaded on the flag state page to evidence that the criteria of flag states are kept and details regarding the low-risk vessels (White List + VIMSAS)[1552].

Specifically, any flag whose total inspection number over three years will not reach the minimum threshold of thirty is not included in the Tokyo MoU. As a result, some flags cannot qualify for their vessel to be classified as low-risk ships by the Tokyo MoU, despite being subject to control by the IMO VIMSAS[1553].

The enumeration of flags that meet the standards for low-risk ships is for the Tokyo MOU process only. Thus, for the purposes of compiling the set list, flags of the Tokyo MoU white list who have completed the Voluntary Ecological Audit of IMO member states (VIMSAS)[1554] have been dictated to inform in writing the Tokyo MoU Secretariat for the completion of the VIMSAS check, for the proper recognition of the NIR compliance[1555].

According to the NIR procedures, an updated list is published on the Ro page that meets the set criteria (RO)[1556] for a vessel deemed low level (High performance + recognition of more than one Tokyo MoU member).

The established ROs dictates that in order to be included in the Tokyo MoU RO performance list, the overall amount of inspections in a three-year set period does not reach a minimum of 60. As a result, some ROs may not qualify for their ships to

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[1551] Ibid.

[1552] Paris MoU, (2022). Flags meeting low risk criteria. Available at: Flags meeting low risk criteria | Paris MoU, last assessed: 29-8-2022.

[1553] Hojatzadeh, A., Koosha, S., & Tezam, M. (2015). Objectives, Principles and Audit area of Voluntary IMO Member States Audit Scheme. *Journal of Maritime Transport Industry*, **1**(2), 49-57.

[1554] Shen, J. H., Liu, C. P., Chang, K. Y., & Chen, Y. W. (2021). Ship deficiency data of port state control to identify hidden risk of target ship. *Journal of Marine Science and Engineering*, **9**(10), 1120. DOI: https://doi.org/10.3390/jmse9101120.

[1555] Tokyo MoU, (2022). New Inspection Regime (NIR). Available at: NIR | Inspections & Detentions | Memorandum of Understanding on Port State Control in the Asia-Pacific (tokyo-mou.org), last assessed: 30-8-2022.

[1556] Tokyo MoU, (2022). Criteria for Attribution of RO Responsibility. Available at: Criteria for Attribution of RO Responsibility | Inspections & Detentions | Memorandum of Understanding on Port State Control in the Asia-Pacific (tokyo-mou.org), last assessed: 29-8-2022.

qualify as low-risk ships by the Tokyo MoU, despite being recognized by one or more Tokyo MoU members[1557].

The list of recovery orders that satisfied the criteria for a low-risk RO ship is for Tokyo MoU inspection purposes and should not be used in any other context.

The vessel targeting system, in effect, is regulated to serve more general parameters (e.g. vessel's flag, RO, and Company performance), points of impact for each parameter, modification of the stages of the vessel's risk status and evaluation of the frequency of inspections regarding each level of risk, subject to the experience gained after four years of assessment by the principal PSC inspection regimes and considering the discussion in the IMO's framework for flags[1558].

The New Inspection Regime (NIR) of the BS MoU, BS-IR, includes a number of vessel risk profiles and time frames that indicate clearly the order and the priority while selecting a vessel to be inspected. The Black Sea Information System (BSIS) evaluates and presents the results of points one to three, using the files of the inspections of the authorities of the States and storing them in the BSIS for utilisation by members while selecting a vessel to be inspected[1559].

At the same time, the USCG (US Coast Guard) endorses that the vessels passing or fishing in US waters should comply with international legislation, besides all regulations in effect and relevant treaties. The U.S. is not a member of any Port State Control MoU and follows its processes, relying upon international practices while enforcing stringent national legislations, such as OPA 1990[1560].

5.4.4 The Port Authorities

Ship inspections are divided into class, flag state, ship-cargo insurers and charterers. All those mentioned above can autonomously execute the inspections based

[1557] Ibid.

[1558] Yan, R., Wang, S., & Peng, C. (2022). Ship selection in port state control: status and perspectives. *Maritime Policy & Management*, **49**(4), 600-615. DOI: https://doi.org/10.1080/03088839.2021.1889067.

[1559] Zheng, L. (2020). The effectiveness of new inspection regime on port state control inspection. *Open Journal of Social Sciences*, **8**(08), 440. 10.4236/jss.2020.88036.

[1560] Yang, Z., Yang, Z., Yin, J., & Qu, Z. (2018). A risk-based game model for rational inspections in port state control. *Transportation Research Part E: Logistics and Transportation Review*, **118**, 477-495. DOI: https://doi.org/10.1016/j.tre.2018.08.001.

on their standards or request that classification societies or private stakeholders initiate the inspection.

Depending on the subject matter of the inspection, there are several categories in which the role of PSC is primarily complementary to the inspections of the aforementioned bodies[1561].

As it was mentioned above, the substantial effort of systematic and extensive control of ships began in the year 1982 in Paris, with the signing by the Maritime Authorities of 15 European States of the Memorandum of Understanding on the control of vessels (Paris MoU) in order for their safe and efficient operation. Presently, while other MoUs have been developed, the PSC is in a phase of implementing uniform policies and practices and considerably raising the required standards[1562].

The process of PSC is based upon the standards that the international conventions determine, in addition to special national requirements. In practice, it's up to each country's discretion to select the level of strictness that will impose during the PSC inspection. Usually, the inspections of the Port Authorities cover the following issues[1563]:

a) The existence of ship and crew certificates
b) The rescue equipment and training drills of the crew
c) Permanent and portable firefighting equipment/fire protection control
d) Maritime safety
e) Measures to prevent pollution
f) Safety and manufacturing integrity
g) The Safe Management of the Ship

Specifically, the control performed by the Port Authorities on board ships is no longer limited to the verification of certificates but extends to the entire ship. Also, inspectors are given the opportunity to conduct even more stringent checks when they

[1561] Yuan, C. C., Chiu, R. H., & Cai, C. (2020). Important Factors Influencing the Implementation of Independent Port State Control Regimes. *Journal of Marine Science and Engineering*, **8**(9), 641. DOI: https://doi.org/10.3390/jmse8090641.
[1562] Piniella, F., Alcaide, J. I., & Rodríguez-Díaz, E. (2020). Identifying stakeholder perceptions and realities of Paris MoU inspections. *WMU Journal of Maritime Affairs*, **19**(1), 27-49. DOI: https://doi.org/10.1007/s13437-020-00193-0.
[1563] Li, K. X., & Zheng, H. (2008). Enforcement of law by the Port State Control (PSC). *Maritime Policy & Management*, **35**(1), 61-71. DOI: https://doi.org/10.1080/03088830701848912.

find omissions (such as omissions in the keeping of the vessel's books, or in the manning of the ship)[1564].

In addition to the aforementioned, according to the said regulations, it is in the jurisdiction of the Port Authority to prohibit the entry of ships that either sailed without meeting the requirements of international standards or did not arrive at the designated repair units. This entry ban will be observed until the vessel meets the requirements of the Port Inspection Authority, at least as far as construction and repair standards are concerned[1565].

Inspections conducted annually concern all types of ships. Thus, the inspectors carry out checks on trucks, tankers, passenger ships, fishing boats, and even floating shipyards, verifying the existence of certificates, and issuing, on some occasions, original certificates, provided that relevant requirements have been carried out[1566].

Particular reference is made to US ports, given that specific measures are being followed in this area to control the ships arriving at these ports. Usually, the policy of the Port Authorities in the area under analysis is not the immediate detention of ships in case violations are found. Still, warning documents are issued, which are addressed to both the ship-owning companies and the crew members. However, in an inspection from USCG, it is evidenced that they can automatically detain the ship at their discretion, without even a warning being issued (even if the vessel has no previous record of violations)[1567].

5.4.4.1 The rights and responsibilities of the Port State Authorities.

Each Coastal State has the right to exercise control on passing vessels, which may vary depending on the maritime zone that the vessel is situated while the inspection is conducted. Thus, in the Exclusive Economic Zone, the control should be on issues relating to the economic activities of passing vessels that directly affect the maritime region's resources. On the other hand, when the control is executed in the Territorial

[1564] Yan, R., & Wang, S. (2019). Ship inspection by port state control—review of current research. *Smart Transportation Systems 2019*, **149**, 233-241. DOI: 10.1007/978-981-13-8683-1_24.
[1565] Gan, X., Li, K. X., & Zheng, H. (2010). Inspection policy of a port state control authority. In *Proceedings of the International Forum on Shipping, Ports and Airports (IFSPA) 2010* (pp. 330-336).
[1566] Cariou, P., Mejia, M. Q., & Wolff, F. C. (2009). Evidence on target factors used for port state control inspections. *Marine Policy*, **33**(5), 847-859. DOI: https://doi.org/10.1016/j.marpol.2009.03.004.
[1567] Bang, H. S., & Jang, D. J. (2012). Recent developments in regional memorandums of understanding on port state control. *Ocean Development & International Law*, **43**(2), 170-187. DOI: https://doi.org/10.1080/00908320.2012.672293.

Sea, the coastal state, having absolute discretion, can also inspect the vessel's certification and other documentation[1568].

Within this region, coastal states have the sovereign rights to explore, exploit, maintain and manage the living resources of the sea and the seabed. Where a ship is within the competence of another State, the competence of a flag State shall be simultaneous with that of coastal or port authorities. According to international maritime law and the United Nations Convention on the Law of the Sea (UNCLOS), the coastal state has the authority to execute controls onboard the vessels of foreign flags within its competence. However, according to the same convention, the State is only authorised to implement a PSC regardless of the vessel's maritime zone to protect the area's marine environment. The USCG relies on this authorisation to execute the strictest controls effectively even if the vessel is in EEZ.

Regarding territorial competence, the International Maritime Organisation (IMO) and the International Labour Organisation (ILO) conventions enable states to conduct P.S.C. inspections of foreign ships within their ports. The registration of each foreign vessel is mainly based upon the rules governing each ship, regarding the applicable law and order applicable, the safety of the vessel and the prevention of marine pollution. Responsibility for equipment, operation, conservation and manning, subject to international maritime legislation, also lies with the flag State. Worldwide, it has been evidenced that foreign vessels are subject to each coastal state's competence when they are in its ports and internal waters. States shall also exercise the right to conduct a PSC inspection for two main reasons, inter alia[1569]:

a) For the self-protection of personnel onboard and preserving the marine environment from the issues that can arise from emerging, below-average vessels.
b) For the enforcement of the international conventions on the safety of ships, to prevent unseaworthy vessels from sailing in their internal waters.

Inspections of the State Port Authorities provide a "*safety net*" in order to

[1568] Marten, B. (2011). The enforcement of shipping standards under UNCLOS. *WMU Journal of Maritime Affairs*, **10**(1), 45-61. DOI: https://doi.org/10.1007/s13437-011-0005-y.
[1569] Yuan, C. C., Chiu, R. H., & Cai, C. (2020). Important Factors Influencing the Implementation of Independent Port State Control Regimes. *Journal of Marine Science and Engineering*, **8**(9), 641. DOI: https://doi.org/10.3390/jmse8090641.

identify degraded ships. As mentioned above, the PSC officers supervised the operation of the port authorities' inspections for European ports. Furthermore, the primary legislation governing the operation of the Paris Memorandum is updated every year in order to adapt it to the new international requirements for the vessels' safety, but also regarding the environmental protection required by the International Maritime Organisation (IMO), in addition to the relevant regulations, such as a variety of EU Directives that consider maritime safety. To this end, the IMO has promoted the creation of other similar bodies and MoUs upon the vessel, aiming to cover the entire world's oceans gradually[1570]. These MOU are:

a) Europe and the North Atlantic (Paris MOU),
b) Asia and the Pacific (Tokyo MOU),
c) Latin America (Acuerdo de Viña del Mar),
d) Caribbean (Caribbean MOU),
e) West and Central Africa (Abuja MOU),
f) Black Sea MOU region,
g) Mediterranean MOU,
h) Indian Ocean MOU
i) Gulf Arab States (GCC MOU (Riyadh MOU).

These Local Agreements define the regulatory framework regarding the controls performed on the ships and give the appropriate guidelines to the PSC officers[1571]. They also publish the results of the inspections annually so that all ports, the shipowners, and the respective inspectors know each vessel's records. When required, they proceed to the detention of ships that do not comply with international regulations and, when deemed necessary, permanently prohibit the arrival of ships that have been repeatedly detained from ports of the Local Agreement[1572].

5.4.4.2 The choice of ships to be inspected.

Ships of Member States operating within the EU must comply with safety

[1570] Kara, E. G. E., & Oksas, O. (2016). A comparative analysis of regional agreements on port state control. *American Academic Scientific Research Journal for Engineering, Technology, and Sciences*, **18**(1), 259-270.
[1571] Peppa, S. (2021, April). The Importance of Measuring the Performance of IMO Member States. In *SNAME 7th International Symposium on Ship Operations, Management and Economics*. OnePetro.
[1572] Graziano, A., Mejia Jr, M. Q., & Schröder-Hinrichs, J. U. (2018). Achievements and challenges on the implementation of the European Directive on Port State Control. *Transport Policy*, **72**, 97-108. DOI: https://doi.org/10.1016/j.tranpol.2018.09.016.

regulations to prevent serious harm to humans and protect the marine environment[1573].

The general rule followed by regional port authorities is to set specific inspection standards in order to achieve the aim that a primary number of vessels are subject to the appropriate control, as well as to implement an evaluation system so that ships that are potentially below average are inspected. Also, ships of a certain age and type are indicated to be inspected under a regime of thorough and meticulous checks, and those vessels are usually preferred to be inspected[1574].

Naturally, due to the peculiarities that exist, the percentages of ships inspected are not absolutely equal for all MoUs. However, the exercise of control seeks to achieve that a significant number of different foreign ships are subject to complete control every year. As some ports or countries include more than one P. S. C. O. (Port State Control Officer), thus the inspection rate may vary within the same MOU and between ports of the same country. Nevertheless, usually, a specific inspection rate applies for each region[1575].

5.4.4.3 Ship inspection by a Port Authority - Port State Control

The Port State Control Officer should execute the vessel inspection in ports. The detention of a ship is the last drastic measure that the PSC officer will take after finding deficiencies on board[1576].

A PSC officer can impose penalties on a ship with the following deficiencies:

a) Deficiencies that can be remedied within fourteen days for minor infringements
b) under certain circumstances the said issues can be corrected when the vessel reaches the next destination.
c) Deficiencies that can be corrected before the vessels depart from the port.
d) and finally, the detention of a vessel.

[1573] Yan, R., Wang, S., & Peng, C. (2022). Ship selection in port state control: status and perspectives. *Maritime Policy & Management*, **49**(4), 600-615. DOI: https://doi.org/10.1080/03088839.2021.1889067.

[1574] Gao, Z., Lu, G., Liu, M., & Cui, M. (2008, June). A novel risk assessment system for port state control inspection. In *2008 IEEE International Conference on Intelligence and Security Informatics* (pp. 242-244). IEEE. DOI: 10.1109/ISI.2008.4565068.

[1575] Vlachos, G.P. (2015). *International Maritime Policy*. Stamoulis Publications, Piraeus. (in Greek), pp. 842-850.

[1576] Knapp, S., & Franses, P. H. (2006). *Analysis of the Maritime Inspection Regimes-Are ships over-inspected?* (No. EI 2006-30).

The criteria to keep a ship, are that it is considered unsafe to proceed towards the open sea and that the issues evidenced during the inspection of the vessel are evaluated as dangerous by the officer that executed the PSC. It is crucial that these deficiencies be corrected before the vessel's departure. The said deficiencies are usually evidenced upon[1577]:

a) Certification of the crew
b) Safety
c) Maritime Safety
d) Marine Pollution and Environment
e) Living and Working Conditions
f) Operation
g) Management

The deficiencies above are regarded among the most commonly faced by PSC Officers. Therefore, when it is evidenced that the said deficiencies can lead to hazards regarding safety and environment, the PSC officer requires that they be amended before the vessel is allowed to depart from the port, or else prohibit the vessel from sailing, or lastly issue a closure of the vessel[1578].

Since these issues are usually an outcome of the vessels' mismanagement, the detention under Port State Control, for the reasons set out above, may cause frustration with the vessel's operational performance[1579].

Also, the short duration of detention cannot practically frustrate a charter party agreement. The charter party cannot be cancelled if the required amendments are executed hastily during the vessel's detention.

When a vessel is detained, the PSC officer must correct the deficiencies that led to the detention. Should these deficiencies be deemed unable to be remedied in the port where they were evidenced, this port can issue a special clearance for the vessel to sail to another destination. Many times, supportive vessels, such as tugboats, are

[1577] Li, K. X., & Zheng, H. (2008). Enforcement of law by the Port State Control (PSC). *Maritime Policy & Management*, **35**(1), 61-71. DOI: https://doi.org/10.1080/03088830701848912.
[1578] Yan, R., Zhuge, D., & Wang, S. (2021). Development of two highly-efficient and innovative inspection schemes for PSC inspection. *Asia-Pacific Journal of Operational Research*, **38**(03), 2040013. DOI: https://doi.org/10.1142/S0217595920400138.
[1579] Ibid.

required to assist the vessel safely to reach the destination (usually a repair yard for repairs).

In most cases, the port authority and the shipowner want the vessel to be hastily repaired to depart and continue its service. Therefore, the delay in the contract due to the detention of the vessel by the PSC rarely compromises the contract of carriage. In general, the voyage charter party can be cancelled when the ship is beyond the control of the contracting parties and the detention time is long enough to cause cancellation. According to the PSC, the detention is mainly caused by the self-inflicting of deficiencies that are not unpredictable, and the detention time is not likely to be long enough to cause the contract to be cancelled. Therefore, in most cases, the vessels' detention is not expected to frustrate a contract of carriage[1580].

5.4.4.4 The detention of a vessel

It is established that the inspection of ships in ports should be performed by the Port State Control Officer (PSCO). The vessel's detention is the last drastic measure to be taken by the PSC Inspector after deficiencies are found on board.[1581]

As carriers, ships calling at ports are usually under the execution of a contract of carriage, whether chartered or responsible for the transport of goods. If a vessel is detained, the vessel and the cargo will be unable to execute the contractual agreement, per the charter party. The detained vessel cannot continue the voyage and reach the port of destination as stated in the convention at that time. As assessed above, it is up to the ship owner's discretion to execute all set requirements by the PSCO. Should the amendments be executed quickly, the vessel will be able to continue the contractual relationship[1582].

The most essential criteria in order to detain a vessel are for the vessel to be considered insecure about proceeding towards the open sea as an outcome of the severity of the evidenced deficiencies by the PSCO. The said deficiencies should be

[1580] Fu, J., Chen, X., Wu, S., Shi, C., Wu, H., Zhao, J., & Xiong, P. (2020). Mining ship deficiency correlations from historical port state control (PSC) inspection data. *PLoS one*, **15**(2), e0229211. DOI: https://doi.org/10.1371/journal.pone.0229211.

[1581] Tsou, M. C. (2019). Big data analysis of port state control ship detention database. *Journal of Marine Engineering & Technology*, **18**(3), 113-121. DOI: https://doi.org/10.1080/20464177.2018.1505029.

[1582] Kiehne, G. (1996). Investigation, detention and release of ships under the Paris Memorandum of Understanding on Port State Control: a view from practice. *The International Journal of Marine and Coastal Law*, **11**(2), 217-224. DOI: doi**:** https://doi.org/10.1163/157180896X00087.

corrected before the vessel sails. In the annual reports of the Paris MoU, it is stated that the major causes of detentions are[1583]:

a) Lack of vital certificates and documentation.

b) Security issues.

c) Maritime Safety.

d) Marine Pollution and environment.

e) Living and Working Conditions, violating even the fundamental regulations.

f) Operational issues that may lead to unseaworthiness.

g) Mismanagement of the vessel

5.4.5 The case of illegal cargo found during a PSC.

The process of PSC has evidently been established to evidence the quality of a vessel[1584]. Although, in some cases, the authorities may find illicit cargo on board the vessel during the inspection[1585]. Illicit cargo has been banned as a transportation good or a cargo that needs special certification to be transported and be considered legal[1586]. Thus, drugs, weapons, or other cargo may be legal should the company possess the specific documentation that allows for their transport[1587]. Nevertheless, in many cases, this cargo is illicitly transported -absent of any documentation- to avoid the dues and the taxes that usually trail it. For instance, this was a typical case with cigarettes smuggled in many countries to avoid the special taxes imposed on them[1588].

[1583] Chen, J., Zhang, S., Xu, L., Wan, Z., Fei, Y., & Zheng, T. (2019). Identification of key factors of ship detention under Port State Control. *Marine Policy*, **102**, 21-27. DOI: https://doi.org/10.1016/j.marpol.2018.12.020.

[1584] Boviatsis, M., & Vlachos, G. (2022). Legal Assessment of the Present Status and Effects of Illicit Trade of Drug Substances in Maritime Transport. *TransNav, International Journal on Marine Navigation and Safety of Sea Transportation,* **16**(2). DOI: 10.12716/1001.16.02.18.

[1585] Atkinson, M. P., Kress, M., & Szechtman, R. (2017). Maritime transportation of illegal drugs from South America. *International Journal of Drug Policy*, **39**, 43-51. DOI: https://doi.org/10.1016/j.drugpo.2016.07.010.

[1586] Szyliowicz, J. S., & Zamparini, L. (2014). Maritime security: issues and challenges. *Maritime transport security*, 13-23. DOI: https://doi.org/10.4337/9781781954973.00008.

[1587] Graves, D. (2019). What are common maritime frauds and illegal activities on board ships?. *The Business & Management Review*, **10**(5), 163-163.

[1588] Bright, D., Koskinen, J., & Malm, A. (2019). Illicit network dynamics: The formation and evolution of a drug trafficking network. *Journal of Quantitative Criminology*, **35**(2), 237-258. DOI: https://doi.org/10.1007/s10940-018-9379-8.

Thus, cargo cannot be characterized as illicit only by its nature, but because of the lack of special documentation that evidence his legal status and the authorization for transfer from a competent authority[1589]. The reason that some specific cargoes were usually found illicit lies in the profitability of those cargoes illegally smuggled[1590].

The outcome of a vessel found transferring such cargo results in the arrest of the vessel and subsequently crew and cargo alike[1591]. This case, while similar to the arrest of the vessel due to civil claims, differs considerably in many aspects. Thus, should the claim be paid in civil arrest, the vessel can continue the journey, while in criminal arrest, the vessel is practically detained until a court ruling and the crew is jailed[1592]. Nevertheless, a common ground between civil and criminal arrest is that the enforcement process is identical and based on the Brussels Convention on the Capture of Sea Ships (the 1952 Arrest Convention)[1593].

It is evident that with the evolution of PSC, the volume of inspection and, subsequently, the cases of illicit trade that are found have increased. Nevertheless, the illicit trade is primarily based on specific types of marine transport, such as container vessels, which due to their unique nature, the illicit cargo is easily hidden[1594]. There are even cases, such as *Atlasnavios*[1595], where while illicit cargo was found, the ship owner successfully claimed the insurance compensation, and the ship was under the authority's control for two years until it was released and sold by the new owner (being the insurance company due to subrogation) in the S&P market[1596].

5.4.6 Evaluation of PSC

Since 1982, when it was enacted with the adoption of the Paris MoU, the PSC process effectively altered the shipping landscape. While the main reason for its

[1589] Aquila, E. (2017). Courts have gone overboard in applying the Maritime Drug Law Enforcement Act. *Fordham L. Rev.*, **86**, 2965.
[1590] Arnold, G. (2013). *The International Drugs Trade*. Routledge. DOI: https://doi.org/10.4324/9780203942802.
[1591] Gilich, R. (2009). Practical Issues arising from the Arrest of Ships. *Austl. & NZ Mar. LJ*, **23**, 63.
[1592] Mohammed-Faraj, O. (2012). The Arrest of Ships: Comprehensive View on the English Law.
[1593] Lynn, R. W. (2000). A Comment on the New International Convention on Arrest of Ships, 1999. *U. Miami L. Rev.*, **55**, 453.
[1594] Eder, B. (2020). Arresting ships: The need for change 1. *In Ship Operations* (pp. 125-132). Informa Law from Routledge.
[1595] Kao, M. B. (2019). Malice in Marine Insurance Law: Navigators Insurance Co Ltd v Atlasnavios-Navegacao LDA [2018] UKSC 26. *Austl. & NZ Mar. LJ*, **33**, 23.
[1596] Boviatsis, M., & Vlachos, G. (2022). Legal Assessment of the Present Status and Effects of Illicit Trade of Drug Substances in Maritime Transport. *TransNav, International Journal on Marine Navigation and Safety of Sea Transportation,* **16**(2). DOI: 10.12716/1001.16.02.18.

creation was the enhancement of safety and environmental protection, the unification of many processes and the adoption of many similar MoUs, led to the overall enhancement of the quality and quantity of port state inspections[1597].

While the PSC was evolving, adopting crucial legislation, such as ISM and ISPS, provided him with new means of operational tools and more detailed inspection processes. It can be stated that the PSC process is the most impactful method of control and enforcement of the international maritime framework.

Before the enactment of PSC, the most competent controlling bodies were the flag state, with flag inspections, and classification societies with class inspections. Because of the effectiveness of the class inspection, many flags gave their authorization to classification societies to inspect and evaluate the vessels' wear and tear. Should the vessel be found worthy under the set requirements, the vessels could acquire a flag. This practice gave the classification societies the ultimate leading to the market, and the class certification was the most important documentation.

The continuous development of P&I Clubs didn't affect this balance. Presently, while the insurance to a P&I club is more important than having traditional insurance (the P&I Clubs provide the required documentation for a vessel to be allowed to enter a port), it does not affect the status of classification societies, whose documentation is constantly used by P&I Clubs to support or defend from a claim.

Evidently, the power shifted with the initiation and development of PSC. Until a few decades ago, the classification societies practically decided the fate of a vessel during their inspection execution. Presently, this power has been transferred to PSC processes, which, with the support of systems such as NIR, execute effectively and with excellent transparency and objectivity the control of the vessels. Thus, while the classification societies are still important and all other stakeholders utilise their certificates, they have been moved to a more supportive role. Each competent port authority effectively exercises the PSC process, and its effectiveness relies on the fact that a failure of the port authority to notice a deficiency will possibly result in a maritime accident. The damages from that accident will be left to the same port authority to

[1597] Hare, J. (1996). Port state control: strong medicine to cure a sick industry. *Ga. J. Int'l & Comp. L.*, **26**, 571.

counter the pollution or other occurrences and claim for damages and overly suffer the outcomes of the incident[1598].

Thus, it can be stated that Port State Control and P&I Clubs will monopolize the future of maritime controlling mechanisms. While it is of paramount importance, the registration of a flag will be of lesser significance, and all flags will become almost identical. The classification societies will be less impactful, and should they continue to lose their identity, the author believes that P&I Clubs will probably absorb them. The P&I Clubs, with all those sets of advantages, after the absorption of traditional marine insurance, will probably move to absorb the classification societies' role by utilizing their excellent network of experts while having an ever-growing trust from the ship owners. Finally, the PSC with continue to dominate the market and, with the support of the continuously expanding technology and the growing uniformity among all MoUs, will probably remain the primary source of control and thus the most reliable option for enforcing the concept of sustainability to the sector.

5.5 Overall evaluation of Covid-19 impact on the shipping industry.

The adoption of restrictive measures, particularly the curfew or its mitigation in response to COVID-19, has resulted in the disruption of the global mobility and transport standards, which directly affected the social and economic activities and the operation of the legal and institutional frameworks for their conduct. The trade sector, with 90% of maritime trade's transport and logistics side, has suffered the hardest[1599].

Specifically, 504 million patients have been officially recorded to date, with the average daily average being 722 thousand new cases. In contrast, the total deaths on a global scale have risen to 6.2 million, with an average death/day of 2,266[1600]. Of course, these include workers in shipping.

[1598] The concept is to let the most affected party in case of the incident to execute any counter measures (the PSC is in fact a **proactive countermeasure**) and this party will have the greatest incentives to effectively execute the set processes.

[1599] Pauksztat, B., Andrei, D. M., & Grech, M. R. (2022). Effects of the COVID-19 pandemic on the mental health of seafarers: A comparison using matched samples. *Safety Science*, **146**, 105542. DOI: https://doi.org/10.1016/j.ssci.2021.105542.

[1600] World Health Organisation, (2022). WHO Coronavirus overview. Available at: https://covid19.who.int/, last accessed: 22-7-2022.

By the end of March 2021, it had pushed a sharp decrease in the number of flights by 100,000 due to lockdown restrictions[1601].

The coronavirus pandemic led to a 3% drop in world trade values in the first quarter of 2020. After that, the recession accelerated, with UNCTAD's forecasts recording a 27% drop in a quarter. The World Bank further noted that trade in goods appeared to have reached its lowest scores in April 2021, with a decline of almost 20% year-on-year, following a 10% drop in March of the same year[1602].

It should be noted that by the end of 2021, only about 25% of the payment changes could occur, generally due to the restrictions imposed by the national health and immigration authorities and the suspension of most international flights, as mentioned above[1603].

At least half a million sailors, out of a total of 1.6 million, have been affected[1604]. In August 2020, it was estimated that over 150,000 sailors needed immediate repatriation, with 250,000 serving under extended crew contracts, with the average repatriation needs reaching 100,000 /month. And one wonders how fundamental rights established by MLC 2006, regarding medical assistance, leave to land, etc., could be served when ships could not or did not have a commercial purpose to dock in a port with port calls from Europe to China being reduced by 58.1% with those from China to Europe by 48.8%, in the period 2020 - 2021[1605].

All the preceding maps the difficulty on the verge of inability, implementation, and compliance with the requirements of international maritime treaties such as MLC 2006, STCW 2010[1606] and the ISM Code.

[1601] Millefiori L., Braca P., Zissis D., Spiliopoulos G., Stefano M., Willett P., Carniel S., (2021). "COVID-19 impact on global maritime mobility". *Scientific Reports Journal*, V(**11**), Article Number 18039, DOI: https://doi.org/10.1038/s41598-021-97461-7.

[1602] UNCTAD, (2021). "COVID-19 cuts global maritime trade, transforms industry". Available at: https://unctad.org/news/covid-19-cuts-global-maritime-trade-transforms-industry, last accessed: 23-7-2022.

[1603] Ibid.

[1604] International Chamber of Shipping, (2021). "The COVID-19 pandemic: The crew change crisis". Available at: https://www.ics-shipping.org/current-issue/the-covid-19-pandemic-the-crew-change-crisis/, last accessed: 23-7-2022.

[1605] European Maritime Safety Agency, (2021). "COVID – 19. Impact on Shipping". Available at: http://emsa.europa.eu, last accessed: 23-7-2022.

[1606] International Maritime Organisation, (2010). "The Manila Amendments to the annex to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978". Available at: file:///C:/Users/user/Downloads/33%20(1).pdf, last accessed: 24-7-2022.

5.5.1 The impact of COVID-19 on crew work performance

According to data from the international organisations ITF and ILO, which are in charge of monitoring compliance with the MLC 2006, of the 6,960 checks on merchant ships, only 884 did not have violations of MLC 2006, while most violations concerned a breach of the terms of the employment contract[1607]. This has undoubtedly affected the crews' operational performance as favourable working conditions and their observance is one of the determining factors. Specifically, the most affected by COVID-19 regulations of MLC are the following:

a) right to repatriation (article 2.5. MLC 2006),
b) lengthening of their employment contracts to the limits that can be classified as forced labour (forced labour, non-observance of articles 2.2., 2.3. MLC 2006),
c) Deprivation of annual leave (2.4., 2.4.2. MLC 2006),
d) Heavy shifts on board, especially in cases where there are reduced staff due to their hospitalization due to the coronavirus,
e) The receipt of a salary, especially for those who are ill and is considered by the companies not to offer their services to the ship (article 2.6. MLC 2006),
f) Their discontinuation from health care (article 4.1., 4.2. MLC 2006),
g) Their movement from state to state to receive medical treatment or repatriation due to the different health protocols observed by each sovereign state, the lack of sanitary material, against the coronavirus, on board ships (article 3.1. MLC 2006 in the context of the company's obligation to ensure remarkable accommodation facilities for seafarers on board),
h) Avoiding shipping companies from paying paid sick leave and social security, the right to leave for the coast and access to welfare facilities and an increase in incidents of abandonment of seafarers.

Research showed that the most critical factor influencing the labour performance of seafarers is the existence of welfare and devotion of the company to them. Monetary return meets only the essential requirement of seafarers, while non-

[1607] International Transport Workers' Federation, (2021). "Seafarers' Bulletin no 35/2021". Available at: https://www.itfseafarers.org/sites/default/files/node/resources/files/SeafarersBulletin2021_EN.pdf, last accessed: 22-7-2022.

monetary earnings and loyalty are the determining factors of labour behaviour. The health crisis has brought about the termination of the possibility of observing, by willful misconduct or negligence, the entire articles of MLC 2006 (IMO resolution A.1160(32))[1608]. According to statistical data, the percentage of seafarers on ships and their contracts again recorded an increasing trend of 4,2% for January 2022[1609]. In 2021, a portion of the naval capacity completed 15 months of continuous sea service, while the projected, according to the MLC 2006, is up to 11 months[1610].

All the above made the sailors, who kept the global supply chain alive, feel like pariahs and abandoned by their flag states, coastal states and their employers. Despite the intense pressure of the international community to recognize seafarers as essential workers[1611]and therefore to enjoy privileges and special treatment, and even though the living and working conditions of seafarers have ended up from a health crisis to compose a humanitarian crisis[1612], only 48 states have recognized them as key workers[1613].

In addition, following a survey conducted by the classification society Lloyd's Register, 25% of the seafarers surveyed replied: "I strongly disagree" about whether they felt they played a meaningful role during the pandemic. The 75% of seafarers said the pandemic meant they were not receiving regular visits from shore-based personnel. Furthermore, 62% of seafarers felt that their health and safety were not properly balanced with operational requirements, and54% of seafarers thought that they were not actively assisted in managing stress and fatigue during the pandemic

[1608] López López, M. N., Campa Portela, R. M. D. L., Bouza Prego, M. D. L. Á., & Sánchez Girón, J. R. (2022, June). Covid-19 control measures and its impact on seafarers' mental health. In *Maritime Transport Conference* (No. 9). Universitat Politècnica de Catalunya. Iniciativa Digital Politècnica.

[1609] Global Maritime Forum, (2022). "Neptune Declaration Crew Change Indicator". Available at: https://www.globalmaritimeforum.org/neptune-declaration/crew-change-indicator, last accessed: 23-7-2022.

[1610] Nielsen A.C.F., (2020). « COVID-19 SEAFARERS' MENTAL HEALTH». Available at: https://www.bimco.org/ships-ports-and-voyage-planning/crew-support/covid-19-seafarers-mental-health, last accessed on 19th April 2022.

[1611] International Maritime Organisation, (2020). "Circular Letter No.4204/Add.18 26 May 2020 - Joint Statement IMO-ICAO-ILO on designation of seafarers as key workers". Available at: https://wwwcdn.imo.org/localresources/en/MediaCentre/HotTopics/Documents/COVID%20CL%204204%20adds/Circular%20Letter%20No.4204-Add.18%20-%20Joint%20Statement%20Imo-Icao-Ilo%20On%20Designation%20Of%20Seafarers.pdf, last accessed: 23-7-2022.

[1612] Josephs J., Russon M.A., (2021). "Coronavirus: Seafarers stuck at sea 'a humanitarian crisis'". Available at: https://www.bbc.com/news/business-55802514, last accessed: 23-7-2022.

[1613] BIMCO, (2022). «BIMCO COVID 19 WEEKLY REPORT DATED 8 APRIL 2022». Available at: https://www.bimco.org/news/ports/20220408-bimco-covid-19-weekly-report, last accessed: 24-7-2022.

(Lloyd's Register, 2022)[1614]. Not only has their work performance recorded a rapid decline due to what has already been exposed, but already 35% of the total human naval personnel have decided to change professional orientation, with the majority being officers. This percentage, which concerns non-work satisfaction, increased by seven times by the end of 2020[1615].

According to the Seafarers' Happiness Index 2021, the most unhappy workers from the influences of Covid-19 were detected on cruise ships with average prosperity of just reaching 4%, while for the rest of the vessel types, the percentages were extremely low but did not fall from 5.5%[1616]. Cases of suicide attempts and a strong expression of discontent have also been recorded[1617]. However, in several cases, payers were stranded at airports for days because they did not have their paperwork or did not have the necessary visas[1618]. Despite the steps taken by the international shipping community through the adoption of the following: a) a solution to the IMO's 12 steps on crew changes, b) the conclusion of the Neptune Declaration by 300 leaders in the shipping industry and the protection of human rights, including new large multinationals such as BP, Cargill, Rio Tinto and Shell[1619], and c) the acceptance by charterers of a term in charter agreements that allow for deviation for a crew change [1620], prosperity and therefore the performance of seafarers was more stabilized than improved.

[1614] Lloyd's Register, (2022). "Significant crew safety and well-being lessons to be learned from survey". Available at: https://www.lr.org/en/latest-news/significant-crew-safety-and-well-being-lessons-to-be-learned-from-industry-wide-survey/, last accessed: 24-7-2022.

[1615] Safety4Sea editorial team, (2021). "Why do seafarers quit their job?". Available at: https://safety4sea.com/cm-why-do-seafarers-quit-their-job/, last accessed: 24-7-2022.

[1616] The Mission to Seafarers, (2021). "Seafarers Happiness Index 2021". Available at: https://www.happyatsea.org/wp-content/uploads/2021/10/SHI_Q3_2021.pdf, last accessed: 24-7-2022.

[1617] Bakhsh N., (2020). "Seafarer abandonment cases at record high". Available at: https://lloydslist.maritimeintelligence.informa.com/LL1135170/Seafarer-abandonment-cases-at-record-high, last accessed: 24-7-2022.

[1618] UK Maritime Coastguard Agency, (2022). "MIN 656 - Understanding the long-term impacts of the COVID-19 pandemic on seafarer wellbeing". Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1059196/MIN_656.pdf, last accessed: 24-7-2022.

[1619] Intercargo, (2022). "The Neptune Declaration on Seafarer Wellbeing and Crew Change". Available at: https://www.intercargo.org/neptune-declaration/, last accessed: 24-7-2022.

[1620] McCulloch E., (2020). "New BIMCO clause to permit deviation for crew changes". Available at: https://www.westpandi.com/publications/news/archive/new-bimco-clause-to-permit-deviation-for-crew-chan/, last accessed: 24-7-2022.

However, research has shown that the issue of the mental health of seafarers and, therefore, their reduced performance could have been solved by the simple use of technology and primarily if the shipping companies had provided for the existence of fast, reliable and free Internet on board ships. A quick and reliable internet connection will reduce the impact of the pandemic and provide access to external support, communication with families, etc. But the companies decided not to proceed in this way due to the cost of installing it[1621].

5.5.2 Ship security risks

If this situation continues indefinitely and ships cannot operate safely in accordance with international rules, many vessels may have to suspend their activities. Moreover, 60% of seafarers surveyed by the n ILO in September 2021 believed that they or their crew companions were more likely to be "involved in an accident that could harm human life, property, or the marine environment due to fatigue or fatigue". It turns out to be almost impossible to comply with Regulation VIII/2 of STCW 2010 on the observance of minimum rest periods, while they said regulation states that the "watch-keeping hours should be accurately maintained"[1622].

Another issue to the safety of ships, which is causally linked to the pandemic, is the inability to provide maritime training and, therefore, to obtain or renew the necessary certificates as defined by the STCW in its articles. Certificates of Competency (CoC) and Certificates of Proficiency (CoP) have either expired on board, or their would-be replacements have not expired. Thus, the coronavirus has dramatically impacted the maritime education sector (as does 50% of the shipping industry, with 44% believing that it just had an effect[1623]), where the absence of proper training has removed the excellent crew factor from shipping.

An outstanding contribution to the objective impossibility of providing education has been the under-functioning of maritime training centres because of the adoption of repressive sanitary measures, which caused a slowdown in the provision of

[1621] Pauksztat, B., Grech, M. R., & Kitada, M. (2022). The impact of the COVID-19 pandemic on seafarers' mental health and chronic fatigue: Beneficial effects of onboard peer support, external support and Internet access. *Marine Policy*, **137**, 104942. DOI: https://doi.org/10.1016/j.marpol.2021.104942.
[1622] Hofbauer, J. A., Janig, P., Ritter, V., Stemeseder, M., & Wittich, S. (2022). Part I: Austrian Judicial Decisions Involving Questions of International Law. *Austrian Review of International and European Law Online*, **25**(1), 255-537.
[1623] World Maritime University, (2022). "MarTID 2022: 2021 Training Practices Report". Available at: https://magazines.marinelink.com/NWM/Others/MarTID2021#page/1, last accessed: 24-7-2022.

training. The 69% of seafarers say they have not received face-to-face training and simulation training. 70% of education centres consider that social distancing measures have had a negative effect on the educational process. In comparison, 17% of educational centres have entirely suspended their operation, and 58% have reduced the variety of courses provided. On the other hand, 45% of maritime training institutions increased their budget for training in 2021, and almost 60% said they expect budgets to increase in 2022. About 80% of shipping companies saw an increase in the use of e-learning. But the trend is that knowledge about specific maritime skills can be provided exclusively in person. 88% of seafarers believe that many aspects of maritime training can be delivered solely in person. Thus, 57% of the seafarers surveyed consider that they have delayed and regressed their training, waiting to fill these gaps when conditions normalize[1624].

Therefore, the health and abilities of seafarers at sea are no longer established. A typical example is a naval shift whose myopia has increased, has not renewed his medical certificate, does not have the appropriate myopia glasses, and cannot safely perform his duties, especially when the same person has been physically and mentally exhausted from his extended stay on board. Also, during these two years of the crisis, the IMO imposed the implementation of many systems in order for companies to comply with its green target for 2050 and the reduction of GHG emissions through the observance by each ship of the SEEMP[1625] green management plan, which amended MARPOL's ANNEX VI (IMO RESOLUTION MEPC.324(75)[1626]). On 1-6-2022, all vessels must have been equipped with Ballast Water Management System according to MEPC.325(75)[1627]. For many of these systems that were difficult to apply to ships, seafarers have not received the necessary training to operate and maintain them.

[1624] Safety4Sea editorial team, (2022). "Report: Maritime training severely affected by COVID-19". Available at: https://safety4sea.com/report-maritime-training-severely-affected-by-covid-19/, last accessed: 24-7-2022.

[1625] Psaraftis, H. N., & Kontovas, C. A. (2020). Influence and transparency at the IMO: the name of the game. *Maritime Economics & Logistics*, **22**(2), 151-172. DOI: https://doi.org/10.1057/s41278-020-00149-4.

[1626] International Maritime Organisation, (2020). "RESOLUTION MEPC.324(75) - Procedures for sampling and verification of the sulphur content of fuel oil and the Energy Efficiency Design Index (EEDI)". Available at: https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Air%20pollution/MEPC.324%2875%29.pdf, last accessed: 23-7-2022.

[1627] IMO, (2022). Resolution MEPC.325(75) - Amendments to the International Convention for the Control And Management of Ships' Ballast Water and Sediments, 2004. Available at: Resolution MEPC.325(75) - Amendments to the International Convention for the Control And Management of

5.5.3 The impact on the quality standards of shipping companies

Overwhelmingly, the Quality Management System of shipping companies is determined by the degree of adherence, functionality and practicality of the ISM Code. The ISM code has incorporated many "quality" issues that mainly concern the improvement and compliance of the company's systems with the current legislation, which each company reflects in its personalized SMS.

The faithful observance of the ISM Code by a shipping company is proven, according to SOLAS Chapter IX, by the performance of the company of Document of Compliance, which certifies the reliability of the company's SMS[1628]. Furthermore, the SMS of the companies are based on the principles of the "Plan-Do-Check-Act"[1629]. Especially the part of the Plan concerns the obligations of the organisation to comply with international and national legislation, rules and regulations, i.e., its responsibility to carry at all times renewed certificates provided for by international treaties, such as MLC's DMLC, STCW's CoC – CoP – Medical Certificates, etc.

It has become challenging for many shipping companies, resulting in failing in the predetermined periodic checks and risking their closure through the removal of the DOC. We analysed many cases of non-compliance with the MLC and STCW above. The risk of removing DOC increased significantly due to three leading causes, namely: a) the imposition of sanitary social distancing measures made it difficult for the shipyards, which were under-functioning, to operate. b) Despite the aforementioned reality, the checks were never stopped or facilitated by the port authorities – port state controls with the imposition of the prescribed sanctions and checks to remain the same after a short break between March and May 2020. As a result, the number of inspections of the Paris MoU from 1 October 2021 to 31 December 2021 was approximately the same as in the previous years, 2018, 2019 and 2020[1630].

Ships' Ballast Water and Sediments, 2004 - (adopted on 20 November 2020) (imorules.com), last assessed: 30-8-2022.

[1628] Wankhede A., (2021). "What ISM Certificates You Require to Start a Shipping Company?". Available at: https://www.marineinsight.com/marine-safety/what-ism-certificates-you-require-to-start-a-shipping-company/, last accessed: 24-7-2022.

[1629] Kantharia R., (2021). "What Is Safety Management System (SMS) On Ships?". Available at: https://www.marineinsight.com/marine-safety/what-is-safety-management-system-sms-on-ships/, last accessed: 24-7-2022.

[1630] Paris MoU, (2022). Inspection Search. Available at: Inspection Search | Paris MoU, last assessed: 30-8-2022.

In the geographical boundaries of the Paris MoU alone, detentions had been imposed for this period[1631]. However, the period of inactivity observed for the two months of 2020 by the Paris MoU was not observed by the Tokyo MoU, where the controls continued unabated[1632]. For some time, the companies claimed that this was an emergency, as a result of avoiding some effects of non-conduct of controls, even though the controls continue as usual. However, after the adjustment period had elapsed, the situation ceased to be considered extraordinary, with the international organisations claiming that the companies had time to plan their adaptation, c) an increased bureaucratic obligation with the number of certificates that the company in question must comply with being exhausting - about fourty - and the health crisis to affect the possibility of errors and non-observance of deadlines. Therefore, one can easily understand the cycle of sequencing events that causally reduce the quality of shipping services[1633].

With this disruption causing problems in obtaining the necessary certifications, and without the necessary tolerance from port state controls and flag administrations, there are deficiencies and the removal or non-renewal of certificates that inevitably lower the quality of shipping companies, who can no longer negotiate and satisfy the requirements of their charterers.

Thus, it can be stated that the effects of the crisis are primarily due to the inaction and non-cooperation of state authorities, control services and international organisations. For example, with port security officers leading to an additional waiting time for berthing operations, shipping companies must compensate charterers for activating off-hire and delivery clauses. The fact is, therefore, that the decision-makers should have taken immediate relief measures to mitigate the effects of the pandemic.

[1631] Yan, R., Mo, H., Guo, X., Yang, Y., & Wang, S. (2022). Is port state control influenced by the COVID-19? Evidence from inspection data. *Transport Policy*, **123**, 82-103. DOI: https://doi.org/10.1016/j.tranpol.2022.04.002.

[1632] ABS, (2021). "ABS PORT STATE CONTROL QUARTERLY REPORT – Q4 2021". Available at: https://ww2.eagle.org/content/dam/eagle/rules-and-resources/Flag-and-Port-State-Information/psc-quarterly-report-q4-2021.pdf, last accessed: 24-7-2022.

[1633] Tokyo MoU, (2022). Inspections and Detentions. Available at: Inspections & Detentions | Memorandum of Understanding on Port State Control in the Asia-Pacific (tokyo-mou.org), last assessed: 30-8-2022.

5.6 Research Outcomes

Regarding the **controlling bodies of the shipping market** and specifically to the issue of **vessel registration**, most shipowners were utilising flags of convenience, the majority of which were upgraded to whitelisted flags, **incorporating the majority of international legislations** while maintaining the concept of **offshore registries**. To counter this phenomenon, the traditional flag stated adopted the concepts of **double or international registries**, which established a secondary FoC as an option to the same registry, in addition to the initial choice of a traditional flag.

Another significant change was introduced to many FoC and Open Registries in 2018, namely the instalment of the **Economic Substance Report**. Subject to this report, an economic substance test should be executed **to evidence the financial substance of a registered company**. Through that test, **the core income-generating activities of the company are checked**, all required information should be stated in a provided form, and penalties will be installed upon the test's failure. The main practical issue that this test created is the establishment **of economic transparency and clarity upon company information** which until recently was deemed private and confidential. More importantly, the instalment of intrusive legislation upon company issues renders the competent authorities more flexible and predisposed to inspections.

Thus, it can be said that **the flag market will evidence changes** when vessels with new technologies start to emerge. Until their dominance, the required **quality will gradually increase**, pressing the flags **to adopt even more regulations related to safety**, thus continuously **increasing the level and the severity of stringency until all flags are rendered almost identical**. Concerning the issue of sustainability, the adoption of strict regulations will enhance safety and outcome sustainability.

Concerning **classification societies**, implementing a five-year cycle of inspections has considerably helped the vessel inspection process. It has effectively helped the shipping practice locate and resolve many **issues** and malfunctions before negative occurrences emerge. Additionally, the adoption of the **IACS Registry Association** establishes the concept of **cooperation** with each other and shows a homogeneity in the Regulation they select for their members. The main focus of classification societies is promoting marine safety and preserving **the marine environment**. To this end, classification societies should install **stricter measures and**

controls over the vessels and be in **close contact with the other stakeholders** to ascertain the quality of the vessel and support the implementation of the control processes.

Lastly, **a structural power shift is evidenced** in the balance of maritime stakeholders invested **in the control process**. A few decades ago, the classification societies were notorious for their strictness and the immediate revocation of their certificates in case of severe issues. However, nowadays, they have **a trend toward leniency**, establishing the concept of sub-standard. The main aim of this concept is neither environmental nor related to safety -it is effortless to shift from one class to another.

This opinion, along with establishing maritime marketing and installing **port state control** as the most **effective and transparent process** of vessel control, has installed the utility of **class as supportive** to maintaining the quality of the vessel and providing certificates to evidence the said quality. Nevertheless, under any circumstance, the classification societies have the power they used to have and are presently resorting to marketing strategies to increase clientele. This fact even questions the transparency and the non-profit role that they have as objective inspectors and surveyors in pursuit of safety and quality in shipping. Thus, a rhetorical question arises: **"*Has the shipping practice rendered the classification societies substandard?*"**

The insurance institution "**Protection and Indemnity Club**" insures anything **not covered** by the **ship's traditional maritime insurance (Hull & Machinery)** and cargo by the insurance companies, which **differs**. The advantages of P&I Clubs are considered being: **Transparency and substantial profit achievement**, the possibility for additional contributions from members, **the provision of security**, **the broad scope of coverage**, **the experienced and highly qualified staff**, and the opportunities provided by the **letters of guarantee and their general flexibility** as a disadvantage can be considered their exclusive dependence on the contributions of their members.

Thus, it is concluded that ship registration evidences a stalemate with the ESR and the ever-increasing need for quality. W**hile classification societies need to repurpose their aims** and be reminded of their scope and origins, P&I Clubs are distinguished from the rest. Specifically, **P&I Clubs concentrate the required**

flexibility on a mostly fluctuated market, along with high-quality services and facilitation of risks.

While the main reason for its creation was **the enhancement of safety and environmental protection**, the unification of many functions and the adoption of many similar MoUs, led to the overall **enhancement of the quality** and quantity of port state inspections.

While the PSC was evolving, adopting crucial legislation, such as ISM and ISPS, provided him with new means of operational tools and more detailed inspection processes. It can be stated that the PSC process **is the most impactful method of control and enforcement** of the international maritime framework.

The power shifted with the initiation and development of PSC. Until a few decades ago, the **classification societies practically decided a vessel's fate during their inspection execu**tion. Presently, this power has been **transferred to PSC processes**, which, with the support of systems such as NIR, execute **effectively and with excellent transparency** and objectivity the control of the vessels. Thus, while **the classification societies are still important** and all other stakeholders utilise their certificates, they have been moved to a more **supportive role**. Each competent port authority effectively exercises the PSC process, and its effectiveness relies on the fact that a **failure of the port authority to notice a deficiency will possibly result in a maritime accident.** The damages from that accident will be left to the same port authority to counter the pollution or other occurrences and claim for damages and overly suffer the outcomes of the incident.

Thus, it can be stated that **Port State Control and P&I Clubs** will monopolise the future of maritime controlling mechanisms. While it is of paramount importance, the registration of a flag will be of lesser significance, and **all flags will become almost identical**. The **classification societies will be less impactful**, and should they continue to lose their identity, the author believes that **P&I Clubs will probably absorb them**. Finally, the PSC with continue to **dominate the market** and, with the support of the continuously expanding technology and the growing uniformity among all MoUs, will probably remain the primary source of control and thus the **most reliable option for enforcing the concept of sustainability to the sector**.

Conclusions

a. Academic Contribution

The shipping industry is undergoing **unprecedented changes**; undoubtedly, the maritime landscape has been considerably altered over the last few years. Nevertheless, the most fascinating is not the changes that happened but the changes that are yet to come.

Under this everchanging environment, IMO, the **foundation of shipping** has adopted new amendments to the most fundamental conventions, namely MARPOL, SOLAS, STCW, and supportively ILO is continuing to address issues of the maritime profession while amending MLC. However, while the amendments incorporated by the said Conventions, the **four pillars of shipping** as they are called, are effective but not impactful.

Initially, **SOLAS Convention**, after the 2012 accident of Costa Concordia, which resulted in the loss of thirty-four lives, adopted new amendments to **Chapter II-1 of SOLAS** with regards to subdivision and vessel stability, focusing mainly on the existing and the newly built passenger ships. Thus, while the amendments are **efficient** and **considerably improve** the safety onboard cruise ships, another accident had to remind the shipping practice that **regulations need constant development** in light of the tremendous technological innovations.

The **MARPOL Convention**, following the steps of international environmental legislation, has adopted a series of amendments to **enhance the environmental standards** by further **reducing all types of harmful emissions** to almost minimal levels. Specifically, Annex I upgraded the standards for tanker navigational tools to improve maritime safety, and Annex V introduced the concept of "E-waste". Undoubtedly, an essential amendment was on Annex VI, which installed the Tier III requirements and certification for the NOx emissions from diesel engines. Still, the paramount was the adoption of the new requirements relating to the **Existing Ship Energy Efficiency Index (EEXI) and Operational Carbon Intensity Indicator (CII)**, introduced with MEPC.328(76). Nevertheless, **while those amendments are effective, there are not impactful**. Regarding the installation of the global Sulphur cap, the two monitor systems installed, namely **EU MRV and IMO CDS**, have been **overlapping**, creating confusion in the operations of shipping companies. Yet again,

the **installation of new amendments comes after the set milestone or is left to shipping practice to adjust itself, implementing "the market rules".**

Regarding **STCW**, which is most appreciated in the shipping industry, the installation of the **2010 Manila amendments** was effective. But, while those amendments enhanced the training processes and improved the medical standards on board the vessels, they proved **ineffective against Covid-19**. Specifically, while Covid-19 was the third pandemic after Ebola and SARS in the last twenty years, the shipping industry was greatly hampered during the vessel operation, and the **maritime profession greatly suffered** during this crisis. Moreover, while STCW has announced new amendments since 2020 to counter Covid-19 even after its emergence, **no efficient measures have been installed**.

On the same page with STCW was the performance of ILO's **MLC** during the Covid-19 pandemic. While MLC and its provisions contribute decisively to the comprehensive regulation of crew safety issues on board ships to ensure **employers' rights and responsibilities**, its' **effectiveness was questioned during the outbreak of Covid-19.** While various regulations were adopted, implementing countermeasures for spreading or treating the infected, those amendments came after the massive spread of the virus. Thus, as with STCW, **the impact** of MLC on battling the virus **was limited**.

Thus, regarding the "four pillars" of shipping, **new regulations need to be adopted to avoid incidents**, such as the overlapping of systems during the enforcement of the low sulfur cap. Most notably, **the poor facilitation of Covid-19 proved that the system is flawed**. The "ingredient" that international shipping is missing is called **"proactiveness"**. Sadly, while the shipping industry is invested **in countering and reacting to emerging events**, time should be spent **predicting and implementing measures to counter** those before they even emerge. The utilisation of **proactive measures** along with fast and efficient responses is the key to **avoiding another "Costa Concordia"** or **the destruction of crews' resilience** and lead the shipping sector towards a sustainable future.

But, while the reflexes of IMOs and ILOs' leading maritime Conventions are being tested, other environmental legislations can prove **impactful** to shipping. One of those legislations is the **Civil Liability Convention (CLC)**, a convention that established the **measurement of the liability** for the shipowners concerning tanker vessels; while it offers the shipowners, the option to limit liability, at the same time, the

penalties in case of **gross negligence** or **willful misconduct** are **severe**. Furthermore, this Convention and the Fund 1992 and LLMC Convention practically install the concept of **due diligence**. Under this concept, when a shipowner executes his duties **pursuant to all the imposed legislation**, in case of an occurrence, he will be compensated for his diligence by **limiting his liability** by the competent conventions. In contrast, the rest of his liability will **be indemnified by the P&I Club**.

Specifically, OPA 1990 is famous for practically installing two impactful changes to vessels sailing on U.S. waters, namely a) the installation of the **double walls** or **double bottoms** regime on all tankers and b) the application of the concept of **unlimited liability** for the party who causes marine pollution. The first change, while it was received by the shipping community with **skepticism**, mainly due to the **enormous costs** that the shipping companies were **forced to pay**, has proved **efficient in practice**, having many instances of "near miss accidents" instead of occurrences leading to mass pollution, due to implementing the double hull/bottom policy. As for the second, which was heavily criticised even in many U.S. States, it has evolved into **an excellent concept tool for sustainable shipping**. The **ultimate transfer of liability** from the shipping company, which is usually veiled behind offshores, to even the initial producer, has generated tremendous pressure from the charterers to the shipowners to implement **the stringiest measures** to eliminate the chance of accidents or otherwise to be able to **prove their "duty of care"** and be even perhaps excluded from liability. This concept of "unlimited liability" is practically utilised in **unmanned vessels**, the so-called ships-of-the-future, where the **liability for malfunctions is transferred to the competent manufacturer**, thus making him an **active stakeholder in the vessel's safety**.

While many regulations are capable of installing and enhancing safety, the managing/executing methods are often **lacking**. To this end, after yet another series of accidents, **ISM Code** was established under, yet again, heavy criticism from the shipping community due to the increase in operating expenses. Nevertheless, after nearly thirty years, **the impact** of the ISM Code on the shipping industry is **eventually recognised**. Namely, the ISM Code effectively **improved maritime transport safety** while offering enhanced compliance measures with the international marine framework and **accident avoidance**. Additionally, ISM Code maximised **the performance and competitiveness of the shipping companies** that adopted the Code most effectively.

Thus, while for all emerging pollutants, processes have been installed to counter them effectively, presently, the shipping industry is developing yet another project that will counter the most common factor for most maritime accidents effectively, namely the human factor. This project concentrates around the development of **unmanned vessels**, and they aim to prospectively **eliminate the human element** and interaction from the shipping industry, thus **reducing the chances of accidents** and, at the same time, the **operational costs of the shipping company**. Presently, the Mayflower Autonomous Ship is tested, while the MV Yara Birkeland, a 120 TEU container ship, is currently operational. While **the project is evolving** and it will effectively reshape the market upon initiation, it was concluded that **this transition should be executed at a slow and stable pace**, not negatively affecting the shipping industry. And although prototype small autonomous ships are operated, the next stage will practically be **navigation with increased remote control from land via satellite, partially operated** for any eventuality.

Thus, it can also be concluded that the **expansion of technology** is another **critical factor** in implementing and enforcing the **adopted regulatory framework**. Specifically, **the inclusion of technology** in the shipping industry has been **substantial** over the last few years. After the spread of Covid-19, **various sections of the maritime industry rely solely on technology**, abolishing the human element. Technology has also been of significant help to the shipbuilding industry and in developing new materials to increase the quality and performance of newly built vessels. That said, the massive reliance on technology leads to the **development and processes** which rely on **recently introduced materials and initially help on issues such as navigation but can be the leading cause of other kinds of pollution.**

With regards to environmental protection and the integration of technology, a typical example is **the handling of ballast water**, which was utilised to help the vessel's stability but ultimately led to the destruction of regional maritime environments. Another example is the utilisation of anti-fouling systems, which increase a vessel's speed and life cycle but cause pollution to regional environments simultaneously. Thus, **the utilisation of technology and new processes should be coupled with the instalment of proactive and sustainable measures** to access and prevent the creation of emerging pollutants.

Additionally, the majority of the said systems and legislation include **the concept of sustainability**. But **how can sustainability be re-assessed, as TMSA does,**

to enhance itself constantly? It is proposed that **sustainability can work in a continuous correlation with due diligence and proactiveness**.

Currently, the legislative **framework can only be reactive**, first experiencing the accidents and then installing countermeasures. Unfortunately, numerous incidents, from Exxon Valdez and Torrey Canyon to Covid-19, prove that the shipping industry **must suffer first and then act**.

Due diligence, on the other hand, is a concept where **the steps of a process are executed in such an order and detail that there are two options: i) any accident or liability will emerge or ii) even if an incident emerges, the care of the party to avoid this incident will be so much evidenced that this party will be excluded of any liability.**

Regarding the **legal landscape of the maritime sector**, which was often criticised for its **reactivity**, the Covid-19 pandemic **exposed many of its weaknesses**. While it **was not the first time that the shipping industry encountered such an incident**, the global scale of the virus and the distinct characteristics of the illness **challenged the reflexes** of the maritime sector. Specifically, from a legal perspective, Covid-19 **heavily impacted i) port safety, ii) some subsequent clauses, such as the right to deviate from the course, and iii) issues related to crew health and safety and the proving the exercise of the duty of care**.

Over the last twenty years, the maritime sector encountered two major pandemics, namely **Ebola and SARS**. During the outbreak of 2015, BIMCO adopted the **Infectious or Contagious Diseases (IOCD) Clauses**, setting the foundations for **an effective counter to pandemics as soon as they emerge**. In general, the clauses developed for battling the Covid-19 pandemic included **proactive measures** to minimise the spread of the virus and **specific measures to counter the spread while on a climax**. The IOCD clauses initially established the terms **'Disease' and 'Affected Area'**, and then they regulated the **right and limitations of the parties** affected by the outbreak.

Concerning the issues related to the resolution of disputes, many new options have emerged besides the judicial process. The most prominent and similar to court processes is that of **arbitration.** Much new legislation sets have been established to regulate the newly emerged dispute resolution system and its variations effectively. The maritime practice has effectively established arbitration as the **primary option for dispute resolution**, leaving only the most complicated conflicts for court processes.

Specifically, the advantages of arbitration and its variations compared to the court processes are: **i) lower costs, unless it is institutional or international arbitration), ii) speed of settlement, unless the parties are unsatisfied with the outcome and they elect to appeal to courts, iii) choosing the judicial authority and the forum, iv) election of the procedure, which can be equally complex comparing to court processes, v) flexibility of the process, vi) confidentiality, vii) protecting the contractual relationship of the parties, adopting a problem-solving approach**.

On the other hand, the disadvantages of arbitration, in comparison to court processes, are: **i) the importance and validity of court order, ii) the complexity of a case, including many parties, iii) when there is a power imbalance between parties and the transparency of the courts is beneficial for the weaker party, iv) disputes relied upon evidential facts and primarily when a party does not provide willingly relevant information and, most importantly v) need of a strong president for the court decision to be established as the rule of law**.

It is presumed that the last point is the most **crucial weakness of the arbitration process, creating substantial legal gaps in the U.K. legal system**. Specifically, as established, the U.K. legal system is based upon case law to evolve. This is why legislation like the Marine Insurance Act may stay in effect for more than one hundred years. To this end, the **courts gathered a substantial number of claims yearly**, most of which had already been resolved (practically) by adopting previous court decisions upon identical issues. Thus, **the judges even supported the initiation of the concept of arbitration**, aiming to **soften their workload** and the repetitive ruling over exact issues, claiming the more complicated and crucial decisions for the court ruling. However, while, at the start, **the establishment of arbitration was a success** and the **courts ruled over the most significant cases**, presently, it has been evidenced that the establishment of arbitration, while beneficial, has also proved entirely parasitic for the court ruling.

b. Industrial Contribution

Regarding the industrial contribution of this thesis, it is proposed **that the mentality of the industry should be reshaped**. For example, **adopting a similar stance to OPA 1990** for the rest of maritime legislation might be proved **very efficient** and will eventually lead to **the elimination of accidents** and subsequently to the

elimination of pollution, a great source of liability for a shipping company. While the shipping industry is battling the enactment of similar Conventions, such as HNS, their stance will change in view of the long-term results of such measures.

With regards to operational systems, TMSA will rapidly become **the dominant stakeholder** in a company's operations, it is suggested that **other shipping tools**, namely **studies of experiences and accidents to avoid similar incidents in the future**, can benefit the process of TMSA. While such tools operate exactly like TMSA, **those tools execute the only thing that the TMSA does not, namely, the study of the past**. While TMSA uses systems like SIRE to build its environment, **the lack of past knowledge before the initiation of TMSA might prove beneficial** and resolve and counter threats **before they even emerge**. An active occurrence will be incorporated by TMSA and become a system experience; **the utilisation of guidebooks, such as ISGOTT**, which include enormous experience along with methods of avoidance, may further benefit the utilisation of TMSA and provide it with a **notion of proactiveness**, which is currently missing from the system. So far, it has been established that one of the fundamental aspects of sustainable shipping **is safety**. Evidently, **TSMA now maximises the safety processes** to such an extent that similar systems will be initiated for other vessel types. The proposal of the utilisation of tools, such as ISGOTT, **enhances** system experience, **proactively including events of the past to effectively avoid similar occurrences in the future.**

Furthermore, from the vessel's perspective, the ballast helps **stabilise the ship during navigation**, minimising vibrations and other emerging incidents caused by the lack of stability; thus, it is paramount for safe navigation. Nevertheless, to avoid the costs, shipping companies usually **unload their wastes to open seas** and avoid utilising the set processes from BWM Convention, with **shady techniques** in collaboration with other stakeholders. To counter this phenomenon, the creation of **an aquatic (bio)map was proposed**, evaluating alterations in the biodiversity of the local environments and notifying the local authorities of possible violations of the set regulations.

After the adoption of the new low-sulfur cap, the shipowners were found with three options, namely i) to **utilise HFO** with the installation of emission reduction technologies, ii) to use **MGO or ULSFO** as compatible fuels or iii) use **LNG as fuel**. From the analysis of the three options, it has been proved that **LNG is the most reliable option** because it **does not pollute** the environment and its **sulfur content is negligible**. Furthermore, it was also evidenced that LNG expansion is **proportionate to the**

instalment of LNG facilities in ports, such as FSRUs. Therefore, the more the installation of facilities will expand, the more the LNG as a fuel will be utilised.

In addition, while LNG is the most sustainable fuel, **another fuel** will soon emerge as a viable and prospectively dominant force in the fuel market in 2050. That fuel is **ammonia**, which will be tested for the first time in 2024 when the **first ammonia-powered machines** are created. While there are installations, no training for utilising ammonia, and it is pretty early to exclude remarks, it has been spotted **that ammonia will probably have the course of LNG**. From its initial initiation as marine fuel in 2037, as estimated, it will need roughly the same time as LNG to dominate the fuel market. The fuels of the future will **compete** concerning **cost, safety, and available facilities and technology** to be utilised.

Additionally, when a fuel is **distinguished as the most effective**, it will require a specific amount of time, usually **proportional to the time needed for facilities to be installed** to **dominate the market**. Currently, this is the case with LNG, and it may be the case with ammonia.

Regarding the installation of the **monitoring processes** for the control of the low sulfur cap, a **loophole in the compliance** of those two processes, namely **EU MRV and IMO CDS**, is evident with no interaction whatsoever. Sadly, the IMO and E.U. procrastinate while the industry pusses for a solution. To resolve the issue, the issuance of "**a big global carbon levy**" is proposed by Prof. Psaraftis, which will lead to the vessels' speed reduction and low carbon fuels and conclusively the GHG emissions reduction both in the short and long run. Nevertheless, to share the costs of this Regulation, BIMCO adopted the "EEXI TRANSITION CLAUSE FOR TIME CHARTER PARTIES 2021" to resolve the dispute between the charterers and shipowners. Sadly, the utilisation of this clause **will not be enough** when structural issues, such as which monitoring system should be abided by, have not been answered, further exposing the gaps in international legislation, significantly overlapping with national or regional legislation.

While **sustainability is the goal, due diligence and proactiveness can be characterised as the means to achieve it**. Another important aspect of this relationship is the **continuity** of the relationship and **the constant repeat of the process**, thus **increasing the experience of the process**, correcting all emerging malfunctions, assessing the quality and performance of the system, and predicting any possible future issues. **However, from the assessed legislation, only the Codes and some legislation,**

such as CLC and OPA, from the previous chapters utilised such characteristics along with the Waste Management and Ship Recycling legislations. Also, it is evident that while those systems are deemed as **successful** and can **achieve sustainability** in their sector, the **shipping practice** has found methods **to avoid their utilisation and devaluate the concept of sustainability** in the maritime industry.

With regards to charter party clauses, BIMCO clauses, upon their creation in 2015, **were supposed to be generic**, to **encounter all similar pandemics effectively**, but specific issues such as the **exclusion of the ship owner from costs and liability**, should **he prove the exercise of due diligence**, proved **unfair and problematic** for the shipping practice. Thus, BIMCO **amended** the clauses of IOCD 2015 by **adding subsections** to the relevant provisions **for voyage charter** parties and adopting **a new set of BIMCO's "Infectious or Contagious Diseases Clauses for Time Charter Parties 2022"**, which establish the shared liability between the parties. While with quite a few flaws, these new clauses have helped the shipping practice **distribute the financial costs of the necessary actions** to counter the virus and have **minimised concealing the outbreak of the illness** onboard vessels.

With regards to insurance market, he newly established MIA 2015 has moved the marine insurance warranties closer to the possibilities and effects of conditions of charter parties, namely in case of a violation, **to i) effectively terminate the contract, ii) claim for damages, iii) set a reasonable time limit to amend the violation (for marine insurance) or to have a time bar of two to three years (for charter parties-exact time bar depends of the type of charter party) to make a claim or be compensated iv) practically avoid the activation of the contract**. Also, the new option for marine warranties **resembles the practices of classification societies**, to regard a vessel with severe defects **as "sub-standard",** thus providing time for the shipping company to amend those issues while the classification society renders the ship "**unclassified**" and until the vessel undergoes a **detailed inspection** after the **vessel's repairs have been executed**.

Regarding the **controlling bodies of the shipping market** and specifically to the issue of **vessel registration**, most shipowners were utilising flags of convenience, the majority of which were upgraded to whitelisted flags, **incorporating the majority of international legislations** while maintaining the concept of **offshore registries**. To counter this phenomenon, the traditional flag stated adopted the concepts of **double or**

international registries, which established a secondary FoC as an option to the same registry, in addition to the initial choice of a traditional flag.

Another significant change was introduced to many FoC and Open Registries in 2018, namely the instalment of the **Economic Substance Report**. Subject to this report, an economic substance test should be executed **to evidence the financial substance of a registered company**. Through that test, **the core income-generating activities of the company are checked**, all required information should be stated in a provided form, and penalties will be installed upon the test's failure. The main practical issue that this test created is the establishment **of economic transparency and clarity upon company information** which until recently was deemed private and confidential. More importantly, the instalment of intrusive legislation upon company issues renders the competent authorities more flexible and predisposed to inspections.

Thus, it can be said that **the "flag market" will evidence changes** when vessels with new technologies start to emerge. Until their dominance, the required **quality will gradually increase**, pressing the flags **to adopt even more regulations related to safety**, thus continuously **increasing the level and the severity of stringency until all flags are rendered almost identical**. Concerning the issue of sustainability, the adoption of strict regulations will enhance safety and outcome sustainability.

Concerning **classification societies**, implementing a five-year cycle of inspections has considerably helped the vessel inspection process. It has effectively helped the shipping practice locate and resolve many **issues** and malfunctions before negative occurrences emerge. Additionally, the adoption of the **IACS Registry Association** establishes the concept of **cooperation** with each other and shows a homogeneity in the Regulation they select for their members. The main focus of classification societies is promoting marine safety and preserving **the marine environment**. To this end, classification societies should install **stricter measures and controls** over the vessels and be in **close contact with the other stakeholders** to ascertain the quality of the vessel and support the implementation of the control processes.

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Thus, it is concluded that ship registration evidences a stalemate with the ESR and the ever-increasing need for quality. W**hile classification societies need to repurpose their aims** and be reminded of their scope and origins, P&I Clubs are distinguished from the rest. Specifically, **P&I Clubs concentrate the required flexibility on a mostly fluctuated market, along with high-quality services and facilitation of risks**.

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Thus, it can be stated that **Port State Control and P&I Clubs** will monopolise the future of maritime controlling mechanisms. While it is of paramount importance, the registration of a flag will be of lesser significance, and **all flags will become almost identical**. The **classification societies will be less impactful**, and should they continue to lose their identity, the author believes that **P&I Clubs will probably absorb them**. Finally, the PSC with continue to **dominate the market** and, with the support of the continuously expanding technology and the growing uniformity among all MoUs, will probably remain the primary source of control and thus the **most reliable option for enforcing the concept of sustainability to the sector**.

c. Regulatory Contribution

While there are numerous examples and incidents, even now, many accidents are still happening while the legislative framework has already been installed. Thus, the legislation in shipping **not only lacks proactiveness but also lacks enforcement** by evidencing many accidents happening for the same reasons. Subject to this, to **be sustainable means to be emission-free, thus, not having incidents create pollution**. Currently, the proactiveness of shipping is evidenced only by Codes and systems that establish effective processes and that are auto-corrected.

While all the above are important, the most important of the ISM's implementation was **the installation of the concept of safety**. Upon this foundation, present systems, such as **TMSA**, were developed and are currently **moving to**

"dominate" the market. The most successful outcome of the TMSA is **the concept of self-assessment**. Namely, the system evaluates the impact of its actions and assesses system malfunctions **to re-calibrate itself** and avoid those issues during future activities. The system is practically built upon its own experience and is constantly evolving.

Nevertheless, besides safety, what other **aspects do sustainable shipping consists of**? The concept of **sustainable shipping** is an **emerging trend**, introduced recently to the shipping industry. It was found that the concept incorporates: i) all **safety practices and management**, installed with the **adoption of maritime codes and safety systems**, along with ii) the established principle of **environmental protection** from the perspective of minimisation of emerging environmental hazards coupled with iii) the **elimination of all sources of pollution** during a routine operation process and lastly iv) the application of **Corporate Social Responsibility** to the shipping industry. Thus, to achieve sustainability, effective **safety systems**, such as TMSA, are required to **enforce legislations**, such as MARPOL and CLC, having installed proactive applications and measures, **coupled with new legislations**, such as Waste Management Treatment, Low Sulfur Cap or Ship Recycling, installed **to minimise and prospectively eliminate pollution sources**. The cost of all those measures requires heavy investments in resources. At this point, the instalment of the concept of Corporate Social Responsibility can upset the reaction of the shipping industry.

While addressing the most prominent of that legislation bound to eliminate all sources of pollution, **Ballast Water Management** is controversial legislation. The ballast water management process is impactful and effective in **handling the unloaded ballast**, eliminating all potential environmental hazards. On the other hand, the negative outcome of this process is **the mounting costs** for the vessels and the possible delays in utilising the ballast handling facilities of port authorities.

With regard to air Emissions, during the last years, IMO and the other international bodies have adopted a successful set of measures to counter the emerging threat from air pollutants. Specifically, regarding **CO2 emissions**, new sets of rules based on **MEPC 76 and SEEMP** have been installed, which, in conjunction with the CCS method, leading to an unprecedented reduction of **the majority of emissions**. Furthermore, regarding **VOCs**, the mandatory utilisation of **vapour lines in port facilities** has been internationally introduced, subject to **Regulation 15 of MARPOL Annex VI**. Additionally, regarding **SOx scrubber wash waters**, IMO 2020 directed

the shipping community towards the **utilisation of scrubber systems** and fuels of high quality as an alternate factor for countering emerging environmental threats.

A similar case of system overlap is evidenced in the process of **ship recycling**. Currently, there are two international (one of which is not in force but partially followed) and one regional legislation on ship recycling. Thus, while all legislations effectively **promote effective ship recycling while protecting the safety of the facilitators**, the **gaps** in their utilisation have led the shipping industry to implement the process of **de-flagging** to avoid the effects of the said legislation. From the analysis, it was concluded that the ideal solution would be the **installation of the E.U. Waste Shipment Regulation** in a global spectrum along with **international incentives and collaboration of flag states**, utilising systems similar to the **New Inspection Regime (NIR)** to counter the phenomenon of de-flagging.

Additionally, while currently there is **no mention of the unmanned vessel in international legislation**, the abolishment of the crew didn't seem to disregard the unmanned vessels being categorised as "vessels. Nevertheless, it was concluded that **the international legal framework is underdeveloped,** and **many alterations to legislation**, such as UNCLOS and COLREG, **should be made before the adoption of unmanned vessels** is initiated. From the analysis of unmanned vessels, it was evidenced that international legislations are very slow to reach such groundbreaking changes. T**o avoid legal gaps in the future**, **the legal community should realise that the rapid expansion of technology is pressing all sections of the maritime sector towards constant reshaping and evolution**.

Regarding the issue of "**wet liabilities**" (as they are called in U.K. maritime practice), the instalment of new technologies will effectively force the legal community to adopt new sets of legislation, considerably enhancing marine safety and security concepts. Specifically: i) **COLREGs should be restructured entirely** to facilitate the new navigational systems that will be installed, ii) **salvage will be utterly professionalised**, with the merchant vessels unable to offer assistance absent of crew, and new methods of salvage will emerge, such as helicopter assistance with tech experts to board an unmanned vessel and repair system malfunctions, iii) **general average is likely to be extinct,** or unique options may be inserted to unload the cargo to save the vessel, iv automatically) **other liabilities, such as towage, will be professionalised absent of crew**, such as salvage, and v) **"remote" pilotage of the vessel by a local operator may be installed to all vessels**, to effectively operate the unmanned vessels

to navigate into demanding circumstances, as it is the entrance, the mooring and the exit from a port of call. As evidenced in other transportation sectors, those developments should undoubtedly **shift the liability from the ship owners to the manufacturers** of the newly installed systems. As OPA 1990 proved in the end, this is an effective shift of liability that effectively enhances the safety processes.

With regard to marine insurance, the present amendments with the adoption of **MIA 2015** were focused upon specific points, namely: i) the restructuring of the duty of **fair presentation**, installing new duties to the insurer, and assured relating to the knowledge of all relevant circumstances of the contract, ii) the **abolishment of "the draconian effect"** from warranties, to offer the insurer a third option, to temporary avoid the contract and its subsequent obligations, until the assured amends the violated clauses, iii) new **sets of remedies for no-disclosure**, iv) the assessment of **fraudulent claims**, installing stringier penalties, v) the new **"transparency" requirement** of the contracts and vi) amendment of the third parties' rights against the insurer.

Specifically, the establishment of the third option **related to the implementation of warranties,** with the termination of the automatic resolution of the contractual relationship when a clause is triggered, evidences **a substantial turn of marine insurance legislation towards the market's needs**. Namely, this new option greatly helps insurers **maintain their contractual relationships** while providing the assured adequate time to amend any sudden issues while protecting against emerging liabilities.

As is evidenced by **P&I Clubs**, which **were established to insure** the third-party liability, which was the only liability that the insurance companies **refused to insure** presently, P&I Clubs **dominate the insurance market**; it is quite the same with **the courts and arbitration**. Namely, the arbitration **emerged to counter the issue of court delay** due to their immense workload by confirming previous court orders (and small claims) and leaving the significant cases to the courts. Presently, however, a considerable shift in the market's preference has been evidenced, **electing arbitration tribunals instead of courts**. The reasons that have led to this phenomenon are all those mentioned above. In contrast, **the flaws of arbitration** have been countered with the **instalment of more complex arbitration processes** that are identical to the court processes, and parties can elect that.

The last "front" where the courts have "barricaded" themselves is that of **the precedent of the court decision**. Even in court rulings, the "strength" of a case is based

upon the degree of the court's jurisdiction, namely High Courts, Court of Appeal, and finally Supreme Court, with the last ruling over the most important of cases and (as it is said in the U.K.) creating law. **The arbitration courts, regarded as "private" and not as transparent and objective as the traditional courts, cannot provide such impactful decisions as Supreme Court**. Thus, this **weakness of arbitration tribunals**, along with a **profound preference** of maritime practice to arbitration in conjunction with the **rapid development of technology** and the instalment of new processes, new materials, and trends (such as sustainability) and even new types of ships and facilities, **creates a legal gap into the evolution of U.K. legal practice, with fewer precedents**.

Two paths can resolve this issue; namely, the first option is the establishment of an **authority which will filter the claims and decide which disputes should be determined by court orders**. However, this option is impractical and, most importantly, violates the principle of freedom of contracts, the most paramount principle upon which the international market has been established. The other option is to **promote the decisions of arbitration tribunals** by **enhancing the status of arbitrators and installing processes that improve the transparency and objectivity of their rulings**. Many steps have been made towards that path, with the enhancement of operations and the publication of judgments with the parties' names veiled. Nevertheless, as long as the traditional courts are not convinced to take into consideration those arbitration rulings and the tribunals effectively are enforced to take into consideration mainly court precedents, which are still primarily utilised by the advocates of both parties, the gap in the U.K. legal precedents will continue to increase. It remains to be seen how this conflict will be resolved.

Finally, it is essential to state the impact of cases like ***The Seaflower*** to clarify the effect of chartering clauses by selecting the so-called **"Waller Test"**. Specifically, this test, initiated by **Judge L.J. Waller**, is an **effective method of classification of charter party** clauses, which first sets unclassified clauses **as innominate terms** and then, throughout stages, a clause is assessed to **be regarded as a condition or a warranty**. This test is of **paramount importance** because **it boosts the development of the legislation** relating to the charter party clauses and ascertains the outcomes of violating those terms. **Specifically, the incorrect termination of a contract from a party, presuming that the violated clause is a condition, while after a legal dispute, this clause is established as a warranty, offering him only the right to**

compensation but not terminating the contract, can prove catastrophic. It can be said that **the execution of the Waller test is similar to the performance of systems such as TMSA**. At the same time, as TMSA adds to the self-assessment, self-correction and self-development of a safety system, this is the same case with the Waller test, by **utilising previous judicial decisions to establish firm rules and strengthen the efficiency of charter parties**. The U.K. legal system was based upon this principle to develop its legal tradition, and as an outcome, it is established as a **dominant force** in maritime legislation. Thus, it is not uncommon that most charter parties incorporate a clause that the jurisdiction for all claims is given to the U.K. courts or legal processes and that the English Maritime Law is solely assessed by this Ph.D. research, along with the international maritime framework.

From all the above mentioned, it can be safely presumed that the national and the international legal framework is at the **crossroads of evolution** in light of **unprecedented technological developments**. Resolute steps have been taken towards the adoption of a **more business-oriented stance**, and it remains to be seen if the legal framework will also **adopt a more proactive stance** towards the creation and development of **new legislation** and **the amendment of the existing**, in light of emerging issues, which were unimagined a few years ago.

Conclusively, it can be stated that **sustainability** can effectively **rely upon systems** such as **TMSA and enforcement processes such as Port State Control**. Also, the effective utilisation of **proactiveness and due diligence** to all systems may improve the performance and the impact of many legislations, such as MARPOL and COLREG, which under the present advances in all sectors, **may be found outdated**. Furthermore, specific processes, such as **vessel registration and classification societies**, will **be absorbed or lose their significance,** and sufficient regulations will be deemed obsolete, such as salvage. Finally, abolishing the human element from the shipping industry and establishing **the concept of unlimited liability** will **increase safety** in all aspects. Thus, sustainability is undoubtedly **correlated with the concept of safety and any action that improves safety and simultaneously enhances sustainability**. Also, adopting technological advances is another aspect that increases sustainability; thus, **technological development is also correlated with sustainability**. To this end, the international regulatory and legal framework **should hasten its actions to adapt to changes** or ever-increasing gaps would be prospectively evidenced, and thus **sustainability would be degraded.**

It should also be stated that for this effective circuit mentioned above to operate efficaciously, the controlling bodies should d**iligently execute and enforce the adopted legislation** and also **provide information to the legislative bodies** from the impact and outcomes of their legislation. Thus, **the more transparency and integration between the legislative bodies and the enforcers, the more effective the regulations can become**, corrective actions can be taken timely and elimination of pollution, with minimum costs and liabilities for the shipping companies, can be achieved. Presently, this lack of transparency and efficient enforcement of legislation from controlling bodies**, forces the legislative bodies to adopt stricter regulations**, in an effort **to press the shipping practice towards compliance**. The shipping companies on their turn meticulously try to **delay or avoid any enforcement of new measures**, pressing legislative bodies to an even a greater extend. From this phenomenon to be resolved, **collaboration between the stakeholders should be established** along with **the adoption of an integrated system** where enforcers will diligently enforce the adopted legislation and provide information to the regulators for the efficiency and effectiveness. Then, the regulators, possessing valid information and outcomes, could collaborate with shipping companies **on the severity and timeframes for the harmonious application of legislative amendments** and the adoption of new legislation.

d. Summarised Conclusions

The amendments incorporated by the four conventions/pillars of the Maritime Institutional Framework do not contain elements of prevention as:

i. The SOLAS Convention is **practically evolving after accidents** (the last accident, the Costa Concordia accident in 2012)
ii. The MARPOL Convention, while it **has approved and complied with the new requirements** on the existing Energy Efficiency Index for Ships (EEXI) and the Operational Carbon Intensity Index (CII) in combination with the implementation of two installed monitoring systems, (EU MRV & IMO CDS), however, **their implementation is considered ineffective**.
iii. The MLC & STCW Conventions, **while deemed effective in many respects**, in **regulating and containing Covid-19** were **judged to be ineffective**, especially

considering that shipping had had to deal with two similar pandemics in the last twenty years (SARS & Ebola).

It is considered that while there are environmental laws such as the Civil Liability Convention (CLC) and the Limitation of Liability Convention (LLMC), **they do not contain successful regulations** for prevention, and therefore their effect on other Conventions (HNS, etc.) is **considered problematic**. It is also considered that the rationale of the US Convention on the Limitation of Oil Pollution (OPA 1990) **can be effective** in **achieving proactiveness** and thus in **achieving sustainability** which will be examined below. Finally, **the mentality from** implementing ISM as well as more specialized codes, such as TMSA, can be **adopted by modern environmental conventions** and related conventions with sustainability, **in order to enhance their effectiveness**.

The concept of sustainable shipping is an emerging trend, recently introduced in the shipping industry. It was found that the concept includes: i**) all safety practices and management**, established through the adoption of maritime codes and safety systems, along with ii) the established principle of environmental protection in terms of **minimizing emerging environmental risks** combined with iii) **the elimination of all sources of pollution** during a normal operating process and finally iv) the implementation of **Corporate Social Responsibility** in the shipping industry.

It is concluded that in order to achieve sustainability, it is necessary to apply the **mentality of effective management systems**, such as TMSA, enforcement of legislation, such as MARPOL and CLC, having installed **proactive applications and measures**, in combination with new legislations, practices and technologies (BWMC, Low Sulphur Cap, Ship Dismantling, Air Pollution minimisation, Sustainable Fuel election, Unmanned Vessels)

In the examination of the above, it appears that **many newly introduced legislation and prevention measures have significant shortcomings**, which **hinder** their effective implementation. It is therefore proposed that sustainability **should operate in constant correlation with the principles of due diligence and proactiveness.**

Regarding the **international and national legal of the maritime sector**, which has often been criticized for its lack of prevention, **the Covid-19 pandemic has**

revealed many of its weaknesses. Although it was not the first time that the shipping industry had faced such an incident, the **global scale of the virus** and the distinct characteristics of the disease made it **difficult to implement the existing institutional framework and the implementation of proactive measures was deemed ineffective**. In particular, from a legal point of view, Covid-19 has greatly affected (i) port safety, (ii) certain subsequent clauses, such as the right to derogate from the course, and (iii) issues related to the health and safety of crews and proof of the exercise of the duty of care.

The analysis concludes that the national and international legal framework is at the **crossroads of evolution** in the light of **unprecedented technological and institutional developments**. Decisive steps have been taken towards adopting a more **market-oriented stance**, but the legal framework **has not yet adopted a stance of proactiveness** or implementation of practices that directly assist the development of sustainable maritime policy.

Finally, regarding the supervisory and control bodies of shipping, it is found that **registers and classification societies contribute limitedly to** the implementation of sustainable maritime policies. On the contrary, **P&I Clubs and port controls (PSCs) are expected to become key players** through which sustainable maritime policies can **be implemented and maintained in perpetuity**.

e. Conclusions per Research Aim

As per research aim, it is concluded that:

i) *Evaluation of the impact of the implementation of the newly created sustainability policy on the shipping market:* The impact is **dire**, and the new policy of sustainability will consecutively **dominate** the shipping market. The market is currently **unprepared** to satisfy the requirements for the effective implementation of the new sustainable policies.

ii) *Creating a circuit with existing practices that will ensure the effectiveness and continuity of the sustainability policy:* It is suggested that through the concepts of **proactiveness and due diligence, sustainable policies can be effective** and can achieve **continuity** through the **effective implementation of port state controls**.

iii) *Assessing the impact of external factors, such as technological development, digitization and the eruption of the Covid-19 incident on the international maritime institutional framework*: Covid-19 ultimately proved that the regulatory system is **reactive and currently ineffective**. Technological developments continuously **test the reflexes** of the shipping market, which is often **caught unprepared** upon **handling emerging issues**, as outcomes of evolution. Digitalisation can be helpful in **further increasing safety measures**. It is evident that the shipping market needs to be reshaped to be able to control technological advancements.

iv) *Examining the impact of recent legislative changes in maritime law and any correlations with sustainable shipping:* The recent legislative changes **were business-oriented** but the connection with the sustainable policies is remote. The national and international legal systems should **also adopt a more proactive stance and regulate newly introduced market practices** in an effective manner to be able to make a contribution and provide a harmonized transaction into the new shipping era.

v) *Assessment of shipping market controlling bodies, their evolution and impact on sustainable shipping:* **Flag states and classification societies** will have a **minor role** in the new shipping reality. On the other hand, **P&I Clubs and especially Port State Controls will have a dominant role** in the new shipping era.

Additionally, while the assessment of those research aims is principally relied upon maritime international institutions, managerial and economic aspects of shipping are integrated to the analysis, as per the concept of sustainability, to effectively **ascertain a holistic and interdisciplinary approach** to the thesis.

f. Research Limitations

Regarding limitations, the focus of the legal and regulatory research was given to the **international** and the national, to the **UK legal system**, as the principal legal system in the maritime industry, commonly elected by the stakeholders in shipping transportation as the applicable law of the contract of carriage.

Furthermore, because the thesis can be characterised as interdisciplinary, assessing regulatory, environmental, legal and managerial aspects of shipping, it was

decided **that further analysis** of other legal authorities, such as the Greek maritime law, **will not be executed**.

Another limitation **was the election of the assessed legislation** from a wide range of aspects, to achieve objective concluding remarks. Also, due to the complexity of the research, **other research approaches**, such as the execution of econometric models and calculations to evaluate PSC effectiveness, **were not executed** and thus **the research completely abides by the legal doctrine**.

Lastly, analysis was conducted only upon **the most paramount aspects of each discussed issue,** and only specific sections of each issue were assessed to be utilised in the thesis analysis. A more detailed analysis of each issue would render the finalization of this thesis impossible.

g. Suggestions for Further Research

A first point of development would be **the assessment of the Corporate Social Responsibility (CSR) and corporate governance policies**, which were left out of this research, in conjunction with the sustainable policies and the evaluation of their connection.

Another point of interest would be **the evaluation of the impact of the PSC** on sustainable practices, the evaluation of the EMSA's data on PSC performance, and the research on developing an even more optimum controlling system.

Another field of research of paramount importance would also be **the newly introduced EEXI & CII legislations** and their effect on sustainable practices. Those legislations have currently been enforced and the outcomes are yet to be seen.

Lastly, the research can be further expanded upon **the creation of a model**, to be applied **to certain legislation and enhance their proactiveness and overall effectiveness**. A proposal would be **the creation of KPIs and the installment of such KPIs to crucial legislation**, to help them evolve and adapt to the continuously changing and evolving market trends.

Reference List

a. Books & Monographs

- Abrahamsson, B. J. (2019). Types of Transport Contracts. In *International Ocean Shipping: Current Concepts and Principles* (pp. 83-93). Routledge. DOI: https://doi.org/10.4324/9780429052057.
- Agreement, P. (2015). United nations. *United Nations Treaty Collect*, 1-27.
- Anderson, P. (2015). *ISM Code: A practical guide to the legal and insurance implications*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315720227.
- Andrews, N. (2015). Arbitration and Contract Law. *Ius Gentium: Comparative Persepctive on Law and Justice*, **54**.
- Arnold, G. (2013). *The International Drugs Trade*. Routledge. DOI: https://doi.org/10.4324/9780203942802.
- Athanasiou L. & Antapasis A. (2020). *Maritime Law*. Law Library, Athens. (in Greek).
- Attard, F. G. (2020). Table of Selected Instruments. In *The Duty of the Shipmaster to Render Assistance at Sea under International Law*. Brill Nijhoff. DOI: https://doi.org/10.1163/9789004438255_005.
- Baatz, Y. (Ed.). (2020). *Maritime law*. Taylor & Francis. DOI: https://doi.org/10.4324/9781003046943.
- Bakker, C., & Montanaro, F. (2022). Response and Recovery in the Event of CBRN Industrial Accidents. In *International Law and Chemical, Biological, Radio-Nuclear (CBRN) Events* (pp. 219-231). Brill Nijhoff.
- Balkin, R. P. (1999). The establishment and work of the IMO Legal Committee. *Current Maritime Issues and the International Maritime Organisation*, *4*, 291.
- Barnes, R., & Barrett, J. (2016). *Law of the Sea-UNCLOS as a Living Treaty*. BIICL.
- Basedow, J., & Wurmnest, W. (2006). *Third-party liability of classification societies: A comparative perspective* (Vol. 2). Springer Science & Business Media.

- Bekiashev, K. A., & Serebriakov, V. V. (1981). International Tanker Owners Pollution Federation, Ltd.(TOVALOP). In *International Marine Organisations* (pp. 180-184). Springer, Dordrecht. DOI: 10.1007/978-94-009-8261-1_13.
- Benamara, H., Hoffmann, J., & Youssef, F. (2019). Maritime transport: The sustainability imperative. In *Sustainable Shipping* (pp. 1-31). Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-04330-8_1.
- Bennett, C. (2015). The development agency of the future. *Fit for protracted crises*.
- Bergesen, H. O., Parmann, G., & Thommessen, Ø. B. (2018). International Maritime Organisation (IMO). In *Yearbook of International Cooperation on Environment and Development 1998–99* (pp. 210-211). Routledge.
- Bertau, M., Kraft, M., Plass, L., & Wernicke, H. J. (2021). *Methanol. Handbook of Fuels: Energy Sources for Transportation*, 245-306. DOI: https://doi.org/10.1002/9783527813490.ch10.
- Bichou, K. (2014). *Port operations, planning and logistics*. CRC Press.
- Bichou, K. (2015). The ISPS code and the cost of port compliance: an initial logistics and supply chain framework for port security assessment and management. In *Port Management* (pp. 109-137). Palgrave Macmillan, London. DOI: 10.1057/9781137475770_6.
- Blake, S. H., Browne, J., & Sime, S. (2016). *A practical approach to alternative dispute resolution.* Oxford University Press.
- Board, O. S., & Board, M. (1998). *Double-Hull Tanker Legislation: An Assessment of the Oil Pollution Act of 1990*. National Academies Press.
- Boczek, B. A. (2013). Flags of convenience. In *Flags of Convenience*. Harvard University Press. DOI: https://doi.org/10.4159/harvard.9780674188396.
- Bowman, M. J., & Kritsiotis, D. (Eds.). (2018). *Conceptual and contextual perspectives on the modern law of treaties*. Cambridge University Press.
- Bridge, M. (2019). *CIF and FOB contracts in English law: current issues and problems*. Research Handbook on International and Comparative Sale of Goods Law, 213-239. DOI: https://doi.org/10.4337/9781786436153.00019.
- Brodecki, Z. (1986). Compensation in the Light of the 1984 Protocols to Revise the 1969 CLC and the 1971 Fund Conventions. In *Yearbook Maritime Law* (pp. 99-118). Springer, Dordrecht. DOI: 10.1007/978-94-017-3707-4_4.

- Brooks M.R, 2017, *Classics in Port Policy and Management*, Publisher Edward Elgar Publishing.
- Buckley J. (2008), *The Business of Shipping*, Cornell Maritime Pr/Tidewater.
- Burns M.G, 2014, *Port Management and Operations*, Routledge Taylor & Francis Group.
- Campe, S. (2009). The secretariat of the International Maritime Organisation: A tanker for tankers. *Managers of global change: The influence of international environmental bureaucracies*, 143-68.
- Carlisle, R. P. (1981). *Sovereignty for sale: the origins and evolution of the Panamanian and Liberian flags of convenience*. Naval Institute Press.
- Caron, D. D., & Caplan, L. M. (2013). *The UNCITRAL arbitration rules: a commentary*. Oxford University Press.
- Chacón, V. H. (2017). The Origin of the Obligation of Practicing Due Diligence in Maritime Transportation. In *The Due Diligence in Maritime Transportation in the Technological Era* (pp. 15-99). Springer, Cham. DOI: 10.1007/978-3-319-66002-8_2.
- Chalmers B. (2020). *A Guide to Port and Terminal Management*. Brown Son and Ferguson.
- Chen, N., Yang, Z., & Luo, W. (2021). The working principle of ballast water management system. *In Development and Implementation of Ship BWMS* (pp. 15-25). Springer, Singapore.
- Christiano, T. (2012). Of international institutions. *The Routledge companion to philosophy of law*, 380.
- Christodoulou, D. (2009). Protection & Indemnity Clubs And Competition. In *Competition and Regulation in Shipping and Shipping Related Industries* (pp. 317-336). Brill Nijhoff. DOI: https://doi.org/10.1163/ej.9789004173958.i-404.111.
- Christofilou, A., & Chatzara, V. (2020). The Internet of Things and Insurance. In *InsurTech: A Legal and Regulatory View* (pp. 49-81). Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-27386-6_3.
- Christofis, N. (2022). Securitizing the Aegean: de-Europeanizing Greek–Turkish relations. *Southeast European and Black Sea Studies*, **22**(1), 83-100. DOI: https://doi.org/10.1080/14683857.2022.2027679.

- Churchill, R. R., & Hedley, C. (2000). The meaning of the" genuine link" requirement in relation to the nationality of ships. At: https://orca.cardiff.ac.uk/id/eprint/45062/1/ITF-Oct2000.pdf.
- Citaristi, I. (2022). International Labour Organisation—ILO. In *The Europa Directory of International Organisations 2022* (pp. 343-349). Routledge.
- Citaristi, I. (2022). United Nations Economic and Social Council—ECOSOC. In *The Europa Directory of International Organisations 2022* (pp. 123-124). Routledge.
- Cooke, J., Young, T., Ashcroft, M., Taylor, A., Kimball, J., Martowski, D., ... & Sturley, M. (2014). *Voyage charters*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315795027.
- Craik, N. (2022, April). Insurance and Compensation Fund Design for Deep-Seabed Liability: Lessons from Existing Civil Liability Regimes. In *The United Nations Convention on the Law of the Sea, Part XI Regime and the International Seabed Authority: A Twenty-Five Year Journey* (pp. 273-300). Brill Nijhoff. DOI: https://doi.org/10.1163/9789004507388_017.
- Curcio, J. A. (2016). Rules of the road for unmanned marine vehicles. In *Springer Handbook of Ocean Engineering* (pp. 517-526). Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-16649-0_23.
- Dalaklis, D. (2017). Safety and security in shipping operations. In *Shipping operations management* (pp. 197-213). Springer, Cham. DOI: 10.1007/978-3-319-62365-8_9.
- David, M., & Gollasch, S. (2015). Ballast Water Management Decision Support System. *In Global Maritime Transport and Ballast Water Management* (pp. 225-260). Springer, Dordrecht.
- David, M., Gollasch, S., & Hewitt, C. (2015). Global maritime transport and ballast water management. Issues and Solutions (Invading Nature: *Springer Series in Invasion Ecology*; Springer: Berlin/Heidelberg, Germany, **10**, 978-994.
- David, M., Gollasch, S., Leppäkoski, E., & Hewitt, C. (2015). Risk assessment in ballast water management. *In Global Maritime Transport and Ballast Water Management* (pp. 133-169). Springer, Dordrecht. DOI: https://doi.org/10.1007/978-94-017-9367-4_7.

- Davies, M., & Lin, J. (2021). Shanghai Tongshun Transportation Co., Ltd. v. Zhoushan City Dongjing Shipping Co., Ltd. et al. In *Chinese Maritime Cases* (pp. 1255-1281). Springer, Berlin, Heidelberg. DOI: DOI: 10.1007/978-3-662-63810-1_42.
- Davies, M., & Lin, J. (2021). Zhoushan Baolong Shipping Co., Ltd. v. Tangshan Hongtai Freight Forwarding Co., Ltd. *In Chinese Maritime Cases* (pp. 1445-1474). Springer, Berlin, Heidelberg. DOI: https://doi.org/10.1007/978-3-662-63810-1_49.
- De La Rue, C., & Anderson, C. (2015). *Shipping and the Environment*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315673325.
- Donner, P., & Johansson, T. (2018). Sulphur directive, short sea shipping and corporate social responsibility in a EU Context. *In corporate social responsibility in the maritime industry* (pp. 149-166). Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-69143-5_9.
- Dörr, O., & Schmalenbach, K. (2018). *Vienna convention on the law of treaties*. Springer.
- Dunt, J. (2015). *Marine cargo insurance*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315758794.
- Durham, M. F. (1982). The Companies Act, 1980: Its Effects on British Corporate Law. *Nw. J. Int'l L. & Bus.*, **4**, 551.
- Duroselle, J. B. (1984). Le «concert européen». *Relations internationales*, 271-285.
- Duxbury, A. (2011). *The participation of states in international organisations: the role of human rights and democracy* (Vol. 71). Cambridge University Press.
- Eder, B. (2020). Arresting ships: The need for change 1. *In Ship Operations* (pp. 125-132). Informa Law from Routledge.
- Ellis, C. H. (2003). *The origin, structure & working of the League of nations*. The Lawbook Exchange, Ltd.
- Endresen, Ø., Eide, M., Dalsøren, S., Sørgård, I. S. I. E., Corbett, J. J., & Winebrake, J. (2010). International maritime shipping: environmental impacts of increased activity levels. *Globalisation, Transport and the Environment*, 161-184.

- Engels, U. D. (2013). European ship recycling regulation: *entry-into-force implications of the Hong Kong Convention* (Vol. 24). Springer Science & Business Media.
- Farnelli, G. M., & Tanzi, A. (2017). Convention on the prevention of marine pollution by dumping of wastes and other matter 1972 and 1996 protocol. *In Elgar Encyclopedia of Environmental Law* (pp. 175-183). Edward Elgar Publishing. DOI: https://doi.org/10.4337/9781783477210.V.16.
- Fedtke, J. (2011). Charles Mitchell and Paul Mitchell (eds). (2010). *Landmark Cases in the Law of Tort*, Hart Publishing. DOI: https://doi.org/10.1515/jetl.2011.330.
- Gareis, S. B. (2012). *The united nations*. Bloomsbury Publishing.
- Gordenker, L. (2013). *The UN Secretary-General and Secretariat*. Routledge.
- Griggs, P., Williams, R., & Farr, J. (2020). *Limitation of liability for maritime claims*. Taylor & Francis.
- Grubb, M., Koch, M., Thomson, K., Sullivan, F., & Munson, A. (2019). *The'Earth Summit'Agreements: A Guide and Assessment: An Analysis of the Rio'92 UN Conference on Environment and Development* (Vol. 9). Routledge.
- Guard, U. C. (2019). Guidelines for the US Coast Guard oil spill removal organisation classification program. *Marine Environmental Response Policy*.
- Guo, Z. (2021). Bank of Communications Co., Ltd. Guizhou Branch v. Guizhou Jinchi Hongye Trading Co., Ltd., Guizhou Yinyuan Financing Guarantee Co., Ltd., Guizhou Zhiyi Real Estate Development Co., Ltd., and Lin X (Dispute over Financial Loan Contract): The Creditor Not Entitled to Claim Guarantee Liability Directly against the Sub-guarantor. In *Selected Cases from the Supreme People's Court of the People's Republic of China* (pp. 201-210). Springer, Singapore. DOI: https://doi.org/10.1007/978-981-15-9136-5_19.
- Gürses, Ö. (2015). *Marine insurance law*. Routledge.
- Gürses, Ö., & Hjalmarsson, J. (2020). Marine Insurance. In *Maritime Law* (pp. 465-529). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781003046943.
- Häkkinen, J., & Posti, A. (2013). Overview of maritime accidents involving chemicals worldwide and in the Baltic Sea. *Maritime Transport & Shipping-*

Marine Navigation and Safety at Sea Transportation, CRC Press, Taylor and Frances Group, Abingdon, Oxford, 15-25.

- Harlaftis, G. (2019). Shipping. In *The Routledge Companion to the Makers of Global Business* (pp. 438-454). Routledge.
- Harris, B., Planterose, R., & Tecks, J. (2008). *The Arbitration Act 1996: A Commentary*. John Wiley & Sons.
- Harrison, J. (2011). *Making the law of the sea: a study in the development of international law* (Vol. 80). Cambridge University Press.
- Henig, R. (2019). *The Peace that Never was: A History of the League of Nations*. Haus Publishing.
- Herkenrath S., (2019). Development of SOx Emissions about MARPOL Annex VI, Degree Thesis: Marine Technology, *Programme in Maritime Management*, Turku, https://urn.fi/URN:NBN:fi:amk-2019120925454.
- Hodges, S. (2012). *Cases and materials on marine insurance law*. Routledge-Cavendish. DOI: https://doi.org/10.4324/9781843142324.
- Hodges, S. (2013). *Law of marine insurance*. Routledge-Cavendish.
- Hong, N. (2012). *UNCLOS and ocean dispute settlement: Law and politics in the South China Sea*. Routledge.
- Housden, M. (2014). *The League of Nations and the Organisation of Peace*. Routledge.
- Howse, T. (2020). P&I perspectives. In *Autonomous Ships and the Law* (pp. 193-206). Routledge.
- Huan, T., Hongjun, F., Wei, L., & Guoqiang, Z. (2019). Options and evaluations on propulsion systems of LNG carriers. *In Propulsion systems* (pp. 1-20). London, UK: IntechOpen.
- Huang, Y., & Yang, W. (2021). The Legal Framework of Marine Scientific Research under UNCLOS: Present and Prospects. In *Marine Scientific Research, New Marine Technologies and the Law of the Sea* (pp. 11-26). Brill Nijhoff. DOI: https://doi.org/10.1163/9789004469372_003.
- Hudson, G., Madge, T., & Sturges, K. (2012). *Marine Insurance Clauses*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315874364.
- Hunter, G. (2020). Standard forms–the BIMCO experience. In *Legal Issues Relating to Time Charterparties* (pp. 1-15). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781003122838.

- Jackson, S., & O'Malley, A. (Eds.). (2018). *The institution of international order: From the League of Nations to the United Nations*. Routledge.
- Jafari, F., & Mokhtari, M. (2017). The Conditions for the Limitation of Liability of Owner of Sea-going Ships (The Survey of International Convention on Limitation of Liability for Maritime Claims 1976). *International Law Review*, **33**(55), 211-232.
- Jeong, J. (2013). Progress and challenges: ten years after the ISPS code.
- Johansson, S. O. (2008). Marine and other types of transport insurance. *Jure Förlag, Stockholm*.
- Johnston, D. M. (1988). *The theory and history of ocean boundary-making*. McGill-Queen's Press-MQUP.
- Jones, E. (2005). The Benelux countries: identity and self-interest. *The Member States of the European Union*, Oxford University Press, *Oxford*, 164-184.
- Kachel, M. J. (2008). Marine Protected Areas in Multilateral Instruments. Particularly Sensitive Sea Areas: The IMO's Role in Protecting Vulnerable Marine Areas, 95-134. DOI: 10.1007/978-3-540-78779-2_5.
- Karim, M. S. (2016). Prevention of pollution of the marine environment from vessels. Berlin: Springer International Pu.
- Kasoulides, G. C. (1993). Port state control and jurisdiction: evolution of the port state regime. In *Port State Control and Jurisdiction*. Brill Nijhoff.
- Kendall, D., & Wright, H. (2017). *A practical guide to the insurance act 2015*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315189161.
- Keohane, R. O. (2017). International institutions: Two approaches. In *International Organisation* (pp. 171-188). Routledge.
- Kismantoro, T., & Sari, D. K. (2020). *Ship Security Officer (SSO)*. PIP Semarang.
- Klein, N. (2005). *Dispute Settlement in the UN Convention on the Law of the Sea* (Vol. 39). Cambridge University Press.
- Kristiansen, S. (2013). *Maritime transportation: safety management and risk analysis*. Routledge.
- Kutner, A., & Wilensky, M. (2014). Flag State Regulation of Greenhouse Gas Emissions: Regulatory Authority of Flags of Convenience and Franchised Registries. at: https://scholarship.law.columbia.edu/sabin_climate_change/138.

- Lagoni, N. I. (2007). *The liability of classification societies* (Vol. 9). Springer Science & Business Media.
- Lakshmi, E., Priya, M., & Achari, V. S. (2021). *Systems and Operation of Ballast Water in Ships with the Changing Ballast Water Management Policy*. Modern Ship Engineering, Design and Operations, p. 17.
- Lavelle, J. (Ed.). (2013). *The Maritime Labour Convention 2006: international labour law redefined*. CRC Press.
- Lay, H. G. (1925). Marine Insurance: A Textbook of the History of Marine Insurance; Including the Functions of Lloyd's Register of Shipping. Post magazine.
- Leggett, J. A. (2020). The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement: *A Summary*. UNFCC, New York, 2.
- Leonard, A. (Ed.). (2016). *Marine Insurance: Origins and Institutions*, 1300-1850. Springer.
- Lillie, N. (2008). The ILO Maritime Labour Convention, 2006: A new paradigm for global labour rights implementation. *Cross-border social dialogue and agreements: An emerging global industrial relations framework*, 191-220.
- Loots, P., & Charrett, D. (2022). *Contracts for Infrastructure Projects: An International Guide to Application*. Taylor & Francis.
- Lorance P. (2009). *Shipping Strategy Innovating for Success*. Cambridge University Press.
- Luck, E. C. (2006). *UN Security Council: practice and promise*. Routledge.
- Lorenzon, F., Sassoon, D. M., Baatz, Y., Skajaa, L., & Nicoll, C. (2012). *CIF and FOB contracts* (Vol. 5). Sweet & Maxwell.
- Lost-Siemińska, D. (2020). Implementation of IMO treaties into domestic legislation: Implementation and enforcement as the key to effectiveness of international treaties. In *Maritime Safety in Europe* (pp. 3-21). Informa Law from Routledge.
- Lyridis, D. V., & Papaleonidas, C. (2019). Organisation and management of tanker shipping companies. In *The Routledge Handbook of Maritime Management* (pp. 58-79). Routledge.

- MacDonald, P. (2018). Direct Action Against Insurers and P&I Clubs. In *Marketing and Managing Tourism Destinations* (pp. 168-186). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781351028141.
- Malashkina, N. (2010). Law Reform in the International Regime of Salvage: The Insurance Perspective.
- Mallia, P. (2009). *Migrant smuggling by sea: combating a current threat to maritime security through the creation of a cooperative framework*. Brill.
- Malone, D., & Malone, R. D. M. (Eds.). (2004). *The UN Security Council: from the Cold War to the 21st century*. Lynne Rienner Publishers.
- Manivannan, S., & Ab Saman, A. K. (2016). A Safety Assurance Assessment Model for an Liquefied Natural Gas (LNG) Tanker Fleet. In *Human Resources and Crew Resource Management* (pp. 179-186). CRC Press.
- Marrella, F. (2004). Unity and Diversity in International Arbitration: The Case of Maritime Arbitration. *Am. U. Int'l L. Rev.*, **20**, 1055.
- Margetson, N. J. (2008). *The system of liability of articles III and IV of the Hague (Visby) Rules*. Uitgeverij Paris.
- Martin, F. (1876). The History of Lloyd's and of Marine Insurance in Great Britain: With an Appendix Containing Statistics Relating to Marine Insurance (No. 44525-44529). Macmillan.
- Mbiah, E. K. (2020). Coastal, Flag and Port State Jurisdictions: Powers and Other Considerations Under UNCLOS. In *Maritime Law in Motion* (pp. 495-523). Springer, Cham. DOI: 10.1007/978-3-030-31749-2_23.
- McConnell, M., Devlin, D., & Doumbia-Henry, C. (2011). *The Maritime Labour Convention, 2006: A legal primer to an emerging international regime*. Brill.
- McDorman, T. L. (1997). Port state control: a comment on the Tokyo MoU and issues of international law. In *Asian Yearbook of International Law*, **7**, pp. 229-241. Brill Nijhoff.
- Mensah, T. A. (2007). Prevention of marine pollution: The contribution of IMO. In *Pollution of the Sea—Prevention and Compensation* (pp. 41-61). Springer, Berlin, Heidelberg. DOI: 10.1007/978-3-540-73396-6_5.
- Merkin, R., Hjalmarsson, J., Bugra, A., & Lavelle, J. (2014). *Marine insurance legislation*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315816678.

- Merkin, R., Seriki, H., Fox, D. P., Flannery, L., & Harwood, S. (2014*). Arbitration act 1996*. Informa law from Routledge. DOI: https://doi.org/10.4324/9781315819150.
- Merkin, R., & Flannery, L. (2019). *Merkin and Flannery on the Arbitration Act 1996*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315692616.
- Mikelis, N. (2019). *Ship recycling. In Sustainable Shipping* (pp. 203-248). Springer, Cham.
- Mitchell, R. B., & Mitchell, R. B. (1994). Intentional oil pollution at sea: environmental policy and treaty compliance. mit Press.
- Mohammed-Faraj, O. (2012). The Arrest of Ships: Comprehensive View on the English Law.
- Mondré, A. (2015). Choosing the UN Security Council: The Greco-Turkish Dispute in the Aegean Sea. In *Forum Shopping in International Disputes* (pp. 90-117). Palgrave Macmillan, London. DOI: 10.1057/9781137466655_4.
- Mutenga, S., & Parsons, C. (2012). *Marine Insurance*. The Blackwell Companion to Maritime Economics, 452-470. DOI: 10.1002/9781444345667.
- Myint-U, T., & Scott, A. (2007). The UN secretariat. *New York: International Peace Academy*.
- Nersesian, R., & Mahmood, S. (2010). International association of classification societies. In *Handbook of Transnational Economic Governance Regimes* (pp. 765-774). Brill Nijhoff. DOI: https://doi.org/10.1163/ej.9789004163300.i-1081.675.
- Newton, G. M. (2005). *Ship Recycling–IMO Guidelines*. Maritime Studies.
- Nichols, J. (2005). Scope of Compensation for Environmental Damage Under the 1992 Civil Liability Convention and the 1992 Fund Convention. In *Marine Resource Damage Assessment* (pp. 59-66). Springer, Dordrecht. DOI: https://doi.org/10.1007/1-4020-3368-0_4.
- Nichols, J. E. (2010). *Oil Pollution Act of 1990 (OPA): Liability of Responsible Parties*. Congressional Research Service.
- Osuji, O. K. (2019). Club Theory and Directors' Performance Evaluation. In *Enhancing Board Effectiveness* (pp. 151-183). Routledge. DOI: https://doi.org/10.4324/9781315169477.
- Özçayır, O. (2018). *Port state control*. Taylor & Francis.

- Papandreou, A., Koundouri, P., & Papadaki, L. (2021). *Sustainable shipping: levers of change. In The Ocean of Tomorrow* (pp. 153-171). Springer, Cham. DOI: 10.1007/978-3-030-56847-4_10.
- Paulenoff, A. (2009). The Aegean Sea Continental Shelf Dispute: Greek and Turkish Interpretations. *Perspectives on Global Issues, Spring*.
- Paulsson, J. (2013). *The idea of arbitration*. OUP Oxford.
- Parsons, J., & Allen, C. (2018). The history of safety management. In *Managing Maritime Safety* (pp. 16-31). Routledge.
- Pedersen, S. (2015). *The guardians: the League of Nations and the crisis of empire*. OUP Oxford.
- Peschmann, J., von Selle, H., Jankowski, J., Horn, G., & Arima, T. (2017). IACS common structural rules as an element of IMO goal based standards for bulk carriers and oil tankers. In *Progress in the Analysis and Design of Marine Structures* (pp. 297-304). CRC Press.
- Pettit S. 2017, *Port Management* 1st Edition, Publisher Kogan Page.
- Pfaff, M. (2022). Occupational Safety and Ship Safety, Fire Protection. In *Ship Operation Technology* (pp. 347-403). Springer, Wiesbaden. DOI: 10.1007/978-3-658-32729-3_7.
- Pictet, J. S. (1952). Geneva convention. *International Committee of the red cross*.
- Pietrzykowski, Z. (2010, October). Maritime intelligent transport systems. In *International Conference on Transport Systems Telematics* (pp. 455-462). Springer, Berlin, Heidelberg.
- Plomaritou, E., & Papadopoulos, A. (2017). *Shipbroking and chartering practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315689609.
- Portney, K. E. (2015). *Sustainability*. MIT Press.
- Prill, K., & Szymczak, M. (2016). Methodology for identification of potential threats and ship operations as a part of ship security assessment. *Zeszyty Naukowe Akademii Morskiej w Szczecinie*. DOI: 10.17402/192.
- Psaraftis, H. N., Amboy, P., & Psaraftis. (2019). *Sustainable shipping*. Berlin: Springer International Publishing.

- Psaraftis, H. N. (2021). Shipping decarbonization in the aftermath of MEPC 76, *Cleaner Logistics and Supply Chain*, DOI: https://doi.org/10.1016/j.clscn.2021.100008.
- Pulbrook, A. (1865). *The Companies Act, 1862, with Analytical References and Copious Index...* Effingham Wison.
- Rao, C. S. (2007). Environmental pollution control engineering. New Age International.
- Rapp-Hooper, M. (2018). Freedom of navigation and the UNCLOS order. *In Maritime Order and the Law in East Asia* (pp. 145-157). Routledge.
- Reynolds, F. (2020). Time charterparties and bills of lading. *In Legal Issues Relating to Time Charterparties* (pp. 161-175). Informa Law from Routledge.
- Rogers, A., Chuah, J., & Dockray, M. (2019). *Cases and Materials on the Carriage of Goods by Sea*. Routledge. DOI: https://doi.org/10.4324/9780429059742.
- Rose, F. (2013). *Marine insurance: law and practice*. CRC Press. DOI: https://doi.org/10.4324/9781315874357.
- Rose, F. (2013). The Nature of Insurance. *In Marine Insurance* (pp. 77-92). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315874357.
- Rose, F. (2013). Aversion and Minimisation of Loss. *In Marine Insurance* (pp. 487-520). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315874357.
- Rose, F. (2013). Institute Time Clauses (Hulls) 1/11/95. *In Marine Insurance* (pp. 819-828). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315874357.
- Rose, F. D. (2017). *General Average: Law and Practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315099842.
- Sandevärn, A. (2018). The Volume Contract of Affreightment. In *Shipbroking and Chartering Practice* (pp. 293-312). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315087979.
- Semark, D. (2013). *P&I Clubs: Law and Practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9780203720936.
- Silverstein, H. B. (2019). *Superships and Nationstates: The Transnational Politics of the Intergovernmental Maritime Consultative Organisation*. Routledge.

- Simma, B. (Ed.). (1995). *The charter of the United Nations*. Oxford, UK: oup.
- Smith, J. E. (1968). *'Torrey Canyon'pollution and marine life. A report by the Plymouth Laboratory of the Marine Biological Association of the United Kingdom*. Cambridge University Press.
- Snowdon, A. L. (2022). Investigating losses occurring during shipment: forensic aspects of cargo claims. In *Postharvest Handling* (pp. 469-484). Academic Press. DOI: https://doi.org/10.1016/B978-0-12-822845-6.00016-6.
- Sohn, L. B., & Noyes, J. (2021). *Cases and Materials on the Law of the Sea*. BRILL.
- Soyer, B. (2012). *Warranties in marine insurance*. Routledge-Cavendish.
- Soyer, B., & Tettenborn, A. (2016). –Institute Cargo Clauses 2009 (A),(B) and (C). In *International Trade and Carriage of Goods* (pp. 433-442). Informa Law from Routledge.
- Stefanidis, F., Boulougouris, E., & Vassalos, D. (2019). Ship evacuation and emergency response trends. *Design and Operation of Passenger Ships*.
- Stopford, M. (2008). *Maritime Economics*, 3rd Edition. Routledge. DOI: https://doi.org/10.4324/9780203891742.
- Swanson, R. A. (2005). The challenge of research in organisations. *Research in organisations: Foundations and methods of inquiry*, 11-26.
- Szyliowicz, J. S., & Zamparini, L. (2014). Maritime security: issues and challenges. *Maritime transport security*, 13-23. DOI: https://doi.org/10.4337/9781781954973.00008.
- Talley W.K, 2017, *Port Economics*, Routledge Taylor & Francis Group.
- Taylor, I., & Smith, K. (2007). *United Nations Conference on Trade and Development (UNCTAD)*. Routledge.
- Theodore, M. K., & Theodore, L. (2021). Effects of Pollutants. *Introduction to Environmental Management*, 61-70. DOI: https://doi.org/10.1201/9781003171126.
- Theotokas, I. (2018). *Management of shipping companies*. Routledge.
- Thiele, L. P. (2016). *Sustainability*. John Wiley & Sons.
- Thirlway, H. (2016). *The International Court of Justice*. Oxford University Press.
- Thompson, S. (2021). Green and Sustainable Finance: *Principles and Practice* (Vol. 6). Kogan Page Publishers.

- Thomas, R. (Ed.). (2015). *The Modern Law of Marine Insurance: Volume Four*. CRC Press.
- Thomas, R. (Ed.). (2020). *Legal issues relating to time charterparties*. Taylor & Francis.
- Thomas, R. (Ed.). (2020). *The evolving law and practice of voyage charterparties*. Taylor & Francis.
- Todd, P. (2016). NYPE 2015: Wholesale reform or an invitation to cherry-pick?. *Lloyd's Maritime & Commercial Law Quarterly*, 2016(May), 306-319.
- Topali, D., Psaraftis, H.N. (2019). The Enforcement of the Global Sulphur Cap in Maritime Transport, *Maritime Business Review*, DOI: doi.org/10.1108/MABR-12-2018-0050.
- Trauttmansdorff, F. (2001). The organs of the United Nations. In *The United Nations* (pp. 25-56). Brill Nijhoff. DOI: https://doi.org/10.1163/9789047403005_007.
- Tsaltas, G. I. (2022). The Application of the United Nations Convention on Law of the Sea in the Archipelagos of the Aegean Sea. DOI: https://doi.org/10.1007/698_2021_834.
- Tselentis V. (2008), *Marine Environment and Shipping Management*, Stamoulis Publications S.A.
- Valenzuela, M. (1986). IMO. In *Yearbook Maritime Law* (pp. 333-339). Springer, Dordrecht. DOI: 10.1007/978-94-017-3707-4_28.
- Van Hooydonk, E. (2020). Maritime safety in Belgium: an overview of the legal framework. *Maritime Safety in Europe*, 65-73. Routledge. DOI: https://doi.org/10.4324/9781003030775.
- Vlachos, G.P. (2007). *Mercantile Shipping & Marine Environment*. Stamoulis Publications, Piraeus. (in Greek).
- Vlachos, G.P. (2011). *Chartering*. Stamoulis Publications, Piraeus. (in Greek).
- Vlachos, G.P. (2015). *Shipbuilding Economics*. Stamoulis Publications, Piraeus. (in Greek).
- Vlachos, G.P. (2015). *International Maritime Policy*. Stamoulis Publications, Piraeus. (in Greek).
- Vlachos, G.P. (2017). *Maritime Economics*. Stamoulis Publications, Piraeus. (in Greek).

- Vlachos, G.P., Boviatsis, M. (2020). *International Maritime Regulations*. Athens, Unibooks. (in Greek).
- Watt, E., & Coles, R. (2013). *Ship registration: law and practice*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9780203722091.
- Weintrit, A., & Neumann, T. (2011). *Human Resources and Crew Resource Management*. CRC Press.
- White, N. D. (2020). The law of international organisations. *In The law of international organisations (third edition)*. Manchester University Press.
- Williams, R. (2020). The impact of deviation on contracts of affreightment. In *The Evolving Law and Practice of Voyage Charterparties* (pp. 289-306). Informa Law from Routledge. DOI: https://doi.org/10.4324/9781003122869.
- Witthohn, R. (2022). Cruise Shipping. In *International Shipping: The Role of Sea Transport in the Global Economy* (pp. 597-675). Wiesbaden: Springer Fachmedien Wiesbaden.
- Wiswall Jr, F. L. (1983). International Regulation of Merchant Shipping. *Australian and New Zealand Maritime Law Journal*, 20-20.
- Xhelilaj, E., Lapa, K., & Danaj, L. (2017). Legal Issues Concerning the UN Convention on the Conditions for Registration of Ships (1986). In *Safety of Sea Transportation* (pp. 397-402). CRC Press.
- Yang, H. (2006). *Jurisdiction of the coastal State over foreign merchant ships in internal waters and the territorial Sea* (Vol. 4). Springer Science & Business Media.
- Yorucu, V., & Mehmet, O. (2022). Small Greek Islands of the Aegean, Turkish Continental Shelf: Legal Precedent and Procedure in Maritime Conflict Resolution. In *Small Islands in Maritime Disputes: Greek Turkish Energy Geo-politics* (pp. 13-33). Springer, Cham. DOI: 10.1007/978-3-031-05732-8_2.
- Yorucu, V., & Mehmet, O. (2022). International Evidence in Maritime Dispute Settlement in Small Islands: Problems with UNCLOS. *Small Islands in Maritime Disputes: Greek Turkish Energy Geo-politics*, 53-82. DOI: 10.1007/978-3-031-05732-8_4.
- Ziring, L., Riggs, R. E., & Plano, J. C. (2005). *The United Nations: International organisation and world politics*. Cengage Learning.

b. Journal Articles

- Aalberg, A. L., Bye, R. J., & Ellevseth, P. R. (2022). Risk factors and navigation accidents: A historical analysis comparing accident-free and accident-prone vessels using indicators from AIS data and vessel databases. *Maritime Transport Research*, **3**, 100062. DOI: https://doi.org/10.1016/j.martra.2022.100062.
- Abadie, L. M., Goicoechea, N., & Galarraga, I. (2017). Adapting the shipping sector to stricter emissions regulations: Fuel switching or installing a scrubber?. *Transportation Research Part D: Transport and Environment*, **57**, 237-250. DOI: https://doi.org/10.1016/j.trd.2017.09.017.
- Abibo, I. M. (2020). The Intrigues and Intricacies of the Twin Concepts of Flag State Jurisdiction and the Requirement of a Genuine Link under International Maritime Law (February 05, 2022). DOI: http://dx.doi.org/10.2139/ssrn.4044120.
- Adăscăliţei, O. (2014). The Maritime Labour Convention 2006–A Long-awaited Change in the Maritime Sector. *Procedia-Social and Behavioral Sciences*, **149**, 8-13. DOI: https://doi.org/10.1016/j.sbspro.2014.08.163.
- Agrawal, H., Welch, W. A., Miller, J. W., & Cocker, D. R. (2008). Emission measurements from a crude oil tanker at sea. *Environmental science & technology*, **42**(19), 7098-7103. DOI: https://doi.org/10.1021/es703102y.
- Agyebeng, W. K. (2006). Theory in search of practice: The right of innocent passage in the territorial sea. *Cornell Int'l LJ*, **39**, 371.
- Ahmed, J. S. D. I. (2020). Safe & Environmentally Sound Recycling of Ships: A Stocktaking of the Current State of International Law. *Fordham Environmental Law Review*, **31**(1), 60–106. DOI: https://www.jstor.org/stable/26954625.
- Ahn, J., Lee, S., Jeong, J., & Choi, Y. (2021). Comparative feasibility study of combined cycles for marine power system in a large container ship considering energy efficiency design index (EEDI). *International Journal of Hydrogen Energy*, **46**(62), 31816-31827. DOI: https://doi.org/10.1016/j.ijhydene.2021.07.068.

- Ahvenjärvi, S. (2016). The human element and autonomous ships. *TransNav: International Journal on Marine Navigation and Safety of Sea Transportation*, **10**(3). DOI: 10.12716/1001.10.03.18.
- Akande, D. (1997). The International Court of Justice and the Security Council: Is There Room for Judicial Control of Decisions of the Political Organs of the United Nations?. *International & Comparative Law Quarterly*, **46**(2), 309-343. DOI: 10.1017/S0020589300060450.
- Akerboom, S., & Craig, R. K. (2022). How law structures public participation in environmental decision making: A comparative law approach. *Environmental Policy and Governance*. DOI: https://doi.org/10.1002/eet.1986.
- Akten, N. (2006). Shipping accidents: a serious threat for marineenvironment. *Journal of Black Sea/Mediterranean Environment*, **12**(3), 269-304.
- Akyuz, E., & Celik, M. (2014). A hybrid decision-making approach to measure effectiveness of safety management system implementations on-board ships. *Safety Science*, **68**, 169-179. DOI: https://doi.org/10.1016/j.ssci.2014.04.003.
- Altaras, D. (2007). Bribery and Separability: Who Decides, the Tribunal or the Courts? Fiona Trust & Holding Corp v Yuri Privalov. Arbitration: *The International Journal of Arbitration, Mediation and Dispute Management*, **73**(2).
- Al Baroudi, H., Awoyomi, A., Patchigolla, K., Jonnalagadda, K., & Anthony, E. J. (2021). A review of large-scale CO2 shipping and marine emissions management for carbon capture, utilisation and storage. *Applied Energy*, **287**, 116510. DOI: https://doi.org/10.1016/j.apenergy.2021.116510.
- Alarcon, S. J., & Jennings, F. M. (1996). Monitoring Costs under the Oil Pollution Act of 1990: A Blank Check for the Coast Guard. *Tul. Mar. LJ*, **21**, 419.
- Alawadhi, M., Almazrouie, J., Kamil, M., & Khalil, K. A. (2020). Review and analysis of the importance of autonomous vehicles liability: a systematic literature review. *International Journal of System Assurance Engineering and Management*, **11**(6), 1227-1249. DOI: https://doi.org/10.1007/s13198-020-00978-9.

- Alcaidea, J. I., Piniella, F., & Rodríguez-Díaza, E. (2016). The "Mirror Flags": Ship registration in globalised ship breaking industry. *Transportation Research Part D: Transport and Environment*, **48**, 378-392. DOI: https://doi.org/10.1016/j.trd.2016.08.020.
- Alcaide, J. I., Rodríguez-Díaz, E., & Piniella, F. (2017). European policies on ship recycling: A stakeholder survey. *Marine Policy*, **81**, 262-272. DOI: https://doi.org/10.1016/j.marpol.2017.03.037.
- Alcock, T. M. (1992). Ecology tankers and the Oil Pollution Act of 1990: A history of efforts to require double hulls on oil tankers. *Ecology LQ*, **19**, 97.
- Alexandrowicz, C. H. (1966). Convention on Facilitation of International Maritime Traffic and International Technical Regulation. *Int'l & Comp. LQ*, **15**, 621.
- Alexopoulos, A. B., Katarelos, E. D., Fournarakis, N. G., Sakkas, K., & Avtzigiannis, K. CODES FROM THE TECHNO-ECONOMIC & MANAGERIAL PERSPECTIVES.
- Alexopoulos, A. B., & Mavranezoulis, A. (2002). Oil Spills in the Eastern Mediterranean Region. The Case of Single-Hull Tankers. *Cyprus Journal of Science & Technology*, **2**, 1-11.
- Alexopoulos, A. B. (2014). Scrap Activities on the Coastal Zone: Dynamic Model for the Recycling of Ships. *Journal of Shipping and Ocean Engineering*, **4**(1-2), 27-37.
- Alexandropoulou, V., Johansson, T., Kontaxaki, K., Pastra, A., & Dalaklis, D. (2021). Maritime remote inspection technology in hull survey & inspection: A synopsis of liability issues from a European Union context. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **5**(4), 184-195. DOI: https://doi.org/10.1080/25725084.2021.2006463.
- Ali, A. (2006). Simulator instructor-STCW requirements and reality. *Pomorstvo*, **20(**2), 23-32.
- Alger, C. F. (1966). Interaction in a committee of the United Nations General Assembly. *Midwest Journal of Political Science*, **10**(4), 411-447. DOI: https://doi.org/10.2307/2108921.
- ALKAN, U. (2015). LEGAL AND POLITICAL ASPECTS OF THE AEGEAN DISPUTE AND ITS IMPLICATIONS FOR TURKEY'S RELATIONS WITH

GREECE AND THE EUROPEAN UNION. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, **29**(4), 691-719.

- Alker, H. R. (1964). Dimensions of conflict in the general assembly. *American Political Science Review*, **58**(3), 642-657. DOI: https://doi.org/10.2307/1953139.
- Alvarez, J. E. (2016). International organisations and the rule of law. *New Zealand Journal of Public and International Law*, **14**(1), 3-46. Available at: https://search.informit.org/doi/10.3316/informit.416948442070338.
- Amin, A. T. M. N. (2005). Economic and financial considerations in Urban Environmental Management. *UMP-Asia Occasional Paper*, **65**.
- Anderson, C. B., & de la Rue, C. (2010). The Role of the P&I Clubs in Marine Pollution Incidents. *Tul. L. Rev.*, **85**, 1257.
- Aneziris, O., Koromila, I., Gerbec, M., Nivolianitou, Z., & Salzano, E. (2022). Ship-to-ship Lng Bunkering: Risk Assessment and Safety Zones. *Chemical Engineering Transactions*, **91**, 535-540. DOI: https://doi.org/10.3303/CET2291090.
- Anghie, A. (2001). Colonialism and the birth of international institutions: Sovereignty, economy, and the mandate system of the League of Nations. *NYUJ Int'l L. & Pol.*, **34**, 513.
- Aps, R., Fetissov, M., Goerlandt, F., Kujala, P., & Piel, A. (2017). Systems-Theoretic Process Analysis of maritime traffic safety management in the Gulf of Finland (Baltic Sea). *Procedia Engineering*, **179**, 2-12. DOI: https://doi.org/10.1016/j.proeng.2017.03.090.
- Aquila, E. (2017). Courts have gone overboard in applying the Maritime Drug Law Enforcement Act. *Fordham L. Rev.*, **86**, 2965.
- Archer, J. N. (1979). Implementation and enforcement of IMCO (Intergovernmental Maritime Consultative Organisation) regulations. *Mar. Eng. Rev.;(United Kingdom)*.
- Argüello, G., Krabbe, N., Langlet, D., Hassellöv, I. M., Martinson, C., & Helmstad, A. (2022). Regulation of ships at anchor: Safety and environmental implications. *Marine Policy*, **140**, 105052. DOI: https://doi.org/10.1016/j.marpol.2022.105052.
- de Arruda, M. A. (2022). General Average Is a Necessity. *Beijing L. Rev.*, **13**, 340.

- Asgarian, H. (2022). Inherent Vice as All-Risk Exclusion and its Clarification from Common Law point of view. *Trento Student Law Review*, **4**(1), 71–93. Retrieved from: https://teseo.unitn.it/tslr/article/view/2215.
- Atkinson, M. P., Kress, M., & Szechtman, R. (2017). Maritime transportation of illegal drugs from South America. *International Journal of Drug Policy*, **39**, 43-51. DOI: https://doi.org/10.1016/j.drugpo.2016.07.010.
- Awal, Z. I., & Hasegawa, K. (2017). A study on accident theories and application to maritime accidents. *Procedia engineering*, **194**, pp. 298-306. DOI: https://doi.org/10.1016/j.proeng.2017.08.149.
- Awoyomi, A., Patchigolla, K., & Anthony, E. J. (2019). CO2/SO2 emission reduction in CO2 shipping infrastructure. International *Journal of Greenhouse Gas Control*, **88**, 57-70. DOI: https://doi.org/10.1016/j.ijggc.2019.05.011.
- Aydin, M., Camliyurt, G., Akyuz, E., & Arslan, O. (2021). Analyzing human error contributions to maritime environmental risk in oil/chemical tanker ship. *Human and Ecological Risk Assessment: An International Journal*, **27**(7), 1838-1859. DOI: https://doi.org/10.1080/10807039.2021.1910011.
- Bai, J., & Li, X. (2021). IMO's Marine Environmental Regulatory Governance and China's Role: An Empirical Study of China's Submissions. *Sustainability*, **13**(18), 10243. DOI: https://doi.org/10.3390/su131810243.
- Bako M., (2018). «DIFFERENT LEADERSHIP STYLE CHOICES, DIFFERENT GENERATIONS». *Prizren Social Science Journal*, **2**(2), p.p. 127-143.
- Balcombe, P., Heggo, D. A., & Harrison, M. (2022). Total Methane and CO2 Emissions from Liquefied Natural Gas Carrier Ships: The First Primary Measurements. *Environmental science & technology*, **56**(13), 9632-9640. DOI: https://doi.org/10.1021/acs.est.2c01383.

  Balcombe, P., Staffell, I., Kerdan, I. G., Speirs, J. F., Brandon, N. P., & Hawkes, A. D. (2021). How can LNG-fuelled ships meet decarbonisation targets? An environmental and economic analysis. *Energy*, **227**, 120462. DOI: https://doi.org/10.1016/j.energy.2021.120462.
- Balkin, R. (2006). The International Maritime Organisation and Maritime Security. *Tul. Mar. LJ*, **30**, 1.

- Bang, H. S., & Jang, D. J. (2012). Recent developments in regional memorandums of understanding on port state control. *Ocean Development & International Law*, **43**(2), 170-187. DOI: https://doi.org/10.1080/00908320.2012.672293.
- Bargate, Q., & Mumma, A. (1993). Marine Pollution and Safety: Practical Proposals for Action. *Eur. Envtl. L. Rev.*, **2**, 103.
- Barrett, G. (2017). Contract or code? Determining the reach of European Union employment law and the effect of flags of convenience: Stroumpoulis. *Common Market Law Review*, **54**(3). DOI: https://doi.org/10.54648/cola2017066.
- Batalden, B. M., & Sydnes, A. K. (2015). Auditing in the maritime industry: A case study of the offshore support vessel segment. *Safety Science Monitor*, **19**(1), 3.
- Baumler, R., Arce, M. C., & Pazaver, A. (2021). Quantification of influence and interest at IMO in Maritime Safety and Human Element matters. *Marine Policy*, **133**, 104746. DOI: https://doi.org/10.1016/j.marpol.2021.104746.
- Bax, N., Williamson, A., Aguero, M., Gonzalez, E., and Geeves, W. (2003). Marine Invasive Alien Species: A Threat to Global Biodiversity. *Mar. Policy* **27**: 313-23. DOI: https://doi.org/10.1016/S0308-597X(03)00041-1.
- Bauer, P. J. (2007). The maritime labour convention: an adequate guarantee of seafarer rights, or and impediment to true reforms. *Chi. J. Int'l L.*, **8**, 643.
- Baumler, R., Bhatia, B. S., & Kitada, M. (2021). Ship first: Seafarers' adjustment of records on work and rest hours. *Marine Policy*, **130**, 104186. DOI: https://doi.org/10.1016/j.marpol.2020.104186.
- Baştuğ, S., Asyali, E., & Battal, T. (2021). Beyond the ISM code: a conceptual proposal for an integrated system within the Seven C's approach. *Maritime Policy & Management*, **48**(3), 354-377. DOI: https://doi.org/10.1080/03088839.2020.1770884.
- Beckman, R. (2008). Singapore Strives to Enhance Safety, Security, and Environmental Protection in Its Ports and in the Straits of Malacca and Singapore. *Ocean & Coastal LJ*, **14**, 167.
- Beckman, R., & Sun, Z. (2017). The Relationship between unclos and imo Instruments. *Asia-Pacific Journal of Ocean Law and Policy*, **2**(2), 201-246. DOI: https://doi.org/10.1163/24519391-00202003.

- Begines, J. L. P. (2005). The EU law on classification societies: Scope and liability issues. *J. Mar. L. & Com.*, **36**, 487.
- Bektaş, T., Ehmke, J. F., Psaraftis, H. N., & Puchinger, J. (2019). The role of operational research in green freight transportation. *European Journal of Operational Research*, **274**(3), 807-823. DOI: doi.org/10.1016/j.ejor.2018.06.001.
- Bennett, P. (2000). Environmental governance and private actors: enrolling insurers in international maritime regulation. *Political geography*, **19**(7), 875-899. DOI: https://doi.org/10.1016/S0962-6298(00)00029-9.
- Bennett, P. (2000). Mutuality at a distance? Risk and regulation in marine insurance clubs. *Environment and Planning A*, **32**(1), 147-163. DOI: https://doi.org/10.1068/a3215.
- Bennett, P. (2001). Mutual risk: P&I insurance clubs and maritime safety and environmental performance. *Marine Policy*, **25**(1), 13-21. DOI: https://doi.org/10.1016/S0308-597X(00)00029-4.
- Bercea, L. (2019). A Rule as a Standard: The Behavior of the Bank in the Execution of the Autonomous Guarantee Letter. *Romanian Rev. Priv. L.*, **448**.
- Bergantino, A. S., & O'SULLIVAN, P. (1999). Flagging out and international registries: main developments and policy issues. *International Journal of Transport Economics/Rivista internazionale di economia dei trasporti*, 447-472. At: https://www.jstor.org/stable/42747413.
- Bernard, S. R. (1997). The Civil Liability Convention and the International Compensation Fund Convention. *Ocean L. & Pol'y Series*, **1**, 129.
- Bettink, H. W. (1987). Open registry, the genuine link and the 1986 convention on registration conditions for ships. *Netherlands Yearbook of International Law*, **18**, 69-119. DOI: https://doi.org/10.1017/S0167676800001689.
- Bhattacharjee, S. (2009). From Basel to Hong Kong: international environmental Regulation of ship-recycling takes one step forward and two steps back. *Trade L. & Dev.*, **1**, 193.
- Bicen, S., & Celik, M. (2022). A bibliometric review on maritime inspection analysis: Current and future insights. *Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment*, DOI: https://doi.org/10.1177/1475090222111934.

- Bicen, S., & Celik, M. (2022). A RAM extension to enhance ship planned maintenance system. *Australian Journal of Maritime & Ocean Affairs*, 1-20. DOI: https://doi.org/10.1080/18366503.2022.2075575.
- Bilgili, L. (2021). Life cycle comparison of marine fuels for IMO 2020 Sulphur Cap. *Science of the total Environment*, **774**, 145719. DOI: https://doi.org/10.1016/j.scitotenv.2021.145719.
- Blanco-Bazán, A. (2004). IMO–Historical highlights in the life of a UN Agency. *Journal of the History of International Law/Revue d'histoire du droit international*, **6**(2), 259-283. DOI: https://doi.org/10.1163/1571805042782118.
- Blanco-Davis, E., & Zhou, P. (2016). Life Cycle Assessment as a complementary utility to regulatory measures of shipping energy efficiency. *Ocean engineering*, **128**, 94-104. DOI: https://doi.org/10.1016/j.oceaneng.2016.10.015.
- Bleicher, S. A. (1969). The legal significance of re-citation of general assembly resolutions. *American Journal of International Law*, **63**(3), 444-478. DOI: https://doi.org/10.2307/2198866.
- Blum, Y. Z. (1969). The Composition of the Trusteeship Council. *American Journal of International Law*, **63**(4), 747-768. DOI: https://doi.org/10.2307/2199483.
- Boczek, B. A. (2013). Flags of convenience. In *Flags of Convenience*. Harvard University Press. DOI: https://doi.org/10.4159/harvard.9780674188396.
- Boisson, P. (1994). Classification societies and safety at sea: Back to basics to prepare for the future. *Marine Policy*, **18**(5), 363-377. DOI: https://doi.org/10.1016/0308-597X(94)90033-7.
- Boviatsis, M. (2022). Implementation of Aggregated Response Plan to Effectively Protect Crew Health and Safety and Prevent Spread of Covid-19 Pandemic Aboard Ships. *Transactions on Maritime Science*, **11**(2). DOI: https://doi.org/10.7225/toms.v11.n02.020.
- Boviatsis, M. (2022). Legal assessment of BIMCO's infectious or contagious diseases (IOCD) clauses for voyage and time charter parties. *Marine Policy*, **144**, 105206. DOI: https://doi.org/10.1016/j.marpol.2022.105206.
- Boviatsis, M. (2022). Comparative analysis of charter party clauses versus marine insurance contractual terms: present legal status and future trends. *WMU*

Journal of Maritime Affairs, pp. 1-16. DOI: https://doi.org/10.1007/s13437-022-00292-0.

- Boviatsis M. Title: The Ever Given: Legal assessment of the causes and the consequences of the accident. *WIT Transactions on The Built Environment*, **212**, pp. 185- 196. DOI: doi:10.2495/UMT220161.
- Boviatsis, M., Alexopoulos, A., & Polemis, D. (2022). Evaluation of the Impact of the Present Ship Recycling Regulations by Assessing the Most Prominent Shipbreaking Countries in the Shipping Industry. *Journal of Shipping and Ocean Engineering*, **12**(2), 61-68. DOI: 10.17265/2159-5879/2022.02.004.
- Boviatsis, M., Alexopoulos, A. B., & Vlachos, G. P. (2022). Evaluation of the response to emerging environmental threats, focusing on carbon dioxide (CO2), volatile organic compounds (VOCs), and scrubber wash water (SOx). *Euro-Mediterranean Journal for Environmental Integration*, **7**(3), 391-398. DOI: https://doi.org/10.1007/s41207-022-00325-3.
- Boviatsis, M., Alexopoulos, A., & Vlachos, G. (2022). Assessing the Potential Impact on Previous Maritime Accidents Had the HNS Convention Been Applied. *Journal of Environmental Science and Engineering B*, **11**(2), 37-42. DOI: 10.17265/2162-5263/2022.02.002.
- Boviatsis, M., & Daniil, G. (2022). Legal Analysis of Impact of Revised BIMCO Clauses on Crew Health and Safety During COVID-19 Era . *Transactions on Maritime Science*, **11**(1), 270–277. DOI: https://doi.org/10.7225/toms.v11.n01.020.
- Boviatsis, M., & Daniil, G. (2022). Legal Analysis of the US Supreme Court Position Upon a Safe Berth Warranty and Evaluation of the UK Legal Position. *TransNav, International Journal on Marine Navigation and Safety od Sea Transportation*, **16**(1). DOI: 10.12716/1001.16.01.01.
- Boviatsis, M., Polemis, D., & Alexopoulos, A. (2022). An Assessment of the Most Sustainable Marine Fuel based on the Present Regulatory Framework and Future Trends. *Journal of Shipping and Ocean Engineering*, **12**, 43-52. DOI: 10.17265/2159-5879/2022.02.002.
- Boviatsis, M., Polemis, D., & Tselentis, V. (2022). Implementing the Ballast Water Management Convention in Shipping Practice: Emerging Threats, Operational Issues and Solutions. *Journal of Shipping and Ocean Engineering*, **12**, 53-60. DOI: 10.17265/2159-5879/2022.02.003.

- Boviatsis, M., & Vlachos, G. (2022). Correlation of the Concepts of Proactiveness and Due Diligence to Achieve Sustainability in the Maritime Sector. *Journal of Shipping and Ocean Engineering*, **12**, 33-42. DOI: 10.17265/2159-5879/2022.02.001.
- Boviatsis, M. & Vlachos, G. (2022). Sustainable Operation of Unmanned Ships under Current International Maritime Law. *Sustainability*, **14**(12), 7369. DOI: https://doi.org/10.3390/su14127369.
- Boviatsis, M., & Vlachos, G. (2022). Legal Assessment of the Present Status and Effects of Illicit Trade of Drug Substances in Maritime Transport. *TransNav, International Journal on Marine Navigation and Safety of Sea Transportation*, **16** (2). DOI: 10.12716/1001.16.02.18.
- Boviatsis, M., & Vlachos, G. Title: Proactive steps towards sustainable shipping: Assessing maritime accidents of the past to prevent similar incidents in the future. *International Journal of Transport Development and Integration*, **7**(1).
- Brennan, B. V. (1989). Liability and Compensation for Oil Pollution from Tankers under Private International Law: TOVALOP, CRISTAL, and the Exxon Valdez.
- Bright, D., Koskinen, J., & Malm, A. (2019). Illicit network dynamics: The formation and evolution of a drug trafficking network. *Journal of Quantitative Criminology*, **35**(2), 237-258. DOI: https://doi.org/10.1007/s10940-018-9379-8.
- Brown, E. D. (1981). Dispute settlement. *Marine Policy*, **5**(3), 282-286. DOI: https://doi.org/10.1016/0308-597X(81)90063-4.
- Bryant, H. (1993). Leading Legal Regimes Dealing with Liability for Oil Pollution from Ships, The. *Eur. Envtl. L. Rev.*, **2**, 69.
- Buffalow, G. C. (2006). Maritime: Letters of Undertaking in the Courts. *Journal of Transportation Law, Logistics and Policy*, **73**(1). At: http://worldcat.org/oclc/31144651.
- Bullock, S., Mason, J., Broderick, J., & Larkin, A. (2020). Shipping and the Paris climate agreement: a focus on committed emissions. *BMC Energy*, **2**(1), 1-16. DOI: https://doi.org/10.1186/s42500-020-00015-2.

- Burgherr, P. (2007). In-depth analysis of accidental oil spills from tankers in the context of global spill trends from all sources. *Journal of hazardous materials*, **140**(1-2), 245-256. DOI: https://doi.org/10.1016/j.jhazmat.2006.07.030.
- Burmeister, H. C., Bruhn, W., Rødseth, Ø. J., & Porathe, T. (2014). Autonomous unmanned merchant vessel and its contribution towards the e-Navigation implementation: The MUNIN perspective. *International Journal of e-Navigation and Maritime Economy*, **1**, 1-13. DOI: https://doi.org/10.1016/j.enavi.2014.12.002.
- Burnham, P. (1994). The organisational view of the state. *Politics*, **14**(1), 1-7. DOI: https://doi.org/10.1111/j.1467-9256.1994.tb00001.
- Busha, T. S. (1986). The IMO Conventions. *Ocean Yearbook Online*, **6**(1), 160-170. DOI: https://doi.org/10.1163/221160086X00121.
- Cairns, W. R. (2005). AIS and long range identification & tracking. *The Journal of Navigation*, **58**(2), 181-189. DOI: 10.1017/S0373463305003267.
- Campbell, S., Naeem, W., & Irwin, G. W. (2012). A review on improving the autonomy of unmanned surface vehicles through intelligent collision avoidance manoeuvres. *Annual Reviews in Control*, **36**(2), 267-283. DOI: https://doi.org/10.1016/j.arcontrol.2012.09.008.
- Carballo Piñeiro, L., Mejia Jr, M. Q., & Ballini, F. (2021). Beyond COVID-19: the future of maritime transport. *WMU Journal of Maritime Affairs*, ***20*(**2), 127-133. DOI: https://doi.org/10.1007/s13437-021-00243-1.
- Cariou, P., Mejia, M. Q., & Wolff, F. C. (2009). Evidence on target factors used for port state control inspections. *Marine Policy*, **33**(5), 847-859. DOI: https://doi.org/10.1016/j.marpol.2009.03.004.
- Cariou, P., & Wolff, F. C. (2011). Do Port State Control inspections influence flag-and class-hopping phenomena in shipping?. *Journal of Transport Economics and Policy (JTEP)*, **45**(2), 155-177.
- Carlsen, H., & van der Geest, M. (2017). Classification and Certification. *Encyclopedia of Maritime and Offshore Engineering*, 1-11. DOI: https://doi.org/10.1002/9781118476406.emoe574.
- Carlisle, R. (2014). The Muscat Dhows Case in Historical Perspective. *The Northern Mariner/Le marin du nord*, **24**(1), 23-40. DOI: https://doi.org/10.25071/2561-5467.248.

- Carter, L. J. (1978). Amoco Cadiz incident points up the elusive goal of tanker safety. Science, 200(4341), 514-516. DOI: 10.1126/science.200.4341.514.
- Celik, M. (2009). Designing of integrated quality and safety management system (IQSMS) for shipping operations. *Safety Science*, **47**(5), 569-577. DOI: https://doi.org/10.1016/j.ssci.2008.07.002.
- Chang, Y. C., Wang, N., & Durak, O. S. (2010). Ship recycling and marine pollution. *Marine pollution bulletin*, **60**(9), 1390-1396. DOI: https://doi.org/10.1016/j.marpolbul.2010.05.021.
- Chase, R. (1952). Howe, Irving. William Faulkner: A Critical Study (Book Review). *Commentary*, **13**, 188.
- Chauvin, C., Lardjane, S., Morel, G., Clostermann, J. P., & Langard, B. (2013). Human and organisational factors in maritime accidents: Analysis of collisions at sea using the HFACS. *Accident Analysis & Prevention*, **59**, 26-37. DOI: https://doi.org/10.1016/j.aap.2013.05.006.
- Cheliotis, M., Boulougouris, E., Trivyza, N. L., Theotokatos, G., Livanos, G., Mantalos, G., ... & Venetsanos, A. (2021). Review on the safe use of ammonia fuel cells in the maritime industry. *Energies*, **14**(11), 3023. DOI: https://doi.org/10.3390/en14113023.
- Chen, J., Wan, Z., Zhang, H., Liu, X., Zhu, Y., & Zheng, A. (2018). Governance of shipping emission of SO x in China's coastal waters: the SECA policy, challenges, and directions. *Coastal Management*, **46**(3), 191-209. DOI: https://doi.org/10.1080/08920753.2018.1451727.
- Chen, J., Zhang, S., Xu, L., Wan, Z., Fei, Y., & Zheng, T. (2019). Identification of key factors of ship detention under Port State Control. *Marine Policy*, **102**, 21-27. DOI: https://doi.org/10.1016/j.marpol.2018.12.020.
- Chen, L. (2000). Legal and practical consequences of not complying with ISM code. *Maritime Policy & Management*, **27**(3), 219-230. DOI: https://doi.org/10.1080/030888300411077.
- Chen, L. (2001). Salvage. *The international Journal of marine and Coastal law*, **16**(4), 686-698. DOI: https://doi.org/10.1163/157180801X00298.
- Chen, L., Yip, T. L., & Mou, J. (2018). Provision of Emission Control Area and the impact on shipping route choice and ship emissions. *Transportation Research Part D: Transport and Environment*, **58**, 280-291. DOI: https://doi.org/10.1016/j.trd.2017.07.003.

- Chen, Y. (2014). Satellite-based AIS and its Comparison with LRIT. *TransNav, International Journal on Marine Navigation and Safety od Sea Transportation*, **8**(2). DOI: 10.12716/1001.08.02.02.
- Choi, J., Lim, S., Park, S., Roh, H., Jin, H., & Lee, C. (2022). The Serious Accidents Punishment Act of South Korea and its impact on the shipping industry: toward sustainability. *Sustainability*, *14*(14), 8936. DOI: https://doi.org/10.3390/su14148936.
- Choi, J., Oh, J. Y., Lee, Y. S., Min, K. H., Hur, G. Y., Lee, S. Y., ... & Shim, J. J. (2018). Harmful impact of air pollution on severe acute exacerbation of chronic obstructive pulmonary disease: particulate matter is hazardous. *International journal of chronic obstructive pulmonary disease*, **13**, 1053. DOI: 10.2147/COPD.S156617.
- Christine, B. (1994). Trends in marine pollution legislation. *Risk Management*, **41**(1), 59-61.
- Christy, J. (2019). The Almost Always Forgotten, Yet Essential Part of Our World: An Examination of the Seafarer's Lack of Legal and Economic Protections on Flag of Convenience Ships. *USF Mar. LJ*, **32**, 49.
- Chua, J. Y., Foo, R., Tan, K. H., & Yuen, K. F. (2022). Maritime resilience during the COVID-19 pandemic: impacts and solutions. *Continuity & Resilience Review*, **4**(1) DOI: https://doi.org/10.1108/CRR-09-2021-0031.
- Chuah, L. F., Mokhtar, K., Bakar, A. A., Othman, M. R., Osman, N. H., Bokhari, A., ... & Hasan, M. (2022). Marine environment and maritime safety assessment using Port State Control database. *Chemosphere*, **304**, 135245. DOI: https://doi.org/10.1016/j.chemosphere.2022.135245.
- Chung, W. H., Kao, S. L., Chang, C. M., & Yuan, C. C. (2020). Association rule learning to improve deficiency inspection in port state control. *Maritime Policy & Management*, **47**(3), 332-351. DOI: https://doi.org/10.1080/03088839.2019.1688877.
- Çinar, M. E., Arianoutsou, M., Zenetos, A., & Golani, D. (2014). Impacts of invasive alien marine species on ecosystem services and biodiversity: a pan-European review. *Aquatic Invasions*, **9**(4), 391-423. DOI: http://dx.doi.org/10.3391/ai.2014.9.4.01.
- Clayton, H. D. (1922). Use of the Water in Navigable Streams for Commerce and Power. *Cent. LJ*, **94**, 442.

- Cloude, S. R., & Pottier, E. (1997). An entropy based classification scheme for land applications of polarimetric SAR. *IEEE transactions on geoscience and remote sensing*, **35**(1), 68-78. DOI: 10.1109/36.551935.
- Coe, T. J. (1995). Lessons learned outfitting the US Coast Guard with oil pollution equipment. *Spill Science & Technology Bulletin*, **2**(4), 233-239. DOI: https://doi.org/10.1016/S1353-2561(96)00003-5.
- Coenen, R. (1997). Dumping of wastes at sea: Adoption of the 1996 Protocol to the London Convention 1972. *Rev. Eur. Comp. & Int'l Envtl. L.*, **6**, 54.
- Cooper, T., & Green, A. (2017). The Torrey Canyon disaster, everyday life, and the "greening" of Britain. *Environmental History*, ***22*(**1), 101-126. DOI: https://doi.org/10.1093/envhis/emw068.
- Coric, D. (1996). House of Lords: Semco Salvage & Marine PTE. Ltd. v. Lancer Navigation Co. Ltd.(Ship Nagasaki Spirit). -152 *Uporedno Pomorsko Pravo*, **149**, 164.
- Costabel, A. M. (2015). The UK Insurance Act 2015: A Restatement of Marine Insurance Law. *Thomas L. Rev.*, **27**, 133.
- Cullinane, K., & Bergqvist, R. (2014). Emission control areas and their impact on maritime transport. *Transportation Research Part D: Transport and Environment*, **28**, 1-5. DOI: https://doi.org/10.1016/j.trd.2013.12.004.
- Cunha, I., Moreira, S., & Santos, M. M. (2015). Review on hazardous and noxious substances (HNS) involved in marine spill incidents—An online database. *Journal of hazardous materials*, **285**, 509-516. DOI: https://doi.org/10.1016/j.jhazmat.2014.11.005.
- Czermański, E., Oniszczuk-Jastrząbek, A., Spangenberg, E. F., Kozłowski, Ł., Adamowicz, M., Jankiewicz, J., & Cirella, G. T. (2022). Implementation of the Energy Efficiency Existing Ship Index: An important but costly step towards ocean protection. *Marine Policy*, **145**, 105259. DOI: https://doi.org/10.1016/j.marpol.2022.105259.
- De Beukelaer, C. (2021). COVID-19 border closures cause humanitarian crew change crisis at sea. *Marine Policy*, **132**, 104661. DOI: https://doi.org/10.1016/j.marpol.2021.104661.
- De Roover, F. E. (1945). Early examples of marine insurance. *The Journal of Economic History*, **5**(2), 172-200. DOI: https://doi.org/10.1017/S0022050700112975.

- Demirel, E., & Bayer, D. (2015). Further studies on the COLREGs (collision regulations). *Transnav-International Journal on Marine Navigation and Safety on Sea Transportation*, **9**(1). DOI: https://doi.org/10.12716/1001.09.01.02.
- Dev, S., Yousefi, A., Lafrance, S., Missaghian, R., & Guo, H. (2022). A Study on the Use of Intake Flow Path Modification to Reduce Methane Slip of a Natural Gas-Diesel Dual-Fuel Engine, *SAE Technical Paper* (No. 2022-01-0467). DOI: https://doi.org/10.4271/2022-01-0467.
- Devaux, C., & Nicolaï, J. P. (2020). Designing an EU ship recycling licence: a roadmap. *Marine Policy*, **117**, 103826. DOI: https://doi.org/10.1016/j.marpol.2020.103826.
- Dias, R. W. M. (1961). Negligence—Remoteness—The Polemis Rule. *The Cambridge Law Journal*, **19**(1), 23-30. DOI: https://doi.org/10.1017/S0008197300010126.
- Dimitriou, P., & Javaid, R. (2020). A review of ammonia as a compression ignition engine fuel. *International Journal of Hydrogen Energy*, **45**(11), 7098-7118. DOI: https://doi.org/10.1016/j.ijhydene.2019.12.209.
- Djadjev, I. (2015). The SCOPIC clause as a major development in salvage law. DOI: http://dx.doi.org/10.2139/ssrn.2627798.
- Dolan, R. H., Anderson, J. E., & Wallington, T. J. (2021). Outlook for ammonia as a sustainable transportation fuel. *Sustainable Energy & Fuels*, **5**(19), 4830-4841. DOI: https://doi.org/10.1039/D1SE00979F.
- Dominick, P. H., & Brody, D. E. (1973). The Alaska Pipeline: Wilderness Society v. Morton and the Trans-Alaska Pipeline Authorization Act. *Am. UL Rev.*, **23**, 337.
- Dong, B., & Zhu, L. (2019). Civil Liability and Compensation for Damage in Connection With the Carriage of Hazardous and Noxious Substances: Chinese Perspective. *Ocean Development & International Law*, **50**(2-3), 209-224. DOI: https://doi.org/10.1080/00908320.2019.1582609.
- Dowers, N. A. (2013). The anti-suit injunction and the EU: legal tradition and Europeanisation in international private law. *Cambridge International Law Journal*, **2**(4), 960-973. DOI: 10.7574/cjicl.02.04.138.
- Du, Z. F., Wang, H., Xu, H., Li, C., Yan, H. S., Xu, H. L., ... & Li, H. W. (2012). Discussion on control of hazardous materials in ship recycling activities.

Advanced Materials Research, **476**, 1674-1677. Trans Tech Publications Ltd. DOI: https://doi.org/10.4028/www.scientific.net/AMR.476-478.1674.

- Du, Z., Zhang, S., Zhou, Q., Yuen, K. F., & Wong, Y. D. (2018). Hazardous materials analysis and disposal procedures during ship recycling. *Resources, Conservation and Recycling*, **131**, 158-171. DOI: https://doi.org/10.1016/j.resconrec.2018.01.006.
- Dubais, B. A. (1977). The 1976 London Covention on Civil Liability for Oil Pollution Damage from Offshore Operations. *J. Mar. L. & Com.*, **9**, 61.
- Dunt, J. (2015). *Marine cargo insurance*. Informa Law from Routledge. DOI: https://doi.org/10.4324/9781315758794.
- Dunt, J., & Melbourne, W. (2015). The Impact of the CENDOR MOPU on the Institute Cargo Clauses. *In The Modern Law of Marine Insurance* (pp. 205-234). Informa Law from Routledge.
- Doud, A. L. (1972). Compensation for Oil Pollution Damage: Further Comment on the Civil Liability and Compensation Fund Conventions. *J. Mar. L. & Com.*, **4**, 525.
- Doumbia-Henry, C. (2020). Shipping and COVID-19: protecting seafarers as frontline workers. *WMU Journal of Maritime Affairs*, **19**, 279-293. DOI: https://doi.org/10.1007/s13437-020-00217-9.
- Duffield, J. (2007). What are international institutions?. *International Studies Review*, **9**(1), 1-22. DOI: https://doi.org/10.1111/j.1468-2486.2007.00643.x.
- Dulebenets, M. A. (2018). The green vessel scheduling problem with transit time requirements in a liner shipping route with Emission Control Areas. *Alexandria Engineering Journal*, **57**(1), 331-342. DOI: https://doi.org/10.1016/j.aej.2016.11.008.
- Ebrahimi, S. N., Keshavarzi, G., Keshavarz Bahadori, N., & Sharifi, S. (2017). The Role of P & I Clubs in Indemnifying Oil Pollution Damages. *Journal Of Researches Energy Law Studies*, **3**(2), 169-192. DOI: 10.22059/JRELS.2018.251052.179.
- Edgcomb, J. D. (1992). Responding to an Oil Spill in California--The Impact of OPA 1990 and OSPRA. *USF Mar. LJ*, **5**, 389.
- Edwards, J. R., & Webb, K. M. (1985). Use of Table A by companies registering under the Companies Act 1862. *Accounting and Business Research*, **15**(59), 177-196. DOI: https://doi.org/10.1080/00014788.1985.9729264.

- Eilstrup-Sangiovanni, M. (2020). Death of international organisations. The organisational ecology of intergovernmental organisations, 1815–2015. *The Review of International Organisations*, ***15***(2), 339-370. DOI: https://doi.org/10.1007/s11558-018-9340-5.
- Eldelman, P. S. (1999). The Maritime Industry and the ISM Code. Currents: *Int'l Trade LJ*, **8**, 43.
- Endresen, Ø., Behrens, H. L., Brynestad, S., Andersen, A. B., & Skjong, R. (2004). Challenges in global ballast water management. *Marine pollution bulletin*, **48**(7-8), 615-623. DOI: https://doi.org/10.1016/j.marpolbul.2004.01.016.
- Ermal, X., & Krisafi, K. (2013). INTERNATIONAL IMPLICATIONS CONCERNING THE LEGAL REGIME AND POLICY OF SHIP REGISTRATION. *Analele Universitatii Maritime Constanta*, **14**(19), 323-330.
- Ertürk, E. (2022). A PRELIMINARY STUDY ON CHALLENGES FACED BY SHIP MANAGEMENT COMPANIES DURING THE COVID-19 PANDEMIC. *Scientific Journal of Gdynia Maritime University*, (122), **23**. DOI: 10.26408/122.02.
- Esad Demirci, S. M., & Cicek, K. (2022). Innovative Strategy Development Approach for Enhancing the Effective Implementation of the International Safety Management (ISM) Code. *Transportation Research Record*, **2677**(1), 25-48. DOI: https://doi.org/10.1177/03611981221098394.
- Eubank, S. R. (1994). Patchwork Justice: State Unlimited Liability Laws in the Wake of the Oil Pollution Act of 1990. *Md. J. Int'l L. & Trade*, **18**, 149.
- Evans, P. D. (1993). FOB and CIF contracts. *Australian Law Journal*, **67**(11), 844-858. DOI: https://search.informit.org/doi/10.3316/agispt.19934643.
- Evans, U. F., Mkpandiok, A., & Okonna, K. O. (2017). An evaluation of the level of awareness of the STCW-78 as amended in Manila 2010, using maritime education and training institutions as collective compliance mechanism. *Australian Journal of Maritime & Ocean Affairs*, **9**(3), 168-181. DOI: https://doi.org/10.1080/18366503.2017.1306915.
- Exarchopoulos, G., Zhang, P., Pryce-Roberts, N., & Zhao, M. (2018). Seafarers' welfare: A critical review of the related legal issues under the Maritime Labour Convention 2006. *Marine Policy*, **93,** 62-70. DOI: https://doi.org/10.1016/j.marpol.2018.04.005.

- Fan, L., Wang, M., & Yin, J. (2019). The impacts of risk level based on PSC inspection deficiencies on ship accident consequences. *Research in Transportation Business & Management*, **33**, 100464. DOI: https://doi.org/10.1016/j.rtbm.2020.100464.
- Faure, M., & Heine, G. (1991). The insurance of fines: the case of oil pollution. *The Geneva Papers on Risk and Insurance-Issues and Practice*, **16**(1), 39-58. DOI: https://doi.org/10.1057/gpp.1991.3.
- Feld, L. P., & Voigt, S. (2003). Economic growth and judicial independence: cross-country evidence using a new set of indicators. *European Journal of Political Economy*, **19**(3), 497-527. DOI: https://doi.org/10.1016/S0176-2680(03)00017-X.
- Felde, L. S. (1952). General Average and the York-Antwerp Rules. *Tul. L. Rev.*, **27**, 406.
- Feldman, N. (2022). Rallying around the "flag of convenience": Merchant fleet flags and sanctions effectiveness. *Marine Policy*, **143**, 105129. DOI: https://doi.org/10.1016/j.marpol.2022.105129.
- Felício, J. A., Rodrigues, R., & Caldeirinha, V. (2021). Green shipping effect on sustainable economy and environmental performance. *Sustainability*, **13**(8), 4256. DOI: https://doi.org/10.3390/su13084256.
- Fitzmaurice, G. (1959). Some Results of the Geneva Conference on the Law of the Sea: Part I—The Territorial Sea and Contiguous Zone and Related Topics. *International & Comparative Law Quarterly*, **8**(1), 73-121. DOI: doi:10.1093/iclqaj/8.1.73.
- Force, R., Davies, M., & Force, J. S. (2010). Deepwater Horizon: Removal costs, civil damages, crimes, civil penalties, and state remedies in oil spill cases. *Tul. L. Rev.*, **85**, 889.
- Frazier, M., Longo, C., & Halpern, B. S. (2016). Mapping uncertainty due to missing data in the global ocean health index. *PloS one*, **11**(8), e0160377. DOI: https://doi.org/10.1371/journal.pone.0160377.
- Fu, J., Chen, X., Wu, S., Shi, C., Wu, H., Zhao, J., & Xiong, P. (2020). Mining ship deficiency correlations from historical port state control (PSC) inspection data. *PLoS one*, **15**(2), e0229211. DOI: https://doi.org/10.1371/journal.pone.0229211.

- Gadžo, S. (2018). The principle of ‘nexus’ or ‘genuine link’as a keystone of international income tax law: A reappraisal. *Intertax*, **46**(3). DOI: https://doi.org/10.54648/taxi2018022.
- Galdorisi, G., & Rowley, J. (2022). Engineering Unmanned Surface Vehicles Into an Integrated Unmanned Solution. *Naval Engineers Journal*, **134**(1), 49-59.
- Galley, M. (2013). Flagging interest: ship registration, owner anonymity, and sub-standard shipping. *Mountbatten Journal of Legal Studies*, **14**(1/2), 87-109. DOI: https://doi.org/10.1007/978-3-319-04699-0_4.
- Garick, J. A. (1993). Crisis in the oil industry: Certificates of Financial Responsibility and the Oil Pollution Act of 1990. *Marine Policy*, **17**(4), 272-293. DOI: https://doi.org/10.1016/0308-597X(93)90083-F.
- Gaskell, N. (2003). Decision making and the legal committee of the international maritime organisation. *International Journal of Marine and Coastal Law*, **18**(2), 155-214. DOI: https://doi.org/10.1163/157180803100380429.
- Gauci, G. (1995). Limitation of liability in maritime law: an anachronism?. *Marine Policy*, **19**(1), 65-74. DOI: https://doi.org/10.1016/0308-597X(95)92573-P.
- Gauci, G. M. (2016). Is it a vessel, a ship or a boat, is it just a craft, or is it merely a contrivance. *J. Mar. L. & Com.*, **47**, 479.
- Gavalas, D., Syriopoulos, T., & Tsatsaronis, M. (2022). COVID–19 impact on the shipping industry: An event study approach. *Transport Policy*, **116**, 157-164. DOI: https://doi.org/10.1016/j.tranpol.2021.11.016.
- Gayer, S. Y. (2020). Admiralty and Maritime Law Committee. *The Brief*, **49**(3), 6-7.
- Gazioğlu, C. (2018). Biodiversity, coastal protection, promotion and applicability investigation of the ocean health index for Turkish seas. *International Journal of Environment and Geoinformatics*, **5**(3), 353-367. DOI: https://doi.org/10.30897/ijegeo.484067.
- Gelgec, A. (2021). Challenging the Impact of FIOST Clauses on Cargo Interests. U. *Bologna L. Rev.*, **6**, 29.
- Gerhard, W. A., Lundgreen, K., Drillet, G., Baumler, R., Holbech, H., & Gunsch, C. K. (2019). Installation and use of ballast water treatment systems–

Implications for compliance and enforcement. *Ocean & Coastal Management*, **181**, 104907. DOI: https://doi.org/10.1016/j.ocecoaman.2019.104907.

- Gilabert Gascón, A. (2021). Insurance related problems in bareboat charter agreements. *Journal of Shipping and Trade*, **6**(1), 1-18. DOI: https://doi.org/10.1186/s41072-021-00093-3.
- Gilich, R. (2009). Practical Issues arising from the Arrest of Ships. *Austl. & NZ Mar. LJ*, **23**, 63.
- Gilligan, A. (1997). Nagasaki Spirit: A Recent Decision Affecting Marine Salvage and Environmental Concerns. *Tul. Mar. LJ*, **22**, 619.
- Girvin, S. (2018). Collisions at sea: All in the evidence?. *Lloyd's maritime and commercial law quarterly*, **1**, 27-33.
- Giustiniano, L., e Cunha, M. P., & Clegg, S. (2016). The dark side of organisational improvisation: Lessons from the sinking of Costa Concordia. *Business Horizons*, **59**(2), 223-232. DOI: https://doi.org/10.1016/j.bushor.2015.11.007.
- Glinski, C. (2022). Liability of shipowners and classification societies for environmental damage and unsafe working conditions at recycling yards. *Review of European, Comparative & International Environmental Law*, **31**(3). DOI: https://doi.org/10.1111/reel.12455.
- Goddu, L. W. (1972). IMCO and the Marine Industry. *Marine Technology and SNAME News*, **9**(03), 273-280. DOI: https://doi.org/10.5957/mt1.1972.9.3.273.
- Goh, L. B., & Yip, T. L. (2014). A way forward for ship classification and technical services. *The Asian Journal of Shipping and Logistics*, **30**(1), 51-74. DOI: https://doi.org/10.1016/j.ajsl.2014.04.003.
- Gollasch, S., & David, M. (2011). Sampling methodologies and approaches for ballast water management compliance monitoring. *Promet-Traffic & Transportation*, **23**(5), 397-405. DOI: https://doi.org/10.7307/ptt.v23i5.158.
- Gollasch, S., David, M., Broeg, K., Heitmüller, S., Karjalainen, M., Lehtiniemi, M., ... & Strake, S. (2020). Target species selection criteria for risk assessment based exemptions of ballast water management requirements. *Ocean & Coastal Management*, **183**, 105021. DOI: https://doi.org/10.1016/j.ocecoaman.2019.105021.

- Gourdon, K. (2019), "Ship recycling: An overview", *OECD Science, Technology and Industry Policy Papers*, No. **68,** OECD Publishing, Paris, https://doi.org/10.1787/397de00c-en.
- Goodrich, L. M. (1947). From league of nations to United Nations. *International Organisation*, **1**(1), 3-21. DOI: https://doi.org/10.1017/S002081830000655X.
- Goulielmos, A. M., & Anastasakos, A. A. (2005). Worldwide security measures for shipping, seafarers and ports: An impact assessment of ISPS code. *Disaster Prevention and Management: An International Journal*. DOI: https://doi.org/10.1108/09653560510618311.
- Goulielmos, A. M., & Goulielmos, M. A. (2005). The accident of m/v Herald of Free Enterprise: A failure of the ship or of the management?. *Disaster Prevention and Management: An International Journal*. DOI: https://doi.org/10.1108/09653560510618320.
- Graves, D. (2019). What are common maritime frauds and illegal activities on board ships?. *The Business & Management Review*, **10**(5), 163-163.
- Graziano, A., Mejia Jr, M. Q., & Schröder-Hinrichs, J. U. (2018). Achievements and challenges on the implementation of the European Directive on Port State Control. *Transport Policy*, **72**, 97-108. DOI: https://doi.org/10.1016/j.tranpol.2018.09.016.
- Griffin, A. (1993). MARPOL 73/78 and vessel pollution: a glass half full or half empty. *Ind. J. Global Legal Stud.*, **1**, 489.
- Grigalunas, T. A., Anderson, R. C., Brown Jr, G. M., Congar, R., Meade, N. F., & Sorensen, P. E. (1986). Estimating the cost of oil spills: lessons from the Amoco Cadiz incident. *Marine Resource Economics*, **2**(3), 239-262.
- Grime, R. P. (1988). Implementation of the 1976 limitation convention: Liability for maritime claims. *Marine Policy*, **12**(3), 306-313. DOI: https://doi.org/10.1016/0308-597X(88)90070-X.\.
- Gu, B., Zhang, L., Van Dingenen, R., Vieno, M., Van Grinsven, H. J., Zhang, X., ... & Sutton, M. A. (2021). Abating ammonia is more cost-effective than nitrogen oxides for mitigating PM2. 5 air pollution. *Science*, **374**(6568), 758-762. DOI: 10.1126/science.abf8623.
- Guo, L., Yang, D., & Yang, Z. (2018). Port integration method in multi-port regions (MPRs) based on the maximal social welfare of the external transport

system. *Transportation research part A: Policy and practice*, **110**, 243-257. DOI: https://doi.org/10.1016/j.tra.2017.09.008.

- Gürses, O., & Merkin, R. (2016). Insurance contracts after the Insurance Act 2015. *Law Quarterly Review*, **132**(3), 445-469. DOI: https://ore.exeter.ac.uk/repository/handle/10871/20256.
- Haapasaari, P., Helle, I., Lehikoinen, A., Lappalainen, J., & Kuikka, S. (2015). A proactive approach for maritime safety policy making for the Gulf of Finland: Seeking best practices. *Marine policy*, **60**, 107-118. DOI: https://doi.org/10.1016/j.marpol.2015.06.003.
- Hadavand, M., AZADBAKHT, F., & Ghazanfari, H. (2022). International Maritime Organisation and Civil Liability for Offshore Oil Pollution. *International Studies Journal (ISJ)*. DOI: 10.22034/ISJ.2022.306679.1610.
- Hák, T., Janoušková, S., & Moldan, B. (2016). Sustainable Development Goals: A need for relevant indicators. *Ecological indicators*, **60**, 565-573. DOI: https://doi.org/10.1016/j.ecolind.2015.08.003.
- Hansen, E. K., Rasmussen, H. B., & Lützen, M. (2020). Making shipping more carbon-friendly? Exploring ship energy efficiency management plans in legislation and practice. *Energy Research & Social Science*, **65**, 101459. DOI: https://doi.org/10.1016/j.erss.2020.101459.
- Hare, J. (1996). Port state control: strong medicine to cure a sick industry. *Ga. J. Int'l & Comp. L.*, **26**, 571.
- Harris, R. (1994). The Bubble Act: Its passage and its effects on business organisation. *The Journal of Economic History*, **54**(3), 610-627. DOI: https://doi.org/10.1017/S0022050700015059.
- Hayden, R. P., & Leland, K. C. (2010). General Average-Issues to Consider. *USF Mar. LJ*, **23**, 103.
- He, Z., Jiang, S., Zhang, J., & Wu, G. (2022). Automatic damage detection using anchor-free method and unmanned surface vessel. *Automation in Construction*, **133**, 104017. DOI: https://doi.org/10.1016/j.autcon.2021.104017.
- Heathcote, P. (2004). An Explanation of the New Measures for Maritime Security Aboard Ships and in Port Facilities. *Maritime Studies*, *2004*(**137**), 13-21. DOI: https://doi.org/10.1080/07266472.2004.10878749.

- Hebbar, A. A., & Mukesh, N. (2020). COVID-19 and seafarers' rights to shore leave, repatriation and medical assistance: a pilot study. *International maritime health*, **71**(4), 217-228. DOI: 10.5603/IMH.2020.0040.
- Hecht, W. H. (1966). Hull Policy: Interrelationship of Hull and P. and I. *Tul. L. Rev.*, **41**, 389.
- Henriksson, T. (2007). SOx scrubbing of marine exhaust gases. *Wärtsilä Technical Journal*, **2**, 55-58.
- Henriques, D. G. (2019). Arbitrating Disputes "in" Third-Party Funding. Arbitration: *The International Journal of Arbitration, Mediation and Dispute Management*, **85**(2). Available at: https://kluwerlawonline.com/journalarticle/Arbitration:+The+International+Journal+of+Arbitration,+Mediation+and+Dispute+Management/85.2/AMDM2019028.
- Hermundsdottir, F., & Aspelund, A. (2021). Sustainability innovations and firm competitiveness: A review. *Journal of Cleaner Production*, **280**, 124715. DOI: https://doi.org/10.1016/j.jclepro.2020.124715.
- Herschaft, J. A. (2004). Not your average coffee shop: Lloyd's of London-a twenty-first-century primer on the history, structure, and future of the backbone of marine insurance. *Tul. Mar. LJ*, **29**, 169.
- Hesse, H. (2003). Maritime security in a multilateral context: IMO activities to enhance maritime security. *The International Journal of Marine and Coastal Law*, **18**(3), 327-340. DOI: https://doi.org/10.1163/092735203770223567.
- Hess-Erga, O. K., Moreno-Andrés, J., Enger, Ø., & Vadstein, O. (2019). Microorganisms in ballast water: disinfection, community dynamics, and implications for management. *Science of the Total Environment*, **657**, 704-716. DOI: https://doi.org/10.1016/j.scitotenv.2018.12.004.
- Hesse, H., & Charalambous, N. L. (2004). New security measures for the international shipping community. *WMU Journal of Maritime Affairs*, **3**(2), 123-138. DOI: https://doi.org/10.1007/BF03195055.
- Hessevik, A. (2022). Green shipping networks as drivers of decarbonization in offshore shipping companies. *Maritime Transport Research*, **3**, 100053. DOI: https://doi.org/10.1016/j.martra.2022.100053.

- Hetherington, C., Flin, R., & Mearns, K. (2006). Safety in shipping: The human element. Journal of safety research, **37**(4), 401-411. DOI: https://doi.org/10.1016/j.jsr.2006.04.007.
- Hirshleifer, J. (1953). War damage insurance. *The Review of Economics and Statistics*, **35**(2) 144-153. DOI: https://doi.org/10.2307/1925800.
- Hoel, M. (1992). International environment conventions: the case of uniform reductions of emissions. *Environmental and Resource Economics*, **2**(2), 141-159.DOI: https://doi.org/10.1007/BF00338240.
- Hofbauer, J. A., Janig, P., Ritter, V., Stemeseder, M., & Wittich, S. (2022). Part I: Austrian Judicial Decisions Involving Questions of International Law. *Austrian Review of International and European Law Online*, **25**(1), 255-537.
- Hogg, T., & Ghosh, S. (2016). Autonomous merchant vessels: examination of factors that impact the effective implementation of unmanned ships. *Australian Journal of Maritime & Ocean Affairs*, **8**(3), 206-222. DOI: https://doi.org/10.1080/18366503.2016.1229244.
- Hojatzadeh, A., Koosha, S., & Tezam, M. (2015). Objectives, Principles and Audit area of Voluntary IMO Member States Audit Scheme. *Journal of Maritime Transport Industry*, **1**(2), 49-57.
- Hormann, H. (2006). Classification societies. *WMU Journal of Maritime Affairs*, **5**(1), 5-16. DOI: https://doi.org/10.1007/BF03195078.
- Hossain, K., Soon Lee, K. C., Abdul Ghani Azmi, I. B., Idris, A. B., Alam, M. N., Rahman, M., & Mohd Ali, N. (2022). Impact of innovativeness, risk-taking, and proactiveness on export performance in a developing country: evidence of qualitative study. *RAUSP Management Journal*, **57**, 165-181. DOI: https://doi.org/10.1108/RAUSP-01-2021-0002.
- Høye, G. K., Eriksen, T., Meland, B. J., & Narheim, B. T. (2008). Space-based AIS for global maritime traffic monitoring. *Acta Astronautica*, **62**(2-3), 240-245. DOI: https://doi.org/10.1016/j.actaastro.2007.07.001.
- Hsu, Y. C. (2022). Assessment of criteria of ship classification societies. *Maritime Policy & Management*, 1-25. DOI: https://doi.org/10.1080/03088839.2022.2061061.

- Hsuan, J., & Parisi, C. (2020). Mapping the supply chain of ship recycling. *Marine Policy*, **118**, 103979. DOI: https://doi.org/10.1016/j.marpol.2020.103979.
- Hughes, J. E. (1997). Safety at sea; a P&I perspective. *Risk Management*, **44**(5), 45-48.
- Hussein, A. W., & Soares, C. G. (2009). Reliability and residual strength of double hull tankers designed according to the new IACS common structural rules. *Ocean Engineering*, **36**(17-18), 1446-1459. DOI: https://doi.org/10.1016/j.oceaneng.2009.04.006.
- Im, M. H., & Sin, H. S. (2017). A Study on the Port State Control Inspection Results of Tokyo MOU-Focused on Detentions of Tokyo MOU. *Journal of Fisheries and Marine Sciences Education*, **29**(2), 333-342. DOI: http://dx.doi.org/10.13000/JFMSE.2017.29.2.333.
- Inal, O. B., Charpentier, J. F., & Deniz, C. (2022). Hybrid power and propulsion systems for ships: Current status and future challenges. *Renewable and Sustainable Energy Reviews*, **156**, 111965. DOI: https://doi.org/10.1016/j.rser.2021.111965.
- Irfani, D. P., & Wedayanti, P. Y. T. (2018). The determinants of tanker spot freight rates: case study of oil transport. *International Journal of Oceans and Oceanography*, **12**(1), 17-28.
- Jacobsson, M., & Trotz, N. (1986). The Definition of Pollution Damages in the 1984 Protocols to the 1969 Civil Liability Convention and the 1971 Fund Convention. *J. Mar. L. & Com.*, **17**, 467.
- Jain, K. P., Pruyn, J. F. J., & Hopman, J. J. (2013). Critical analysis of the Hong Kong international convention on ship recycling. *International Journal of Environmental and Ecological Engineering*, **7**(10), 684-692.
- Jain, K., & Pruijn, J. (2017). An overview of the global ship recycling industry. Reference Module in *Material Sciences and Materials Engineering*, 1-22. DOI: 10.1016/B978-0-12-803581-8.10396-0.
- Jalkanen, J. P., Johansson, L., Wilewska-Bien, M., Granhag, L., Ytreberg, E., Eriksson, K. M., ... & Moldanova, J. (2021). Modelling of discharges from Baltic Sea shipping. *Ocean Science*, **17**(3), 699-728. DOI: https://doi.org/10.5194/os-17-699-2021.

- James, A. P., & Van Dell, H. G. (2002). The Impacts Of The War On Terrorism On Maritime Shipping. *International Business & Economics Research Journal (IBER)*, **1**(8). DOI: https://doi.org/10.19030/iber.v1i8.3962.
- Jang, H., Jeong, B., Zhou, P., Ha, S., & Nam, D. (2021). Demystifying the lifecycle environmental benefits and harms of LNG as marine fuel. *Applied Energy*, **292**, 116869. DOI: https://doi.org/10.1016/j.apenergy.2021.116869.
- Jarah, B., Jarrah, M., & Al-Zaqeba, M. (2022). The role of internal audit in improving supply chain management in shipping companies. *Uncertain Supply Chain Management*, **10**(3), 1023-1028. DOI: *10.5267/j.uscm.2022.2.011*.
- Javadinejad, S., Ostad-Ali-Askari, K., & Jafary, F. (2019). Using simulation model to determine the regulation and to optimize the quantity of chlorine injection in water distribution networks. *Modeling Earth Systems and Environment*, **5**(3), 1015-1023. DOI: https://doi.org/10.1007/s40808-019-00587-x.
- Jing, Z. (2022). Fabricating insurance subject matter and defrauding insurance money: a civil wrong or a criminal offence?. *Asia Pacific Law Review*, **30**(1), 145-166. DOI: https://doi.org/10.1080/10192557.2022.2045710.
- Johnson, S. P. (2001). The earth summit: The United Nations conference on environment and development (UNCED). *The Earth Summit*, 1-540. Permalink: http://digital.casalini.it/9789041177261.
- Joseph, A., & Dalaklis, D. (2021). The international convention for the safety of life at sea: highlighting interrelations of measures towards effective risk mitigation. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **5**(1), 1-11. DOI: https://doi.org/10.1080/25725084.2021.1880766.
- Juda, L. (1986). The exclusive economic zone: Compatibility of national claims and the un convention on the law of the sea. *Ocean Development & International Law*, **16**(1), 1-58. DOI: https://doi.org/10.1080/00908328609545784.
- Julian, M. (2000). MARPOL 73/78: the International Convention for the Prevention of Pollution from Ships. *Maritime Studies*, **2000**(113), 16-23. DOI: https://doi.org/10.1080/07266472.2000.10878605.
- Kalmre, E. (1998). Legends connected with the sinking of the ferry Estonia on September 28, 1994. DOI: https://doi.org/10.1515/fabl.1998.39.3-4.209.

- Kao, M. B. (2019). Malice in Marine Insurance Law: Navigators Insurance Co Ltd v Atlasnavios-Navegacao LDA [2018] UKSC 26. *Austl. & NZ Mar. LJ*, **33**, 23.
- Kara, E. G. E., & Oksas, O. (2016). A comparative analysis of regional agreements on port state control. *American Academic Scientific Research Journal for Engineering, Technology, and Sciences*, **18**(1), 259-270.
- Karakasnaki, M., Vlachopoulos, P., Pantouvakis, A., & Bouranta, N. (2018). ISM Code implementation: an investigation of safety issues in the shipping industry. *WMU Journal of Maritime Affairs*, **17**(3), 461-474. DOI: https://doi.org/10.1007/s13437-018-0153-4.
- Karamikolmoti, F., & Malaekehpour Shoshtarai, S. M. H. (2022). Comparative study of the guarantee of violation of the condition of opening the documentary credit contained in international commercial sale from the perspective of Iranian law and the Convention on the International Sale of Goods. *Journal of Comparative Law*, **5**(2). DOI: 0.22080/LPS.2022.22679.1286.
- Kariotis, T. C. (1990). The case for a greek exclusive economic zone in the Aegean sea. *Marine Policy*, **14**(1), 3-14. DOI: https://doi.org/10.1016/0308-597X(90)90033-N.
- Karlis, T. (2018). Maritime law issues related to the operation of unmanned autonomous cargo ships. *WMU Journal of Maritime Affairs*, **17**(1), 119-128. DOI: https://doi.org/10.1007/s13437-018-0135-6.
- Kasoulides, G. (1990). Paris Memorandum of Understanding: a regional regime of enforcement. *Int'l J. Estuarine & Coastal L.*, ***5,*** 180.
- Kavussanos, M., Strandenes, S. P., & Thanopoulou, H. (2022). ends of eras and new beginnings: twenty-first century challenges for shipping. *Maritime Economics & Logistics*, 1-21. DOI: https://doi.org/10.1057/s41278-021-00207-5.
- Keating, G. C. (2001). The theory of enterprise liability and common law strict liability. *Vand. L. Rev.*, **54**, 1285.
- Kelektsoglou, K. (2018). Carbon capture and storage: A review of mineral storage of CO2 in Greece. *Sustainability*, **10**(12), 4400. DOI: https://doi.org/10.3390/su10124400.

- Keohane, R. O. (1969). Institutionalization in the United Nations general assembly. *International Organisation*, **23**(4), 859-896. DOI: https://doi.org/10.1017/S0020818300025698.
- Keohane, R. O. (1965). Political influence in the General Assembly. *Int'l Conciliation*, **36**, 1.
- Khalimonov, O. (1999). Framework for co-operation and recent IMO activities in preventing and managing marine pollution. *Sing. J. Int'l & Comp. L.*, **3**, 370.
- Khan, S. A. (2020). Clearly hazardous, obscurely regulated: lessons from the Basel convention on waste trade. *American Journal of International Law*, **114**, 200-205. DOI: https://doi.org/10.1017/aju.2020.38.
- Kiehne, G. (1996). Investigation, detention and release of ships under the Paris Memorandum of Understanding on Port State Control: a view from practice. *The International Journal of Marine and Coastal Law*, **11**(2), 217-224. DOI: doi**:** https://doi.org/10.1163/157180896X00087.
- Kiern, L. I. (1994). The Oil Pollution Act of 1990 and the National Pollution Funds Center. *J. Mar. L. & Com.*, **25**, 487.
- Kiern, L. I. (2011). Liability, Compensation, and Financial Responsibility Under the Oil Pollution Act of 1990: A Review of the Second Decade. *Tul. Mar LJ*, **36**, 1.
- Kim, A. R., & Seo, Y. J. (2019). The reduction of SOx emissions in the shipping industry: The case of Korean companies. *Marine Policy*, **100**, 98-106. DOI: https://doi.org/10.1016/j.marpol.2018.11.024.
- Kim, C. H. (2014). A Study on the Preparedness of Port State Control for the Enforcement of NIR. *Journal of Navigation and Port Research*, **38**(2), 141-146. DOI: https://doi.org/10.5394/KINPR.2014.38.2.141.
- Kim, H., Koo, K. Y., & Joung, T. H. (2020). A study on the necessity of integrated evaluation of alternative marine fuels. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **4**(2), 26-31. DOI: https://doi.org/10.1080/25725084.2020.1779426.
- Kim, I. (2004). Opa 90 and the decision to own or charter tank vessels. *J. Mar. L. & Com.*, **35**, 219.
- Kim, J. W. (2019). The Duty of Disclosure under the Doctrine of Utmost Good Faith in Marine Insurance Contract: In Connection with the UK Insurance Act

in 2015. *Korea Trade Review*, **44**(3), 137-154. DOI: https://data.doi.or.kr/10.22659/KTRA.2019.44.3.137.

- Kim, K., Roh, G., Kim, W., & Chun, K. (2020). A preliminary study on an alternative ship propulsion system fueled by ammonia: Environmental and economic assessments. *Journal of marine science and engineering*, **8**(3), 183. DOI: https://doi.org/10.3390/jmse8030183.
- Kim, M. C. (2022). Special Issue on Energy Saving Device in Ship. Applied Sciences, **12**(9), 4445. DOI: https://doi.org/10.3390/app12094445.
- Kimball, J. D. (2012). The Central Role of P&I Insurance in Maritime Law. *Tul. L. Rev.*, **87**, 1147.
- Kingston, C. (2007). Marine insurance in Britain and America, 1720–1844: a comparative institutional analysis. *The Journal of Economic History*, **67**(2), 379-409. DOI: doi:10.1017/S0022050707000149.
- Knapp, S., & Franses, P. H. (2006). *Analysis of the Maritime Inspection Regimes-Are ships over-inspected?* (No. EI 2006-30).
- Knapp, S., & Franses, P. H. (2009). Does ratification matter and do major conventions improve safety and decrease pollution in shipping?. *Marine Policy*, **33**(5), 826-846. DOI: https://doi.org/10.1016/j.marpol.2009.03.00.
- Knapp, S., & Franses, P. H. (2010). Comprehensive review of the maritime safety regimes: present status and recommendations for improvements. *Transport reviews*, **30**(2), 241-270. DOI: https://doi.org/10.1080/01441640902985934.
- Komianos, A. (2018). The autonomous shipping era. operational, regulatory, and quality challenges. *TransNav: International Journal on Marine Navigation and Safety of Sea Transportation*, **12**(2). DOI: 10.12716/1001.12.02.15.
- Koufopoulos, D. N., Lagoudis, I. N., & Pastra, A. (2005). Planning practices in the Greek ocean shipping industry. *European Business Review*, ***17***(2), 151-176. DOI: https://doi.org/10.1108/09555340510588020.
- Koutoupis A., Kyriakogkonas P., Ploumpis I., Leontis D., (2020). «Risk based internal audit at Greek listed shipping companies of New York stock exchange». *Journal of Accounting and Taxation*, **12**(4), p.p. 135-144. DOI: https://doi.org/10.5897/JAT2020.0418.
- Krantz, G., Brandao, M., Hedenqvist, M., & Nilsson, F. (2022). Indirect CO2 emissions caused by the fuel demand switch in international

shipping. *Transportation Research Part D: Transport and Environment*, **102**, 103164. DOI: https://doi.org/10.1016/j.trd.2021.103164.

- Kumaravel, S. K., Subramani, R. K., Jayaraj Sivakumar, T. K., Madurai Elavarasan, R., Manavalanagar Vetrichelvan, A., Annam, A., & Subramaniam, U. (2020). Investigation on the impacts of COVID-19 quarantine on society and environment: Preventive measures and supportive technologies. *3 Biotech*, **10**(9), 1-24. DOI: https://doi.org/10.1007/s13205-020-02382-3.
- Lagouvardou, S., Psaraftis, H.N. (2022). Implications of the EU Emissions Trading System (ETS) on European container routes: a carbon leakage case study, *Maritime Transport Research*, **3**, 100059. DOI: https://doi.org/10.1016/j.martra.2022.100059.
- Lagouvardou, S., Psaraftis, H.N., Zis, T. (2022). Impacts of a bunker levy on decarbonizing shipping: a tanker case study, *Transportation Research Part D, Transport and Environment*, **106**, 103257. DOI: https://doi.org/10.1016/j.trd.2022.103257.
- Lakshmi, E., Priya, M., & Achari, V. S. (2021). An overview on the treatment of ballast water in ships. *Ocean & Coastal Management*, **199**, 105296. DOI: https://doi.org/10.1016/j.ocecoaman.2020.105296.
- Lappalainen, F. J., Kuronen, J., & Tapaninen, U. (2012). Evaluation of the ISM Code in the Finnish shipping companies. *Journal of Maritime Research*, **9**(1), 23-32.
- Lazarus, I. O., & Wilfred, I. U. (2011). The effectiveness of the International Ship and Port Facility Security Code (ISPS) in Nigeria. *African Journal of Business Management*, **5**(4), 1426-1430. DOI: 10.5897/AJBM10.1474.
- Le Gac, J. M., & Texier, S. (2022). Training in the detection of psychological distress on board ships through health simulation during the COVID-19 epidemic. *International Maritime Health*, **73**(2), 89-94.
- Lee, H. J., Yoo, S. H., & Huh, S. Y. (2020). Economic benefits of introducing LNG-fuelled ships for imported flour in South Korea. *Transportation Research Part D: Transport and Environment*, **78**, 102220. DOI: https://doi.org/10.1016/j.trd.2019.102220.
- Lee, T., & Nam, H. (2017). A study on green shipping in major countries: in the view of shipyards, shipping companies, ports, and policies. *The Asian Journal*

of Shipping and Logistics, **33**(4), 253-262. DOI: https://doi.org/10.1016/j.ajsl.2017.12.009.

- Lehtoranta, K., Aakko-Saksa, P., Murtonen, T., Vesala, H., Ntziachristos, L., Rönkkö, T., ... & Timonen, H. (2019). Particulate mass and nonvolatile particle number emissions from marine engines using low-sulfur fuels, natural gas, or scrubbers. *Environmental science & technology*, **53**(6), 3315-3322. DOI: https://doi.org/10.1021/acs.est.8b05555.
- Levantesi, S., & Piscopo, G. (2022). Mutual peer-to-peer insurance: The allocation of risk. *Journal of Co-operative Organisation and Management*, **10**(1), 100154. DOI: https://doi.org/10.1016/j.jcom.2021.100154.
- Li, H. (2020). Letter to the Journal Coastal State Jurisdiction in the "Norstar" Case at the ITLOS. *Chinese Journal of International Law*, ***19*(**1), 177-182. DOI: https://doi.org/10.1093/chinesejil/jmaa010.
- Li, K., Wu, M., Gu, X., Yuen, K. F., & Xiao, Y. (2020). Determinants of ship operators' options for compliance with IMO 2020. *Transportation Research Part D: Transport and Environment*, **86**, 102459. DOI: https://doi.org/10.1016/j.trd.2020.102459.
- Li, K. X., & Wonham, J. (1999). New developments in ship registration, *Int'l J. Marine & Coastal L*. **14**, 137. DOI: https://doi.org/10.1163/157180899X00066.
- Li, K. X., & Zheng, H. (2008). Enforcement of law by the Port State Control (PSC). *Maritime Policy & Management*, **35**(1), 61-71. DOI: https://doi.org/10.1080/03088830701848912
- Li, L. (2014). Marine Insurance Law-General Conditions in Hull, Cargo and P&I Covers. *Asian Bus. Law.*, **13**, 129.
- Li, L., Tuo, Y., Li, T., Tong, M., & Wang, S. (2022). Time-varying formation control of multiple unmanned surface vessels with heterogeneous hydrodynamics subject to actuator attacks. *Applied Mathematics and Computation*, **422**, 126987. DOI: https://doi.org/10.1016/j.amc.2022.126987.
- Linder, A. (2018). Explaining shipping company participation in voluntary vessel emission reduction programs. *Transportation Research Part D: Transport and Environment*, **61**, 234-245. DOI: https://doi.org/10.1016/j.trd.2017.07.004.

- Lissillour, R., Fernandez, D. B., & Fulconis, F. (2019). *The classification societies, an obstacle or an accelerator to international maritime safety?* (No. hal-02280979).
- Lissillour, R., & Bonet Fernandez, D. (2021). The balance of power in the governance of the global maritime safety: the role of classification societies from a habitus perspective. In *Supply Chain Forum: An International Journal*, **22**(3), pp. 268-280. Taylor & Francis. DOI: https://doi.org/10.1080/16258312.2020.1824533.
- Lissilour, R., Fulconis, F., Psaraftis, H.N. (2021). A Nomos Perspective of Shipping Service Industries. *European Review of Service Economics and Management* 2021, **2**(12), 125-154. DOI: https://DOI:10.48611/isbn.978-2-406-12261-6.p.0125.
- Liu, J., & Faure, M. (2018). Risk-sharing agreements to cover environmental damage: theory and practice. *International Environmental Agreements: Politics, Law and Economics*, **18**(2), 255-273. DOI: https://doi.org/10.1007/s10784-018-9386-0.
- Livaniou, S., Chatzistelios, G., Lyridis, D. V., & Bellos, E. (2022). LNG vs. MDO in Marine Fuel Emissions Tracking. *Sustainability*, **14**(7), 3860. DOI: https://doi.org/10.3390/su14073860.
- Liwång, H., Ringsberg, J. W., & Norsell, M. (2013). Quantitative risk analysis–Ship security analysis for effective risk control options. *Safety science*, **58**, 98-112. DOI: https://doi.org/10.1016/j.ssci.2013.04.003.
- Lopez, N. (1991). The master's role in charter performance. *MLAANZ Journal*, **8**, 3.
- Lucas, D., Jego, C., Jensen, O. C., Loddé, B., Pougnet, R., Dewitte, J. D., ... & Jegaden, D. (2021). Seafarers' mental health in the COVID-19 era: lost at sea?. *International maritime health*, **72**(2), 138-141. DOI: 10.5603/IMH.2021.0023.
- Lynn, R. W. (2000). A Comment on the New International Convention on Arrest of Ships, 1999. *U. Miami L. Rev.*, **55**, 453.
- MacFarlane, D. R., Cherepanov, P. V., Choi, J., Suryanto, B. H., Hodgetts, R. Y., Bakker, J. M., ... & Simonov, A. N. (2020). A roadmap to the ammonia economy. *Joule*, **4**(6), 1186-1205. DOI: https://doi.org/10.1016/j.joule.2020.04.004.

- Macnab, R. (2004). The case for transparency in the delimitation of the outer continental shelf in accordance with UNCLOS Article 76. *Ocean Development & International Law*, **35**(1), 1-17. DOI: https://doi.org/10.1080/00908320490271483.
- Magaletti, E., Garaventa, F., David, M., Castriota, L., Kraus, R., Luna, G. M., ... & Gollasch, S. (2018). Developing and testing an early warning system for non-indigenous species and ballast water management. *Journal of sea research*, **133**, 100-111. DOI: https://doi.org/10.1016/j.seares.2017.03.016.
- Maggi, E., & Mazzarino, M. (1999). Support of Maritime Education and Training Systems for the Implementation of the ISM Code. *Promet-Traffic & Transportation*, **11**(4), 203-207. At: http://traffic.fpz.hr/index.php/PROMTT/article/view/1131.
- Mahafzah, Q. A. (2010). The Legal Effectiveness of the Both-to-Blame Collision Clause under Bills of Lading and Charterparties. *J. Mar. L. & Com.*, **41**, 263.
- Maitland, I. (2019). Maritime insurance: The establishment of Lloyds of London and the fascinating history of marine insurance. *Bulletin (Law Society of South Australia)*, **41**(10), 23-25.
- Mantoju, C. D. (2021). Analysis of impact of the maritime labour convention, 2006: A seafarer's perspective. *Journal of International Maritime Safety, Environmental Affairs, and Shipping*, **5**(3), 107-119. DOI: https://doi.org/10.1080/25725084.2021.1955475.
- Marlow, P., & Mitroussi, K. (2008). EU shipping taxation: the comparative position of Greek shipping. *Maritime Economics & Logistics*, **10**(1), 185-207. DOI: https://doi.org/10.1057/palgrave.mel.9100198.
- Marten, B. (2011). The enforcement of shipping standards under UNCLOS. *WMU Journal of Maritime Affairs*, **10**(1), 45-61. DOI: https://doi.org/10.1007/s13437-011-0005-y.
- Martínez-López, A., Ruiz-García, A., & Pérez, I. (2020). Social cost benefit analysis of port handling plans for Annex IV waste of MARPOL: a case study in las palmas port. *Sustainability*, **12**(6), 2382. DOI: https://doi.org/10.3390/su12062382.
- Matlin, D. F. (1990). Re-evaluating the status of flags of convenience under international law. *Vand. J. Transnat'l L.*, **23**, 1017.

- Marquais, O., & Grec, A. (2020). Do's and Dont's of Regulating Third-Party Litigation Funding: Singapore Vs. France. *Asian International Arbitration Journal*, **16**(1). DOI: https://doi.org/10.54648/aiaj2020014.
- Martos-Pedrero, A., Jiménez-Castillo, D., Ferrón-Vílchez, V., & Cortés-García, F. J. (2023). Corporate social responsibility and export performance under stakeholder view: The mediation of innovation and the moderation of the legal form. *Corporate social responsibility and Environmental Management*, **30**(1), 248-266. DOI: https://doi.org/10.1002/csr.2352.
- Mason, M. (2003). Civil liability for oil pollution damage: examining the evolving scope for environmental compensation in the international regime. *Marine Policy*, **27**(1), 1-12. DOI: https://doi.org/10.1016/S0308-597X(02)00051-9.
- Mattson, G. (2006). MARPOL 73/78 and Annex I: an assessment of its effectiveness. *Journal of International Wildlife Law and Policy*, **9**(2), 175-194. DOI: https://doi.org/10.1080/13880290600728195.
- Matz, N. (2005). Civilization and the Mandate System under the League of Nations as Origin of Trusteeship. *Max Planck Yearbook of United Nations Law Online*, **9**(1), 47-95. DOI: https://doi.org/10.1163/187574105X00039.
- Matz-Lück, N. (2010). Safe and sound scrapping of 'Rusty Buckets'? The 2009 Hong Kong ship recycling convention. *Review of European Community & International Environmental Law*, **19**(1), 95-103. DOI: https://doi.org/10.1111/j.1467-9388.2010.00667.x.
- Mayhall, M. A. (1975). The Louisiana Offshore Terminal Authority and the Deepwater Port Act of 1974. *Loy. Law.*, **1**, 9.
- Mazaheri, A., & Ekwall, D. (2009). Impacts of the ISPS code on port activities: a case study on Swedish ports. *World Review of Intermodal Transportation Research*, **2**(4), 326-342.
- Mazis, I. T., & Sgouros, G. A. (2013). The Greek EEZ: Principles of a Geopolitical Analysis. *Civitas Gentium*, **3**(1), 109-132.
- McCarter, C. P. (1999). STCW'95: implementation issues: What is the pass mark?. *Marine Policy*, **23**(1), 11-24. DOI: https://doi.org/10.1016/S0308-597X(97)00046-8.
- McCurdy, G. L. (1992). An Overview of OPA 1990 and Its Relationship to Other Laws. *USF Mar. LJ*, **5**, 423.

- McDorman, T. L. (2000). Regional port state control agreements: some issues of international law. *Ocean & Coastal LJ*, **5**, 207.
- Meirong, Z., Yi, Y., & Wei, T. (2009). An Analysis of the Legal Issues in Lien Clause in the Time Charter Party. *China Oceans L. Rev.*, **350**.
- Mejia, M. Q. (2010). The STCW conference in Manila. *WMU Journal of Maritime Affairs*, **9**, 231-234. DOI: https://doi.org/10.1007/BF03195178.
- Melnyk, O., Onyshchenko, S., Pavlova, N., Kravchenko, O., & Borovyk, S. (2022). Integrated Ship Cybersecurity Management as a Part of Maritime Safety and Security System. *International Journal of Computer Science and Network Security*, **22**(03), 135-140. DOI: https://doi.org/10.22937/IJCSNS.2022.22.3.18.
- Mensah, T. A. (2004). The place of the ISPS Code in the legal international regime. *WMU Journal of Maritime Affairs*, **3**(1), 17-30. DOI: https://doi.org/10.1007/BF03195047.
- Meron, T. (1960). The question of the composition of the Trusteeship Council. *Brit. YB Int'l L.*, **36**, 250.
- Metaxas, B. N. (1974). Some thoughts on flags of convenience. *Maritime studies and Management*, ***1***(3), 162-177. DOI: https://doi.org/10.1080/03088837400000006.
- Mikelis, N. (2013). An analysis of European Regulation of ship recycling. *BIMCO Bulletin*, **108**(6), 26-29.
- Millefiori L., Braca P., Zissis D., Spiliopoulos G., Stefano M., Willett P., Carniel S., (2021). "COVID-19 impact on global maritime mobility". *Scientific Reports Journal*, V(**11**), Article Number 18039, DOI: https://doi.org/10.1038/s41598-021-97461-7.
- Mišković, D., Ivče, R., Hess, M., & Đurđević-Tomaš, I. (2022). The influence of organisational safety resource-related activities and other exploratory variables on seafarers' safety behaviours. *The Journal of Navigation*, **75**(2), 319-332. DOI: 10.1017/S0373463322000054.
- Mitchell, R. B. (1995). Compliance with international treaties: lessons from intentional oil pollution. *Environment: Science and Policy for Sustainable Development*, **37**(4), 11-41. DOI: https://doi.org/10.1080/00139157.1995.9929234.

- Mitnick, E. R. (1983). Admiralty-Insurance-War Risk Underwriters Liable for Insured Value of Vessels Seized by Sandinista Rebels, Ope Shipping, Ltd. v. Allstate Insurance Co. *Suffolk Transnat'l LJ*, **7**, 391.
- Mitroussi, K. (2004). Quality in shipping: IMO's role and problems of implementation. *Disaster Prevention and Management: An International Journal*. DOI: https://doi.org/10.1108/09653560410521698.
- Mitroussi, K., & Arghyrou, M. G. (2016). Institutional performance and ship registration. *Transportation Research Part E: Logistics and Transportation Review*, **85**, 90-106. DOI: https://doi.org/10.1016/j.tre.2015.10.004.
- Mokhtari, S. The legal role and responsibilities of classification societies. *Regulation*, **6**(3), 13.
- Molenda, M. (2010). *Overview of international legal and technical regulations for ship recycling*. Zeszyty Naukowe/Akademia Morska w Szczecinie, 63-67.
- Moncayo, G. A. (2016). International law on ship recycling and its interface with EU law. *Marine pollution bulletin*, **109**(1), 301-309. DOI: https://doi.org/10.1016/j.marpolbul.2016.05.065.
- Morgan, J. D. (1994). The Oil Pollution Act of 1990: a look at its impact on the oil industry. *Fordham Envtl. LJ*, **6**, 1.
- Mossop, J. (2018). Can We Make the Oceans Greener: The Successes and Failures of UNCLOS as an Environmental Treaty. *Victoria U. Wellington L. Rev.*, **49**, 573.
- Mukherjee, P. K. (2007). The ISM Code and the ISPS Code: A critical legal analysis of two SOLAS regimes. *WMU Journal of Maritime affairs*, **6**(2), 147-166. DOI: https://doi.org/10.1007/BF03195110.
- Murphy, D. G., Teitz, L. E., Mullen, D. K., & Mirmirani, N. (2001). International Litigation. *In Int'l L.*, **35**, p. 491.
- Myburgh, Paul, P & I Club Letters of Undertaking and Admiralty Arrests (June 19, 2018). NUS Law Working Paper No. 2018/015, NUS - Centre for Maritime Law Working Paper 18/04, Published in (2018) 24 *Journal of International Maritime Law* 201-212. DOI: http://dx.doi.org/10.2139/ssrn.3199592.
- Nagi, A., & Kersten, W. (2022). A Process Model for Cooperative Risk Management in Seaports. *Sustainability*, **14**(3), 1662. DOI: https://doi.org/10.3390/su14031662.

- Nair, A. (2013). A note on Norden: Voyage Charterparties, the Hague/Visby Rules and Enforcing Foreign Arbitration Awards. *Austl. & NZ Mar. LJ*, **27**, 90.
- Naji, G. M. A., Isha, A. S. N., Alazzani, A., Saleem, M. S., & Alzoraiki, M. (2022). Assessing the Mediating Role of Safety Communication Between Safety Culture and Employees Safety Performance. *Frontiers in Public Health*, **10.** DOI: 10.3389/fpubh.2022.840281.
- Nanda, V. P. (1967). The Torrey Canyon disaster: some legal aspects. *Denv. LJ*, **44**, 400.
- Ng, A. K., & Vaggelas, G. K. (2012). Port security: the ISPS Code. *The Blackwell companion to maritime economics*, 674-700. DOI: 10.1002/9781444345667.*Public Health*, **10.** DOI: 10.3389/fpubh.2022.840281.
- Nielsen, M. B., Baun, A., Mackevica, A., Thit, A., Wallinder, I. O., Gallego, J. A., ... & Hansen, S. F. (2021). Nanomaterials in the European chemicals legislation–methodological challenges for registration and environmental safety assessment. *Environmental Science: Nano*, **8**(3), 731-747. DOI: https://doi.org/10.1039/D0EN01123A.
- Nitta, A., Arai, H., & Magaino, A. (1992). Basis of IACS unified longitudinal strength standard. *Marine Structures*, **5**(1), 1-21. DOI: https://doi.org/10.1016/0951-8339(92)90032-K.
- Nosratabadi, S., Mosavi, A., Shamshirband, S., Zavadskas, E. K., Rakotonirainy, A., & Chau, K. W. (2019). Sustainable business models: A review. *Sustainability*, **11**(6), 1663. DOI: https://doi.org/10.3390/su11061663.
- Öberg, M. D. (2005). The legal effects of resolutions of the UN Security Council and General Assembly in the jurisprudence of the ICJ. *European Journal of International Law*, **16**(5), 879-906. DOI: https://doi.org/10.1093/ejil/chi151.
- O'Connell, D. P. (1971). The Juridical Nature of the Territorial Sea. *Brit. YB Int'l L.*, **45**, 303.
- Okamura, B. (1995). Proposed IMO Regulations for the prevention of air pollution from ships. *J. Mar. L. & Com.*, **26**, 183.
- Olenin, S., Ojaveer, H., Minchin, D., & Boelens, R. (2016). Assessing exemptions under the ballast water management convention: preclude the Trojan horse. *Marine pollution bulletin*, **103**(1-2), 84-92. DOI: https://doi.org/10.1016/j.marpolbul.2015.12.043.

- Opeskin, B. R., & Rothwell, D. R. (1991). Australia's territorial sea: international and federal implications of its extension to 12 miles. *Ocean Development & International Law*, **22**(4), 395-431. DOI: https://doi.org/10.1080/00908329109545967.
- Ostad-Ali-Askari, K. (2022). Management of risks substances and sustainable development. *Applied Water Science*, **12**(4), 1-23. DOI: https://doi.org/10.1007/s13201-021-01562-7.
- O'Sullivan, A. J. (1978). The AMOCO CADIZ oil spill. *Marine Pollution Bulletin*, **9**(5), 123-128. DOI: https://doi.org/10.1016/0025-326X(78)90586-6.
- Othman, A., El-gazzar, S., & Knez, M. (2022). A Framework for Adopting a Sustainable Smart Sea Port Index. *Sustainability*, **14**(8), 4551. DOI: https://doi.org/10.3390/su14084551.
- Outinen, O., Bailey, S. A., Broeg, K., Chasse, J., Clarke, S., Daigle, R. M., ... & Viard, F. (2021). Exceptions and exemptions under the ballast water management convention–Sustainable alternatives for ballast water management?. *Journal of Environmental Management*, **293**, 112823. DOI: https://doi.org/10.1016/j.jenvman.2021.112823.
- Özcayir, D. Z. O., & General, I. (2000). Flags of Convenience and the Need for International Co-operation. *International Maritime Law*, **7**(4), 111-117.
- Ozcayr, Z. O. (2008). The use of port state control in maritime industry and application of the Paris MoU. *Ocean & Coastal LJ*, **14**, 201.
- Ozguc, O. (2021). The assessment of impact damage caused by dropped objects on floating offshore structures. *Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment*, **235**(2), 491-510. DOI: https://doi.org/10.1177/147509022097258.
- Panagakos, G., de Sousa Pessoa, T., Barfod, M., Desypris, N., Psaraftis, H.N. (2019). Monitoring the Carbon Footprint of Dry Bulk Shipping in the EU: An Early Assessment of the MRV Regulation, *Sustainability*, **11**, 5133; DOI: doi:10.3390/su11185133.
- Pantouvakis, A., & Karakasnaki, M. (2018). The human talent and its role in ISM Code effectiveness and competitiveness in the shipping industry. *Maritime Policy & Management*, **45**(5), 649-664. DOI: https://doi.org/10.1080/03088839.2018.1454989.

- Papavizas, C. G. (1995). The OECD Shipbuilding Agreement and its Effects on US Law. *J. Mar. L. & Com.*, **26**, 385.
- Park, S. K., Kim, J. R., & Shin, Y. R. (2012). A Study on the Institute Warranties in the Institute Time Clauses-Hulls 1/10/83. *Journal of Navigation and Port Research*, **36**(5), 329-338. DOI: https://doi.org/10.5394/KINPR.2012.36.5.329.
- Pauksztat, B., Andrei, D. M., & Grech, M. R. (2022). Effects of the COVID-19 pandemic on the mental health of seafarers: A comparison using matched samples. *Safety Science*, **146**, 105542. DOI: https://doi.org/10.1016/j.ssci.2021.105542.
- Pauksztat, B., Grech, M. R., & Kitada, M. (2022). The impact of the COVID-19 pandemic on seafarers' mental health and chronic fatigue: Beneficial effects of onboard peer support, external support and Internet access. *Marine Policy*, **137**, 104942. DOI: https://doi.org/10.1016/j.marpol.2021.104942.
- Peet, G. (1994). The role of (environmental) non-governmental organisations at the Marine Environment Protection Committee (MEPC) of the International Maritime Organisation (IMO), and at the London Dumping Convention (LDC). *Ocean & coastal management*, **22**(1), 3-18. DOI: https://doi.org/10.1016/0964-5691(94)90080-9.
- Pérez, R., Lamas, M., & Carral, L. M. (2012). Classification and damage stability of flotel ships. *Journal of Maritime Research*, **9**(1), 33-38.
- Peterson, C. H., Rice, S. D., Short, J. W., Esler, D., Bodkin, J. L., Ballachey, B. E., & Irons, D. B. (2003). Long-term ecosystem response to the Exxon Valdez oil spill. *Science*, **302**(5653), 2082-2086. DOI: 10.1126/science.10842.
- Petrinović, R., Mandić, N., & Siriščević, E. (2016). The importance of maritime law in seafarer training pursuant to amendments to the STCW convention. *Transactions on Maritime Science*, **5**(1), 53-64. DOI: 10.7225/toms.v05.n01.007.
- Petrossian, G. A., Sosnowski, M., Miller, D., & Rouzbahani, D. (2020). Flags for sale: An empirical assessment of flag of convenience desirability to foreign vessels. *Marine Policy*, **116**, 103937. DOI: https://doi.org/10.1016/j.marpol.2020.103937.
- Phillips, B. (1997). The Future of P&I Clubs. *MLAANZ Journal*, **12**, 23.
- Pictet, J. S. (1952). Geneva convention. *International Committee of the red cross*.

- Piniella, F., Alcaide, J. I., & Rodríguez-Díaz, E. (2020). Identifying stakeholder perceptions and realities of Paris MoU inspections. *WMU Journal of Maritime Affairs*, **19**(1), 27-49. DOI: https://doi.org/10.1007/s13437-020-00193-0.
- Piniella, F., Silos, J. M., & Bernal, F. (2013). Who will give effect to the ILO's Maritime Labour Convention, 2006?. *International Labour Review*, **152**(1), 59-83. DOI: https://doi.org/10.1111/j.1564-913X.2013.00169.x.
- Polakis, M., Zachariadis, P., & Kat, J. O. D. (2019). The energy efficiency design index (EEDI). *In Sustainable shipping* (pp. 93-135). Springer, Cham. DOI: 10.1007/978-3-030-04330-8_3.
- Polemis, D., Darousos, E. F., & Boviatsis, M. (2022). A Theoretical Analysis of Contemporary Vessel Navigational Systems: Assessing the Future Role of the Human Element for Unmanned Vessels. *TransNav, the International Journal on Marine Navigation and Safety of Sea Transportation*, **16**(4), 637-646. DOI: 10.12716/1001.16.04.05.
- Poornikoo, M., Øvergård, K.I. Levels of automation in maritime autonomous surface ships (MASS): a fuzzy logic approach. *Maritime Economics & Logistics*, **24**, 278–301 (2022). DOI: https://doi.org/10.1057/s41278-022-00215-z.
- Posner, Eric A., The Decline of the International Court of Justice (December 2004). U Chicago Law & Economics, Olin Working Paper No. 233; U of Chicago, Public Law Working Paper No. 81, Available at SSRN: https://ssrn.com/abstract=629341 or http://dx.doi.org/10.2139/ssrn.629341
- Powell, E. J., & Mitchell, S. M. (2007). The International Court of Justice and the world's three legal systems. *Journal of Politics*, **69**(2), 397-415. DOI: https://doi.org/10.1111/j.1468-2508.2007.00539.x.
- Pun, K. F., Yam, R. C., & Lewis, W. G. (2003). Safety management system registration in the shipping industry. *International Journal of Quality & Reliability Management*. **20**(6), 704-721. DOI: https://doi.org/10.1108/02656710310482140.
- Puthucherril, T. G. (2010). From shipbreaking to sustainable ship recycling: *Evolution of a legal regime*. Brill.
- Pritchard, S. Z. (1977). Load on Top-From the Sublime to the Absurd. J. Mar. L. & Com., **9**, 185.

- Proelss, A. (2018). The Limits of Jurisdiction Ratione Materiae of UNCLOS Tribunals. *Hitotsubashi journal of law and politics*, **46**, 47-60.
- Progoulaki, M., Katradi, A., & Theotokas, I. (2013). Promoting and developing seafarers' welfare under the maritime labour convention: A research agenda. *SPOUDAI-Journal of Economics and Business*, **63**(3-4), 75-82.
- Prokopenko, O., & Miśkiewicz, R. (2020). Perception of" Green Shipping" in the contemporary conditions. *Entrepreneurship and Sustainability Issues*, **8**(2), 269. DOI: 10.9770/jesi.2020.8.2(16).
- Psaraftis, H. N. (2002). Maritime safety: to be or not to be proactive. *WMU Journal of Maritime Affairs*, **1**(1), 3-16. DOI: https://doi.org/10.1007/BF03195022.
- Psaraftis, H. N. (2019). Ship routing and scheduling: the cart before the horse conjecture, *Maritime Economics and Logistics*, **21**(1), 111–124. DOI: https://doi.org/10.1057/s41278-017-0080-x.
- Psaraftis, H.N. (2019). Speed Optimization vs Speed Reduction: the Choice between Speed Limits and a Bunker Levy, *Sustainability*, **11**, 2249; DOI: 10.3390/su11080000.
- Psaraftis, H.N., Lagouvardou, S. (2019). Market Based Measures for the reduction of green house gas emissions from ships: a possible way forward, Samfundsøkonomen 2019, **4**, 60-70.
- Psaraftis, H.N., Kontovas, C.A. (2020). Influence and Transparency at the IMO: the Name of the Game. *Maritime Economics and Logistics*, **22**(2), 151-172. DOI: https://doi.org/10.1057/s41278-020-00149-4.
- Psaraftis, H.N., Kontovas, C.A. (2021). Decarbonization of maritime transport: Is there light at the end of the tunnel? *Sustainability* **13**, 237. DOI: https://doi.org/10.3390/su13010237.
- Psaraftis, H.N., Zis, T., Lagouvardou, S. (2021). A comparative evaluation of Market Based Measures for shipping decarbonization, *Maritime Transport Research*, **2**, 100019. DOI: https://doi.org/10.1016/j.martra.2021.100019.
- Psaraftis, H. N., & Zis, T. (2021). Impact assessment of a mandatory operational goal-based short-term measure to reduce GHG emissions from ships: the LDC/SIDS case study. *International Environmental Agreements: Politics, Law and Economics*, **21**, 445-467. DOI: https://doi.org/10.1007/s10784-020-09523-2.

- Qi, J., Wang, S., Psaraftis, H.N. (2021). Bi-level optimization model applications in managing air emissions from ships: A review. *Communications in Transportation Research*, **1**, 100020. DOI: https://doi.org/10.1016/j.commtr.2021.100020.
- Qi, Y., Harrod, S., Psaraftis, H. N., & Lang, M. (2022). Transport service selection and routing with carbon emissions and inventory costs consideration in the context of the Belt and Road Initiative. *Transportation Research Part E: Logistics and Transportation Review*, **159**, 102630. DOI: https://doi.org/10.1016/j.tre.2022.102630.
- Qiao, W., Liu, Y., Ma, X., & Lan, H. (2021). Cognitive gap and correlation of safety-I and safety-II: A case of maritime shipping safety management. *Sustainability*, **13**(10), 5509. DOI: https://doi.org/10.3390/su13105509.
- Raadi, K. (2005). General Average in the Marine Insurance Law. *Journal of Legal Research*, **4**(8), 217-242.
- Racquet, B. E., & Romsdahl, R. J. (1992). Piercing the Corporate Veil Under the Oil Pollution Act of 1990. *USF Mar. LJ*, **5**, 369.
- Radović, J. R., Rial, D., Lyons, B. P., Harman, C., Viñas, L., Beiras, R., ... & Bayona, J. M. (2012). Post-incident monitoring to evaluate environmental damage from shipping incidents: Chemical and biological assessments. *Journal of environmental management*, **109**, 136-153. DOI: https://doi.org/10.1016/j.jenvman.2012.04.042.
- Rak, G., Zec, D., Kostelac, M. M., Joksimović, D., Gollasch, S., & David, M. (2019). The implementation of the ballast water management convention in the Adriatic Sea through States' cooperation: The contribution of environmental law and institutions. *Marine pollution bulletin*, **147**, 245-253. DOI: https://doi.org/10.1016/j.marpolbul.2018.06.012.
- Rehbein, K., & Lenway, S. (1994). Determining an industry's political effectiveness with the US International Trade Commission. *Business & Society*, **33**(3), 270-292. DOI: https://doi.org/10.1177/000765039403300303.
- Rendtel, J., & Lunsford, R. (2006). From the IMO Council. *WGN, Journal of the International Meteor Organisation*, **34**, 62.
- Reynardson, W. R. (1968). History and Development of P & I Insurance: The British Scene. *Tul. L. Rev.*, **43**, 457.

- del Río González, P. (2008). Policy implications of potential conflicts between short-term and long-term efficiency in CO2 emissions abatement. *Ecological economics*, **65**(2), 292-303. DOI: https://doi.org/10.1016/j.ecolecon.2007.06.013.
- Ritter, M. J. (2012). Disputing Arbitration Clauses in International Insurance Agreements: Problems With the Self-Execution Framework. *Pace Int'l L. Rev*. Online Companion, i.
- Rizvi, M. J., Islam, M. R., Adekola, O., & Margaret, O. N. (2020). A sustainable shipbreaking approach for cleaner environment and better wellbeing. *Journal of Cleaner Production*, **270**, 122522. DOI: https://doi.org/10.1016/j.jclepro.2020.122522.
- Robards, M. D., Silber, G. K., Adams, J. D., Arroyo, J., Lorenzini, D., Schwehr, K., & Amos, J. (2016). Conservation science and policy applications of the marine vessel Automatic Identification System (AIS)—a review. *Bulletin of Marine Science*, **92**(1), 75-103. DOI: https://doi.org/10.5343/bms.2015.1034.
- Roberts, S. E., & Hansen, H. L. (2002). An analysis of the causes of mortality among seafarers in the British merchant fleet (1986–1995) and recommendations for their reduction. *Occupational medicine*, **52**(4), 195-202. DOI: https://doi.org/10.1093/occmed/52.4.195.
- Robert, K. W., Parris, T. M., & Leiserowitz, A. A. (2005). What is sustainable development? Goals, indicators, values, and practice. *Environment: science and policy for sustainable development*, **47**(3), 8-21. DOI: https://doi.org/10.1080/00139157.2005.10524444.
- Rodriguez, A. J., & Hubbard, M. C. (1998). International Safety Management (ISM) Code: a new level of uniformity. *Tul. L. Rev.*, **73**, 1585.
- Rodríguez, E., & Piniella, F. (2012). The new inspection regime of the Paris MOU on port state control: improvement of the system. *Journal of Maritime Research*, **9**(1), 9-16.
- Ronneberg Jr, N. J. (1990). An introduction to the protection & (and) indemnity clubs and the marine insurance they provide. *USF Mar. LJ*, **3**, 1.
- Rosen, S. (1934). The Origin and Development of the Modern Maritime Law. *Law Soc'y J.*, **6**, 240.

- Rosenthal, G. (2005). The economic and social council of the United Nations. An Issues Paper. New York: *Friedrich-Ebert-Foundation* (Occasional Paper No. 15).
- Russo, M. A., Leitão, J., Gama, C., Ferreira, J., & Monteiro, A. (2018). Shipping emissions over Europe: A state-of-the-art and comparative analysis. *Atmospheric environment*, **177**, 187-194. DOI: https://doi.org/10.1016/j.atmosenv.2018.01.025.
- Saboori, B., Al-Mulali, U., Bin Baba, M., & Mohammed, A. H. (2016). Oil-induced environmental Kuznets curve in organisation of petroleum exporting countries (OPEC). *International Journal of Green Energy*, **13**(4), 408-416. DOI: https://doi.org/10.1080/15435075.2014.961468.
- Sahatjian, L. C. (1998). The ISM Code: A brief overview. *J. Mar. L. & Com.*, **29**, 405.
- Sahu, M. K. (2014). The Rule of Causa Proxima as a Principle of Insurance. *Kathmandu Sch. L. Rev.*, **4**, 154.
- Salzman, G. I. (1966). The Law of Insurable Interest in Property Insurance. *Ins. LJ*, **394**.
- dos Santos, M. C., & Pereira, F. H. (2022). ESG performance scoring method to support responsible investments in port operations. *Case Studies on Transport Policy*, **10**(1), 664-673. DOI: https://doi.org/10.1016/j.cstp.2022.01.027.
- Sarkhosh, E. (2019). A legal Study of Nature, Structure and the Establishment Way of the Protection and Indemnity Clubs (P&I Clubs) in Local and International Domain. *Iranian Journal of Insurance Research*, **34**(1), 85-103.
- Saville, L. J. (1997). Departmental advisory committee on arbitration law 1996 report on the arbitration bill. *Arbitration International*, **13**(3), 275-316. DOI: https://doi.org/10.1093/arbitration/13.3.275.
- Schachter, O. (1964). The quasi-judicial role of the Security Council and the General Assembly. *American Journal of International Law*, **58**(4), 960-965. DOI: 10.2307/2196038.
- Schiferli, R. W. (1991). The Memorandum of Understanding on Port State Control: its History, Operation and Development. *The Marine Environment and Sustainable Development: Law, Policy and Science*, **448**.

- Schisel-Meslin, J. M. (2018). Out of the Club: Out of Luck: Complexities Facing Injured Third Parties Seeking Recovery from P&I Clubs. *Tul. Mar. LJ*, **43**, 319.
- Schneider, A. R. H. (1982). UNCLOS III Revisited. *Envtl. Pol'y & L.*, **9**, 108.
- Schøyen, H., Burki, U., & Kurian, S. (2017). Ship-owners' stance to environmental and safety conditions in ship recycling. A case study among Norwegian shipping managers. *Case Studies on Transport Policy*, **5**(3), 499-508. DOI: https://doi.org/10.1016/j.cstp.2017.06.003.
- Schröder-Hinrichs, J. U., Hollnagel, E., & Baldauf, M. (2012). From Titanic to Costa Concordia—a century of lessons not learned. *WMU journal of maritime affairs*, **11**(2), 151-167. DOI: https://doi.org/10.1007/s13437-012-0032-3.
- Schwartz, H., Solakivi, T., & Gustafsson, M. (2022). Is There Business Potential for Sustainable Shipping? Price Premiums Needed to Cover Decarbonized Transportation. *Sustainability*, **14**(10), 5888. DOI: https://doi.org/10.3390/su14105888.
- Scoones, I. (2007). Sustainability. *Development in practice*, **17**(4-5), 589-596. DOI: https://doi.org/10.1080/09614520701469609.
- Seckinger, N., & Radgen, P. (2021). Dynamic Prospective Average and Marginal GHG Emission Factors—Scenario-Based Method for the German Power System until 2050. *Energies*, **14**(9), 2527. DOI: https://doi.org/10.3390/en14092527.
- Seco, E. (2017). Challenges Facing The Shipping Sector Due to Environmental Regulations. *Journal of Maritime Research*, **14**(2), 66-72. Available at: View of Challenges Facing The Shipping Sector Due to Environmental Regulations (unican.es).
- Serra, P., & Fancello, G. (2020). Towards the IMO's GHG goals: A critical overview of the perspectives and challenges of the main options for decarbonizing international shipping. *Sustainability*, **12**(8), 3220. DOI: https://doi.org/10.3390/su12083220.
- Sezer, S. I., Akyuz, E., & Arslan, O. (2022). An extended HEART Dempster–Shafer evidence theory approach to assess human reliability for the gas freeing process on chemical tankers. *Reliability Engineering & System Safety*, **220**, 108275. DOI: https://doi.org/10.1016/j.ress.2021.108275.

- Sharp, W. R. (1947). The specialized agencies and the United Nations: Progress report I. *International Organisation*, **1**(3), 460-474.
- Shen, J. H., Liu, C. P., Chang, K. Y., & Chen, Y. W. (2021). Ship deficiency data of port state control to identify hidden risk of target ship. *Journal of Marine Science and Engineering*, **9**(10), 1120. DOI: https://doi.org/10.3390/jmse9101120.
- Shi, Y. (2016). Reducing greenhouse gas emissions from international shipping: Is it time to consider market-based measures? *Marine Policy*, **64**, 123-134. DOI: https://doi.org/10.1016/j.marpol.2015.11.013.
- Silos, J. M., Piniella, F., Monedero, J., & Walliser, J. (2013). The role of the Classification Societies in the era of globalization: a case study. *Maritime Policy & Management*, **40**(4), 384-400. DOI: https://doi.org/10.1080/03088839.2013.776184.
- Silva, J. S., Rojas, J. P., Norabuena, M., & Seguel, R. J. (2018). Ozone and volatile organic compounds in the metropolitan area of Lima-Callao, Peru. *Air Quality, Atmosphere & Health*, **11**(8), 993-1008. DOI: https://doi.org/10.1007/s11869-018-0604-2.
- Simberloff, D., Martin, J. L., Genovesi, P., Maris, V., Wardle, D. A., Aronson, J., ... & Vilà, M. (2013). Impacts of biological invasions: what's what and the way forward. *Trends in ecology & evolution*, **28**(1), 58-66. DOI: https://doi.org/10.1016/j.tree.2012.07.013.
- Simmonds, K. R. (1963). The Constitution of the Maritime Safety Committee of IMCO. *International & Comparative Law Quarterly*, **12**(1), 56-87. DOI: 10.1093/iclqaj/12.1.56.
- Sinclaire, J. K., & Vogus, C. E. (2011). Adoption of social networking sites: an exploratory adaptive structuration perspective for global organisations. *Information Technology and Management*, **12**(4), 293-314. DOI: https://doi.org/10.1007/s10799-011-0086-5.
- Singh, A. (2022). Economic and Legal Impact of 2020 Sulphur Limit Under Annex VI, MARPOL. *European Energy and Environmental Law Review*, **31**(4). pp. 241 – 257. DOI: https://doi.org/10.54648/eelr2022017.
- Singh, A. J. (2022). UNCLOS: Facilitating ocean governance and maritime security. *Maritime Affairs: Journal of the National Maritime Foundation of India*, 1-19. DOI: https://doi.org/10.1080/09733159.2022.2097643.

- Sletmo, G. K., & Hoste, S. (1993). Shipping and the competitive advantage of nations: the role of international ship registers. *Maritime Policy and Management*, **20**(3), 243-255. DOI: https://doi.org/10.1080/03088839300000016.
- Sloane, R. D. (2009). Breaking the genuine link: The contemporary international legal regulation of nationality. *Harv. Int'l LJ*, **50**, 1.
- Smith, J. C., & Burns, P. (1983). Donoghue v. Stevenson: The not so golden anniversary. *The Modern Law Review*, **46**(2), 147-163. DOI: http://www.jstor.org/stable/1095489.
- Smith, H. D. (1995). The environmental management of shipping. *Marine Policy*, **19**(6), 503-508. DOI: https://doi.org/10.1016/0308-597X(95)00033-3.
- So, L. K., & Sooksripaisarnkit, P. (2021). Seaworthiness and Autonomous Ships: Legal Implications in the 21st Century. *Austl. & NZ Mar. LJ*, **35**, 21.
- Sobrino Heredia, J. M. (2021). The Loss of Institutionality in International Organisations, and their Decline in the Contemporary International Society. *Paix & Sec. Int'l*, **9**, 1. DOI: http://dx.doi.org/10.25267/Paix_secur_int.2021.i9.02.
- Solakivi, T., Kiiski, T., Kuusinen, T., & Ojala, L. (2021). The European Ship Recycling Regulation and its market implications: Ship-recycling capacity and market potential. *Journal of Cleaner Production*, **294**, 126235. DOI: https://doi.org/10.1016/j.jclepro.2021.126235.
- Sollien, K., Jensen, T. E., & Schøyen, H. (2014). Designated person ashore–how do they perceive their role in the organisation and to which extent are they legally exposed in case of an accident?. *Journal of Maritime Research*, **11**(3), 3-12.
- Song, L. (2018). International Group of P&I Clubs/BIMCO Revised Himalaya Clause. *Journal of International Maritime Law*, **24**(1), 11-15.
- Song, W., Guo, J., Wang, Y., & Li, L. (2021). An evaluation of the development of the Ocean Economy in China using an Ocean Economic Development Index. *Marine Policy*, **132**, 104691. DOI: https://doi.org/10.1016/j.marpol.2021.104691.
- Soto-Onate, D., & Caballero, G. (2017). Oil spills, governance and institutional performance: The 1992 regime of liability and compensation for oil pollution

damage. *Journal of Cleaner Production*, **166**, 299-311. DOI: https://doi.org/10.1016/j.jclepro.2017.08.021.

- Spoof-Tuomi, K., & Niemi, S. (2020). Environmental and economic evaluation of fuel choices for short sea shipping. *Clean Technologies*, **2**(1), 4. DOI: https://doi.org/10.3390/cleantechnol2010004.
- Sulaiman, O., Saharuddin, A. H., & Kader, A. S. A. (2013). Towards sustainable green ship technology. *African Journal of Business Management*, **7**(2), 96. DOI: 10.5897/AJBM10.1634.
- Sumi, Y. (2019). Structural safety of ships developed by lessons learned from the 100-year history of break-in-two accidents. *Marine Structures*, **64**, 481-491. DOI: https://doi.org/10.1016/j.marstruc.2018.12.003.
- Sun, S., & Ertz, M. (2020). Life cycle assessment and Monte Carlo simulation to evaluate the environmental impact of promoting LNG vehicles. *MethodsX*, **7**, 101046. DOI: https://doi.org/10.1016/j.mex.2020.101046.
- Srivastava, C. P. (1976). The Inter-Governmental Maritime Consultative Organisation. *The Journal of Navigation*, **29**(4), 307-316. DOI: 10.1017/S0373463300039266.
- Stafford-Smith, M., Griggs, D., Gaffney, O., Ullah, F., Reyers, B., Kanie, N., ... & O'Connell, D. (2017). Integration: the key to implementing the Sustainable Development Goals. *Sustainability science*, **12**, 911-919. DOI: https://doi.org/10.1007/s11625-016-0383-3.
- Staring, G. S., & Waddell, G. L. (1998). Marine Insurance. *Tul. L. Rev.*, **73**, 1619.
- Stemmer, J. E. O. (1987). A new economic order for postwar shipping and the liner conference system. The International Maritime Conference, 1948. *Maritime policy and management*, **14**(1), 5-26. DOI: https://doi.org/10.1080/03088838700000002.
- Stone, A. G. (1975). The Trans-Alaska Pipeline and Strict Liability for Oil Pollution Damage. *Urb. L. Ann.*, **9**, 179.
- Størkersen, K. V. (2021). Safety management in remotely controlled vessel operations. *Marine Policy*, **130**, 104349. DOI: https://doi.org/10.1016/j.marpol.2020.104349.
- Strathy, G. (2005). Maritime Law. *Dalhousie Law Journal*, **28**(1), 261.

- Swanson, S. R. (2001). OPA 90+ 10: The Oil Pollution Act of 1990 After Ten Years. J. Mar. L. & Com., 32, 135.
- Tache, S. W. (1982). The nationality of ships: the definitional controversy and enforcement of genuine link. The International Lawyer, 301-312. At: https://www.jstor.org/stable/40706615.
- Talley, W. K., Jin, D., & Kite-Powell, H. (2005). Post OPA-90 Vessel oil transfer spill prevention: The Effectiveness of coast guard enforcement. *Environmental and Resource Economics*, **30**(1), 93-114. DOI: https://doi.org/10.1007/s10640-004-2378-2.
- Tenold, S. (2019). Onshore and Offshore: The New Maritime Norway. In *Norwegian Shipping in the 20th Century* (pp. 259-274). Palgrave Macmillan, Cham. DOI: https://doi.org/10.1007/978-3-319-95639-8_9.
- Thai, V. V., & Grewal, D. (2006). The Maritime Safety Management System (MSMS): A survey of the international shipping community. *Maritime Economics & Logistics*, **8**(3), 287-310. DOI: https://doi.org/10.1057/palgrave.mel.9100161.
- Thaler, B., Kanchiralla, F. M., Posch, S., Pirker, G., Wimmer, A., Brynolf, S., & Wermuth, N. (2022). Optimal design and operation of maritime energy systems based on renewable methanol and closed carbon cycles. *Energy Conversion and Management*, **269**, 116064. DOI: https://doi.org/10.1016/j.enconman.2022.116064.
- Thanopoulou, H. A. (1998). What price the flag? The terms of competitiveness in shipping. *Marine Policy*, **22**(4-5), 359-374. DOI: https://doi.org/10.1016/S0308-597X(97)00043-2.
- Theotokas, I., & Alexopoulos, A. (1998). Safety and Quality in the Shipping Industry: A Legal Analysis of the ISM Code's Principles and Applications. *European Research Studies Journal*, **1**(3), 81-98.
- Tilley, M. (1986). The Origin and Development of the Mutual Shipowners' Protection & (and) Indemnity Associations. *J. Mar. L. & Com.*, **17**, 261.
- Tillig, F., Ringsberg, J., Psaraftis, H.N., Zis, T. (2020). Reduced environmental impact of marine transport through speed reduction and wind assisted propulsion, *Transportation Research Part D*, **83**, DOI: 10.1016/j.trd.2020.102380.

- Tilman, A. R., Levin, S., & Watson, J. R. (2018). Revenue-sharing clubs provide economic insurance and incentives for sustainability in common-pool resource systems. *Journal of theoretical biology*, 454, 205-214. DOI: https://doi.org/10.1016/j.jtbi.2018.06.003.
- Todd, P. (2014). Safe port issues: The Ocean Victory. *Lloyd's Maritime and Commercial Law Quarterly*, 1-12.
- Toh, K. S. (2021). Admiralty and shipping law. *Singapore Academy of Law Annual Review of Singapore Cases*, **38**, 59-86.
- Toh, R. S., & Susilowidjojo, H. (1987). Flags of convenience shipping in the 1980s: The American perspective. *Transportation journal*, 34-42. At: https://www.jstor.org/stable/20712925.
- Toth, J. (2014). The Genuine Link Principle in Nationality Law. *Hungarian YB Int'l L. & Eur. L.*, **45**.
- Tran, T. M. T., Yuen, K. F., Li, K. X., Balci, G., & Ma, F. (2020). A theory-driven identification and ranking of the critical success factors of sustainable shipping management. *Journal of Cleaner Production*, **243**, 118401. DOI: https://doi.org/10.1016/j.jclepro.2019.118401.
- Trenkner, P., & Cole, C. W. (2012). The STCW Manila Amendments and their Impact on Maritime English. *Constanta Maritime University Annals*, **17**.
- Tromiadis, R., & Stanca, C. (2014). Comparative analysis of tanker ships incidents and their environment impacts. *In Advanced Materials Research* (Vol. **837**, pp. 775-779). Trans Tech Publications Ltd. DOI: https://doi.org/10.4028/www.scientific.net/AMR.837.775.
- Tsimplis, M. (2020). Regulatory systems supporting innovation: Lessons from the development of the 2004 Ballast Water Management Convention. *The International Journal of Marine and Coastal Law*, **36**(1), 59-87. DOI: https://doi.org/10.1163/15718085-BJA10039.
- Tsou, M. C. (2019). Big data analysis of port state control ship detention database. *Journal of Marine Engineering & Technology*, **18**(3), 113-121. DOI: https://doi.org/10.1080/20464177.2018.1505029.
- Turker, F., & Er, I. D. (2008). Enhancing quality and safety management in shipping: tanker management and self assessment. *Lex ET Scientia Int'l J.*, **15**, 128.

- Tuerk, H., & Hafner, G. (2022). The United Nations Convention on the Law of the Sea, 1982: Reflections after 40 Years. *Ocean Yearbook Online*, **36**(1), 1-47. DOI: https://doi.org/10.1163/22116001-03601002.
- Tzeng, P. (2016). Jurisdiction and applicable law under UNCLOS. *Yale LJ*, **126**, 242.
- Utton, A. E. (1967). Protective Measures and the Torrey Canyon. *BC Indus. & Com. L. Rev.*, **9**, 613.
- Tzannatos, E., & Kokotos, D. (2009). Analysis of accidents in Greek shipping during the pre-and post-ISM period. *Marine Policy*, **33**(4), 679-684. DOI: https://doi.org/10.1016/j.marpol.2009.01.006.
- Ulfstein, G. (2020). Interpretation of the ECHR in light of the Vienna Convention on the Law of Treaties. *The international journal of human rights*, **24**(7), 917-934. DOI: https://doi.org/10.1080/13642987.2019.1598055.
- Urrutia, B. (2006). The EU regulatory action in the shipping sector: a historical perspective. *Maritime Economics & Logistics*, **8**, 202-221. DOI: https://doi.org/10.1057/palgrave.mel.9100154.
- Valdez Banda, O. A., Hänninen, M., Lappalainen, J., Kujala, P., & Goerlandt, F. (2016). A method for extracting key performance indicators from maritime safety management norms. *WMU Journal of maritime affairs*, **15**(2), 237-265. DOI: https://doi.org/10.1007/s13437-015-0095-z.
- Van Hooydonk, E. (2014). The law of unmanned merchant shipping–an exploration. *The Journal of International Maritime Law*, **20**(3), 403-423.
- Van Panhuys, H. F. (1968). The "Genuine Link Doctrine" and Flags of Convenience. *American Journal of International Law*, **62**(4), 942-943. DOI: https://doi.org/10.1017/S0002930000043128.
- Van, T. C., Ramirez, J., Rainey, T., Ristovski, Z., & Brown, R. J. (2019). Global impacts of recent IMO regulations on marine fuel oil refining processes and ship emissions. *Transportation Research Part D: Transport and Environment*, **70**, 123-134. DOI: https://doi.org/10.1016/j.trd.2019.04.001.
- Vance, W. R. (1908). Early History of Insurance Law. *Colum. L. Rev.*, **8**, 1.
- Vandeventer, B. (1974). Analysis of Basic Provisions of Voyage and Time Charter Parties. *Tul. L. Rev.*, **49**, 806.

- Vanem, E., Endresen, Ø., & Skjong, R. (2008). Cost-effectiveness criteria for marine oil spill preventive measures. *Reliability Engineering & System Safety*, **93**(9), 1354-1368. DOI: https://doi.org/10.1016/j.ress.2007.07.008.
- Varahrami, V., & Haghighat, M. S. (2018). The assessment of liquefied natural gas (LNG) demand reversibility in selected OECD countries. *Energy Reports*, **4**, 370-375. DOI: https://doi.org/10.1016/j.egyr.2018.05.006.
- Vassalos, D. (1999). Shaping ship safety: the face of the future. *Marine Technology and SNAME News*, **36**(02), 61-76. DOI: https://doi.org/10.5957/mt1.1999.36.2.61.
- Veal, R., Tsimplis, M., & Serdy, A. (2019). The legal status and operation of unmanned maritime vehicles. *Ocean Development & International Law*, **50**(1), 23-48. DOI: https://doi.org/10.1080/00908320.2018.1502500.
- Vedachalam, S., Baquerizo, N., & Dalai, A. K. (2022). Review on impacts of low sulfur regulations on marine fuels and compliance options. *Fuel*, **310**, 122243. DOI: https://doi.org/10.1016/j.fuel.2021.122243.
- Velayudan, R. (2021). The Applicability of Proxima Causa Rule in Insurance Contracts, **3**(4), *Int'l JL Mgmt. & Human.*, **4**, 5510.
- Venier, S. (2022). Rising from the Ashes, Once Again?: The Beirut Port Explosion and International Disaster Law. *Yearbook of International Disaster Law Online*, **3**(1), 325-351. DOI: https://doi.org/10.1163/26662531_00301_013.
- Venkadasalam, S., Mohamad, A., & Sifat, I. M. (2020). Operational efficiency of shipping companies: Evidence from Malaysia, Singapore, the Philippines, Thailand and Vietnam. *International Journal of Emerging Markets*, **15**(5), pp. 875-897. DOI: https://doi.org/10.1108/IJOEM-07-2019-0493.
- Verschuur, J., Pant, R., Koks, E., & Hall, J. (2022). A systemic risk framework to improve the resilience of port and supply-chain networks to natural hazards. *Maritime Economics & Logistics*, 1-18. DOI: https://doi.org/10.1057/s41278-021-00204-8.
- Vinar, B. (1960). Effect of the Genuine Link Principle of the 1958 Geneva Convention on the National Character of a Ship. *NYUL Rev.*, ***35***, 1049.
- Vlachos G.P.-K. Giziakis: Casualties of Ferry Ro/Ro and Passengers Ships and the Rules for Safety for Safety, Article published in the Journal of Science and Technology, Vol. 1-No 4, 1997, Nicosia.

- Vlachos G.P.-K. Giziakis: The Effects of Casualties on Economic Effeciency and the Rules for Safety, Article published in the Journal of Science and Technology, Vol. 1- No 3, 1997, Nicosia.
- Vlachos G.P.-M. Lekakou: The Reform of the Institutional Framework of the Coastal Shipping, According to the New European Regulation 3577/92. Case Study: Concepts Concerning the Greek Coastal Shipping Policy, Selected papers in Economic Intergration: Limits and Prospects, London, McMillan, 1997.
- Vlachos G.P.-K. Zois: Assessment of Greek Maritime Policy for the Port War Period up to Present. Article published in the Archives of Economic History, (Volume VIII, No 1-2) Athens (1997).
- Vlachos G.P.-Fournarakis N.: Applications of Information Technology prospectives in the sector of merchant marine. A case study: Improvement of the transportation services and alternatives to reduce the Operational cost of modern ships, Article published in the Journal of Science and Technology, Vol. 1 - No5, 1998, Nicosia.
- Vlachos G.P.-Giziakis K.-Thalassinos G.E.: An economical Approach to ship Casualties, Article published in the journal of European Research Studies, Vol. 1 - No 2, 1998.
- Vlachos G.P.-Em. Nikolaidis: Quality in Shipping and the Impact of ISM Code: Results Derived from Applied Research on Shipping Enterprises. Article published in the Journal of Science and Technology, Vol. 2-No. 4, 2000, Nicosia.
- Vlachos G.P.-Tselentis V.-Samiotis G.: Institutional, Economic and Environmental Aspects Arising from Activities Associated With Areas of High Maritime Activities.
- Vlachos G.P.: «The Choice of Flag in the Light of Non-Complied Vessels», Article published in the «Archive of Economic History», Vol.7, No2 (2001).
- Vlachos G.P.: «Economic Approach on Substandard Vessel Effect to Ship owners», Article published in the «Cyprus Journal of Science and Technology», Vol.3. No2 Nicosia, Cyprus, (2001).
- Vlachos G.P.: «KYOTO PROTOCOL: Significance, Implications and Specified Policies Concerning the Merchant Marine Sector», Article published in the «Archives of Economic History», Vol.14, No 1-2 (2002).

- Vlachos G.P.-Nikolaidis Em.: «Strategic Analysis and Policy Measures on Combating Substandard Ships», Article published in the «Applied Researched Review», (2000).
- Vlachos G.P.: «Legal and Economic Approach of Pollution in Port Areas: The Case of Eastern Mediterranean», Piraeus 2001, Article Published in the Honorary Volume of Peer Professor of the University of Piraeus Apost. Lazari.
- Vlachos G.P.: «The Issue of the Pollution of Marine Environment from Naval Ships: Institutional Approach and Necessary Policies», Piraeus 2001, Article Published in the Honorary Volume of Peer Professor of the University of Piraeus Apost. Lazari.
- Vlachos G.P.-Nikolaidis Em.: «OPEC and its Role on Oil and Energy Market», Article published in the «Annals of Maritime Studies».
- Vlachos G.P.: «Innovation in Maritime Sector», Article presented at the «European Commission Maritime Forum» – Session III: «Innovation for Growth and Jobs: Ministerial Panel» Gijon, Spain, May 2010.
- Vlachos G.P.-Zikos Dimitrios-Lema Eva: «Linking Casual Factors and the Human Element in Maritime Accidents Using K-Means Clustering» Article to be published in the «International Journal of Risk Assessment and Management – I.J.R.A.M.» 2015.
- Vollaard, B. (2017). Temporal displacement of environmental crime: Evidence from marine oil pollution. *Journal of Environmental Economics and Management*, **82**, 168-180. DOI: https://doi.org/10.1016/j.jeem.2016.11.001.
- Wagner, T. J. (1990). The Oil Pollution Act of 1990: An Analysis. *J. Mar. L. & Com.*, **21**, 569.
- Wagner, T. J. (1992). Recoverable Damages Under the Oil Pollution Act of 1990. *USF Mar. LJ*, **5**, 283.
- Wang, G., Arita, K., & Liu, D. (2000). Behavior of a double hull in a variety of stranding or collision scenarios. *Marine structures*, **13**(3), 147-187. DOI: https://doi.org/10.1016/S0951-8339(00)00036-8.
- Wang, H., Huang, S., Liu, Z., & Zheng, L. (2013). Optimal tanker chartering decisions with spot freight rate dynamics considerations. *Transportation Research Part E: Logistics and Transportation Review*, **51**, 109-116. DOI: https://doi.org/10.1016/j.tre.2012.12.006.

- Wang, J., & Zhang, S. M. (2000). Management of human error in shipping operations. *Professional safety*, ***45***(10), 23.
- Wang, J., Zhou, Y., Zhuang, L., Shi, L., & Zhang, S. (2022). Study on the critical factors and hot spots of crude oil tanker accidents. *Ocean & Coastal Management*, **217**, 106010. DOI: https://doi.org/10.1016/j.ocecoaman.2021.106010.
- Wang, S., Psaraftis, H.N., Qi, J. (2021). Paradox of International Maritime Organisation's carbon intensity indicator. Communications in *Transportation Research*, DOI: https://doi.org/10.1016/j.commtr.2021.100005.
- Wang, S., Zheng, L., Psaraftis, H.N. (2020). Three potential benefits of the EU and IMO's landmark efforts to monitor carbon dioxide emissions from shipping, *Frontiers of Engineering Management*, **8**(2), 310-311. DOI: https://doi.org/10.1007/s42524-020-0096-2.
- Wang, S., Zheng, L., Psaraftis, H.N., Yan, R. (2021). Implications of the EU's inclusion of maritime transport in Emissions Trading System for shipping companies, *Engineering*, **7**(5), 554-557. DOI: https://doi.org/10.1016/j.eng.2021.01.007.
- Wang, Z., Countryman, A. M., Corbett, J. J., & Saebi, M. (2022). Economic and environmental impacts of ballast water management on Small Island Developing States and Least Developed Countries. *Journal of Environmental Management*, **301**, 113779. DOI: https://doi.org/10.1016/j.jenvman.2021.113779.
- Wang, Z., Nong, D., Countryman, A. M., Corbett, J. J., & Warziniack, T. (2020). Potential impacts of ballast water regulations on international trade, shipping patterns, and the global economy: An integrated transportation and economic modeling assessment. *Journal of Environmental Management*, **275**, 110892. DOI: https://doi.org/10.1016/j.jenvman.2020.110892.
- Wang, Z., Saebi, M., Grey, E. K., Corbett, J. J., Chen, D., Yang, D., & Wan, Z. (2022). Ballast water-mediated species spread risk dynamics and policy implications to reduce the invasion risk to the Mediterranean Sea. *Marine Pollution Bulletin*, **174**, 113285. DOI: https://doi.org/10.1016/j.marpolbul.2021.113285.
- Ward, L. (1981). The SDR in transport liability conventions: some clarification. *J. Mar. L. & Com.*, **13**, 1.

- Watanabe, M. D. B., Cherubini, F., & Cavalett, O. (2022). Climate change mitigation of drop-in biofuels for deep-sea shipping under a prospective life-cycle assessment. *Journal of Cleaner Production*, **364**, 132662. DOI: https://doi.org/10.1016/j.jclepro.2022.132662.
- Watanabe, Y., & Koyanagi, S. (2016). Development and installation of marine-use hybrid SOx scrubber system that complies with IMO SOx emission regulations. *Mitsubishi Heavy Ind. Tech. Rev*, **53**, 48.
- Wernli, D., Harbarth, S., Levrat, N., & Pittet, D. (2022). A 'whole of United Nations approach'to tackle antimicrobial resistance? A mapping of the mandate and activities of international organisations. *BMJ global health*, **7**(5), e008181. DOI: http://dx.doi.org/10.1136/bmjgh-2021-008181.
- Werschkun, B., Banerji, S., Basurko, O. C., David, M., Fuhr, F., Gollasch, S., ... & Höfer, T. (2014). Emerging risks from ballast water treatment: The run-up to the International Ballast Water Management Convention. *Chemosphere*, **112**, 256-266. DOI: https://doi.org/10.1016/j.chemosphere.2014.03.135.
- Wilkinson, A., Hill, M., & Gollan, P. (2001). The sustainability debate. *International Journal of Operations & Production Management*, **21**(12), 1492-1502. DOI: https://doi.org/10.1108/01443570110410865.
- Wolfe, D., Michel, J., Hameedi, M. J., Payne, J. R., Galt, J. A., Watabayashi, G., ... & Rice, S. (1994). The fate of the oil spilled from the Exxon Valdez. *Environmental science & technology*, **28**(13), 560A-568A. DOI: https://doi.org/10.1021/es00062a001.
- Woo, J., Fatima, R., Kibert, C. J., Newman, R. E., Tian, Y., & Srinivasan, R. S. (2021). Applying blockchain technology for building energy performance measurement, reporting, and verification (MRV) and the carbon credit market: A review of the literature. *Building and Environment*, **205**, 108199. DOI: https://doi.org/10.1016/j.buildenv.2021.108199.
- Wood, P. J. (1995). OPA 90. *Maritime Policy and Management*, **22**(3), 201-208. DOI: https://doi.org/10.1080/03088839500000053.
- Woods, D. W., & Weinkle, J. (2020). Insurance definitions of cyber war. *The Geneva Papers on Risk and Insurance-Issues and Practice*, **45**(4), 639-656. DOI: https://doi.org/10.1057/s41288-020-00168-5.

- Woods, J. M. (2008). Going on Twenty Years-The Oil Pollution Act of 1990 and Claims Against the Oil Spill Liability Trust Fund. *Tul. L. Rev.*, **83**, 1323.
- Wu, C. (2002). Liability and compensation for bunker pollution. J. Mar. L. & Com., **33**, 553.
- Wu, Z., Chen, R., Meadows, M. E., & Liu, X. (2021). Application of the Ocean Health Index to assess ecosystem health for the coastal areas of Shanghai, *China. Ecological Indicators*, **126**, 107650. DOI: https://doi.org/10.1016/j.ecolind.2021.107650.
- Wurman, I. (2020). The Origins of Substantive Due Process. *The University of Chicago Law Review*, **87**(3), 815–881. https://www.jstor.org/stable/26910604.
- Xiao, Y., Wang, G., Lin, K. C., Qi, G., & Li, K. X. (2020). The effectiveness of the new inspection regime for port state control: Application of the Tokyo MoU. *Marine policy*, **115**, 103857. DOI: https://doi.org/10.1016/j.marpol.2020.103857.
- Xing, W., & Zhu, L. (2021). A functional approach to reassessing the legal status and navigational rights of ships and ship-shaped structures. *Transport Policy*, **106**, 120-130. DOI: https://doi.org/10.1016/j.tranpol.2021.03.025.
- Xu, H., & Yang, D. (2020). LNG-fuelled container ship sailing on the Arctic Sea: Economic and emission assessment. *Transportation Research Part D: Transport and Environment*, **87**, 102556. DOI: https://doi.org/10.1016/j.trd.2020.102556.
- Yan, R., Mo, H., Guo, X., Yang, Y., & Wang, S. (2022). Is port state control influenced by the COVID-19? Evidence from inspection data. *Transport Policy*, **123**, 82-103. DOI: https://doi.org/10.1016/j.tranpol.2022.04.002.
- Yan, R., & Wang, S. (2019). Ship inspection by port state control—review of current research. *Smart Transportation Systems 2019*, **149**, 233-241. DOI: 10.1007/978-981-13-8683-1_24.
- Yan, R., Wang, S., & Peng, C. (2022). Ship selection in port state control: status and perspectives. *Maritime Policy & Management*, **49**(4), 600-615. DOI: https://doi.org/10.1080/03088839.2021.1889067.
- Yan, R., Wang, S., & Psaraftis, H. N. (2021). Data analytics for fuel consumption management in maritime transportation: Status and perspectives. *Transportation Research Part E: Logistics and Transportation Review*, ***155,*** 102489. DOI: https://doi.org/10.1016/j.tre.2021.102489.

- Yan, R., Zhuge, D., & Wang, S. (2021). Development of two highly-efficient and innovative inspection schemes for PSC inspection. *Asia-Pacific Journal of Operational Research*, **38**(03), 2040013. DOI: https://doi.org/10.1142/S0217595920400138.
- Yang, H. S., & Noh, C. K. (2010). A study on the Change of Domestic Marine Accidents and Insurance Rates according to Enforcement of ISM Code. *Journal of the Korean Society of Marine Environment & Safety*, **16**(1), 65-69.
- Yang, S. (2020). Trade for the environment: transboundary hazardous waste movements after the Basel Convention. *Review of Policy Research*, **37**(5), 713-738. DOI: https://doi.org/10.1111/ropr.12386.
- Yang, Z. L., Wang, J., & Li, K. X. (2013). Maritime safety analysis in retrospect. *Maritime Policy & Management*, **40**(3), 261-277. DOI: https://doi.org/10.1080/03088839.2013.782952.
- Yang, Z., Yang, Z., & Teixeira, A. P. (2020). Comparative analysis of the impact of new inspection regime on port state control inspection. *Transport Policy*, **92**, 65-80. DOI: https://doi.org/10.1016/j.tranpol.2020.04.009.
- Yang, Z., Yang, Z., Yin, J., & Qu, Z. (2018). A risk-based game model for rational inspections in port state control. *Transportation Research Part E: Logistics and Transportation Review*, **118**, 477-495. DOI: https://doi.org/10.1016/j.tre.2018.08.001.
- Yıldız, E. (2020). The Conflict Between Greece And Turkey In The Mediterranean Sea (International Maritime Law Study). *Jurnal Hukum*, **36**(2), 126-138. DOI: http://dx.doi.org/10.26532/jh.v36i2.11393.
- Young, C. (1995). Comprehensive Revision of the STCW convention: an overview. *J. Mar. L. & Com.*, **26**, 1.
- Young, R. (1958). The Geneva Convention on the continental shelf: a first impression. *American Journal of International Law*, **52**(4), 733-738. DOI: https://doi.org/10.2307/2195594.
- Yorulmaz, M., & Karabulut, K. (2022). Analyzing the factors determining the effectiveness of the international safety management code applied on ships through the fuzzy DEMATEL method. *Safety science*, **155**. DOI: https://doi.org/10.1016/j.ssci.2022.105872.

- Yu, Y. (2021). Exploring the Effectiveness of New Inspection Regime on Port State Control. *Frontiers in Economics and Management*, **2**(6), 402-406. DOI: 10.6981/FEM.202106_2(6).0063.
- Yu, Y., Lorenc, M., & Shao, Y. (2022). Legal Challenges in Protecting the Rights of Cruise Ship Crew at the Post COVID-19 Pandemic Era. *Sustainability*, **14**(16), 9875. DOI: https://doi.org/10.3390/su14169875.
- Yu, Y., Zhao, Y., & Chang, Y. C. (2018). Challenges to the primary jurisdiction of flag states over ships. *Ocean Development & International Law*, **49**(1), 85-102. DOI: https://doi.org/10.1080/00908320.2017.1370919.
- Yuan, C. C., Chiu, R. H., & Cai, C. (2020). Important Factors Influencing the Implementation of Independent Port State Control Regimes. *Journal of Marine Science and Engineering*, **8**(9), 641. DOI: https://doi.org/10.3390/jmse8090641.
- Yuen, K. F., Li, K. X., Xu, G., Wang, X., & Wong, Y. D. (2019). A taxonomy of resources for sustainable shipping management: Their interrelationships and effects on business performance. *Transportation Research Part E: Logistics and Transportation Review*, **128**, 316-332. DOI: https://doi.org/10.1016/j.tre.2019.06.014.
- Yusuf, A. A., Inambao, F. L., & Ampah, J. D. (2022). Evaluation of biodiesel on speciated PM2. 5, organic compound, ultrafine particle and gaseous emissions from a low-speed EPA Tier II marine diesel engine coupled with DPF, DEP and SCR filter at various loads. *Energy*, **239**, 121837. DOI: https://doi.org/10.1016/j.energy.2021.121837.
- Žaglinskis, J., Rapalis, P., & Lazareva, N. (2018). An overview of natural gas use in ships: necessity and engine supply. Periodica *Polytechnica Transportation Engineering*, **46**(4), 185-193. DOI: https://doi.org/10.3311/PPtr.11708.
- Zec, D., Frančić, V., & Rudan, I. (2008). An Analysis of the Security Issues in Croatian Ports in Relation to the Port State Control Inspections. *Promet-Traffic&Transportation*, **20**(1), 31-36. Available at: http://traffic.fpz.hr/index.php/PROMTT/article/view/983.
- Zhang, A., Boardman, A. E., Gillen, D., & Waters, I. I. W. G. (2004). Towards estimating the social and environmental costs of transportation in Canada. *Report for Transport Canada*, **7**.

- Zhang, S., Chen, J., Wan, Z., Yu, M., Shu, Y., Tan, Z., & Liu, J. (2021). Challenges and countermeasures for international ship waste management: IMO, China, United States, and EU. *Ocean & Coastal Management*, **213**, 105836. DOI: https://doi.org/10.1016/j.ocecoaman.2021.105836.
- Zhang, Y., & Sun, Z. (2021). The Coevolutionary Process of Maritime Management of Shipping Industry in the Context of the COVID-19 Pandemic. *Journal of Marine Science and Engineering*, **9**(11), 1293. DOI: https://doi.org/10.3390/jmse9111293.
- Zhao, Y., & Chang, Y. C. (2014). A comparison of ship-recycling legislation between Chinese law and the 2009 Hong Kong convention. *Ocean Development & International Law*, **45**(1), 53-66. DOI: https://doi.org/10.1080/00908320.2013.839157.
- Zheng, L. (2020). The effectiveness of new inspection regime on port state control inspection. *Open Journal of Social Sciences*, **8**(08), 440. 10.4236/jss.2020.88036.
- Zhou, Q., Du, Z., Liu, J., Liang, J., & Jiao, Y. (2021). Factors influencing green ship recycling: A conceptual framework and modeling. *Journal of Cleaner Production*, **322**, 129155. DOI: https://doi.org/10.1016/j.jclepro.2021.129155.
- Zhu, G. (2020). STCW Convention Changes and Its Impact on Crew. *International Journal of Social Science and Education Research*, **3**(4), 170-176. DOI: 10.6918/IJOSSER.202004_3(4).0022.
- Zhuo, R. (2020). THE HNS CONVENTION: WILL IT BE A GAME CHANGER FOR CHINA'S MARINE POLLUTION LAW? *Natural Resources Journal*, **60**(2), 207–238. https://www.jstor.org/stable/26975590.
- Zis, T. P., Psaraftis, H. N., Panagakos, G., & Kronbak, J. (2019). Policy measures to avert possible modal shifts caused by sulphur regulation in the European Ro-Ro sector. *Transportation Research Part D: Transport and Environment*, **70**, 1-17. DOI: https://doi.org/10.1016/j.trd.2019.03.001.
- Zis, T. P., & Cullinane, K. (2020). The desulphurisation of shipping: Past, present and the future under a global cap. *Transportation Research Part D: Transport and Environment*, **82**, 102316. DOI: https://doi.org/10.1016/j.trd.2020.102316.

- Zis, T., Psaraftis, H.N., Ding, L. (2020). Ship weather routing: a taxonomy and survey, *Ocean Engineering*, **213**, 107697. DOI: 10.1016/j.oceaneng.2020.107697.
- Zis, T., Psaraftis, H.N., Tillig, F., Ringsberg, J. (2020). Decarbonizing maritime transport: A RoPax case study. *Research in Transportation Business and Management*, **37**, 100565. DOI: https://doi.org/10.1016/j.rtbm.2020.100565.
- Zis, T., Psaraftis, H.N. (2021). Impacts of short-term measures to decarbonize maritime transport on perishable cargoes, *Maritime Economics and Logistics*, **24**(3), 602-629. DOI: https://doi.org/10.1057/s41278-021-00194-7.
- Zisi, V., Psaraftis, H.N., Zis, T. (2021). The impact of the global sulfur cap on CO2 emissions, *Maritime Business Review*, **6**(4), 339-357. DOI: https://doi/10.1108/MABR-12-2020-0069.
- Zis, T. P., Cullinane, K., & Ricci, S. (2022). Economic and environmental impacts of scrubbers investments in shipping: a multi-sectoral analysis. *Maritime Policy & Management*, **49**(8), 1097-1115. DOI: https://doi.org/10.1080/03088839.2021.1937742.

c. Case Law

- *Action Navigation Inc v Bottigliere di Navigatione SpA (The Kitsa) [2005] EWHC 177.*
- *Aggeliki Charis Compania Maritima SA v Pagnan SpA (The Angelic Grace)* [1995] 1 Lloyd's Rep 87.
- *Agile Holdings Corp v Essar Shipping Ltd (The Maria)* [2018] EWHC 1055 (Comm); [2018] Bus L R 1513.
- *Alianca Navegacao e Logistica Ltda v Ameropa SA (The Santa Isabella) [2019]* EWHC 3152 (Comm).
- *Amlin Corporate Member Ltd v Oriental Assurance Corp. [2014] EWCA Civ 1135; [2014]* 2 Lloyd's Rep 561.
- *Amoco Cadiz*, 954 F.2d 1279 (7th Cir. 1992).
- *Ark Shipping Co LLC v Silverburn Shipping (IoM) Ltd (The Arctic) [2019]* EWCA Civ 1161.
- *Barclays Bank plc v Nylon Capital LLP* [2011] 2 Lloyd's Rep 347 (CA)
- *Bayview v Mitsui [2002] EWCA Civ 1605;* [2003] 1 Lloyd's Rep 131.

- *Bilgent Shipping PTE Ltd v ADM International Sarl (The Alpha Harmony)* [2019] EWHC 2522 (Comm).
- *Bottiglieri di Navigazione Spa v Cosco Qingdao Ocean Shipping Co (The Bunga Saga Lima) [2005]* EWHC 244; [2005] 2 Lloyd's Rep 1.
- *Bremer Vulkan Schiffbau und Maschinenfabrik Respondents v South India Shipping Corporation Ltd* [1981] AC 909 (HL).
- *Brownsville Holdings Ltd v Adamjee Insurance Co Ltd (The Milasan).* [2000] 2 All ER (Comm) 803; [2000] 2 Lloyd's Rep 458.
- *BS &N. Ltd. v. Micado Shipping Ltd.(Malta)(The" Seaflower"),* [2001] Lloyd's Rep 1 341 (2001).
- *Bunge Corporation v Tradax Export SA [1981] 1 WLR 711; [1981] 2 Lloyd's Rep 1.*
- *BW Gas AS v JAS Shipping Ltd* [2010] EWCA Civ 68.
- *C-Trade of Geneva SA v Uni-Ocean Lines Pte of Singapore (The Lucille)* [1984] 1 Lloyd's Rep 244 (CA).
- *Channel Tunnel Group Ltd v Balfour Beatty Construction Ltd.* [1993] AC 334.
- *Classic Maritime Inc v Limbungan Makmur Sdn Bhd* [2019] EWCA Civ 1102; [2019] 4 All ER 1145.
- *Cobelfret Bulk Carriers NV v Swissmarine Services SA (The Lowlands Orchid)* [2009] EWHC 2883 (Comm).
- *Corfu Navigation Co v Mobil Shipping Co (The Alpha) (No 2)* [1991] 2 Lloyd's Rep 515.
- *Dallah Real Estate and Tourism Holding Co v The Ministry of Religious Affairs, Government of Pakistan* [2010] 2 Lloyd's Rep 691.
- *Decorum Investments Ltd v Atkin (The Elena G)* [2001] 2 Lloyd's Rep 378.
- *DGM Commodities Corp v Sea Metropolitan SA (The Andra*) [2012] EWHC 1984 (Comm); [2012] 2 Lloyd's Rep 587.
- *Dolphin Tanker Srl v Westport Petroleum Inc (The Savina Caylyn)* [2010] EWHC 2617 (Comm).
- *Dreymoor Fertilisers Overseas PTE Ltd v Eurochem Trading GmbH* [2018] EWHC 909 (Comm).
- *Eagle Star Insurance Co Ltd v Games Video Co (GVC) SA (The Game Boy),* [2004] EWHC 15 (Comm); [2004] 1 Lloyd's Rep 238.

- *EL Oldendorff & Co GmbH v Tradax Export SA (The Johanna Oldendorff)* [1973] 2 Lloyd's Rep 285.
- *ENE 1 Kos Limited v Petroleo Brasileiro SA (The Kos)* [2012] UKSC 17.
- *Enercon GmbH v Enercon (India) Ltd* [2012] 1 Lloyd's Rep 519.
- *England and Wales Cricket Board Ltd v Danish Kaneria [2013]* EWHC 1074 (Comm).
- *Fiona Trust & Holding Corp v. Privalov,* [2007] U.K.H.L. 40 (2007).
- *Firma C-Trade SA v Newcastle Protection & Indemnity Association (The Fanti) and Socony Mobil Oil Inc and Others v West of England Shipowners Mutual Insurance Association (London) Ltd* (No 2) (The Padre Island) [1990] 2 Lloyd's Rep 191.
- *F. & G. Sykes (Wessex) Ltd v Fine Fare Ltd [*1967] 1 Lloyd's Rep 53.
- *FW Woolworth Co. v. Contemporary Arts, Inc.*, 344 U.S. 228, 73 S. Ct. 222, 97 L. Ed. 276 (1952).
- *Gard Marine & Energy Ltd v China National Chartering Co Ltd (The Ocean Victory)* [2017] UKSC 35; [2017] 1 WLR 1793.
- *GE Frankona Reinsurance Ltd v CMM Trust No 1400 (The Newfoundland Explorer).* [2006] EWHC 429 (Admlty); [2006] Lloyd's Rep IR 704.
- *Glencore Grain Ltd v Flacker Shipping Ltd (The Happy Day)* [2002] 2 Lloyd's Rep 487.
- *Glencore International AG v Ryan (The Beursgracht) (No 1)* [2001] EWCA Civ 2051; [2002] 1 Lloyd's Rep 574.
- *Great American Insurance Company v. Bureau Veritas, 338 F. Supp. 999* (S.D.N.Y. 1972).
- *Greatship (India) Limited v Oceanografia SA de CV* [2012] EWHC 3468 (Comm).
- *HC Trading Malta Ltd v Tradeland Commodities SL* [2016] EWHC 1279 (Comm)
- *HIH Casualty & General Insurance Ltd v New Hampshire Insurance Co.* [2001] EWCA Civ 735; [2001] Lloyd's Rep IR 596.
- *Home Office v Dorset Ship Company Ltd* [1970] AC 1004.
- *Hong Kong Fir Shipping Co Ltd v Kawasaki Kisen Kaisha Ltd* [1962] 2 QB 26; [1961] 2 Lloyd's Rep 478.

- *Insurance Co of Africa v Scor (UK) Reinsurance Co Ltd* [1985] 1 Lloyd's Rep 312
- *Itagrani Export SA v Care Shipping Corp (The Cebu)* (No 2) [1990] 2 Lloyd's Rep 316.
- *JA Chapman & Co Ltd (In Liquidation) v Kadirga Denizcilik ve Ticaret AS* [1998] Lloyd's Rep IR 377.
- *K Shipping Co Ltd v BB Energy (Asia) Pte Ltd* [2000] 1 All ER (Comm) 810.
- *Kerr LJ General Reinsurance Corp v Forsakringsaktiebolaget Fennia Patria* [1983] QB 856; [1983] 2 Lloyd's Rep 287.
- *Kodros Shipping Corp v Empresa Cubana de Fletes (The Evia) (No 2)* [1982] 2 Lloyd's Rep 307.
- *Kosmar Villa Holidays Plc v Trustees of Syndicate 1243* [2008] EWCA Civ 147; [2008] Lloyd's Rep IR 489.
- *Kuwait Airways Corp & Anor v Kuwait Insurance Co SAK [*1999] CLC 934.
- *Landcatch Ltd v. International Oil Pollution Compensation Fund*, 1999 Lloyd 2, 1999 Lloyd's Rep. 2 316 (1999).
- *Leeds Shipping Co v Societe Francaise Bunge (The Eastern City)* [1958] 2 Lloyd's Rep 127.
- *Leyland Shipping Company Ltd v Norwich Union Fire Insurance Society Ltd* [1918] AC 350.
- *London Arbitration* 11/96 LMLN 442.
- *London Arbitration* 6/99 LMLN 504.
- *Maestro Bulk Ltd v Cosco Bulk Carrier Co Ltd (The Great Creation)* [2014] EWHC 3987 (Comm).
- *Marc Rich & Co AG v Portman* [1997] 1 Lloyd's Rep 225.
- *Maredelanto Compania Naviera SA v Bergbau-Handel GmbH (The Mihalis Angelos)* [1970] 2 Lloyd's Rep 43.
- *Marida Ltd v Oswal Steel (The Bijela)* [1994] 2 Lloyd's Rep 1.
- *Markappa Inc v N W Spratt & Son Ltd (The Arta)* [1985] 1 Lloyd's Rep 534.
- *Mitera Marigo v Owners of Fritz Thyssen (The Fritz Thyssen)* [1967] 1 All ER 628.
- National Ability SA v Tinna Oils & Chemicals Ltd (The Amazon Reefer) [2010] 1 Lloyd's Rep 222, [5] (CA).

- *Navalmar UK Ltd v Kalemaden Hammeddeler Sanayi Ve Ticaret AS (The Arundel Castle)* [2017] EWHC 116 (Comm); [2017] Lloyd's Rep Plus 22.
- *New Hampshire Insurance Co Ltd v MGN Ltd* [1997] LRLR 24.
- *Nima SARL v Deves Insurance. [2002] EWCA Civ 1132;* [2003] 2 Lloyd's Rep 327.
- *Nippon Yusen Kaisha v Marocaine de L'Industrie du Raffinage* (The Tsukuba Maru) [1979] 1 Lloyd's Rep 459. Contrast, e.g. cl 7.3.2 of BPVOY 4.
- *North Star Shipping Ltd v Sphere Drake Insurance Plc* [2006] EWCA Civ 378; [2006] 2 Lloyd's Rep 183.
- *Ocean Crown (Owners) & Ors v Five Oceans Salvage Consultants Ltd (The Ocean Crown) [*2009] EWHC 3040 (Admlty); [2009] 2 CLC 878.
- *Ocean Pride Maritime Ltd Partnership v Qingdao Ocean Shipping Co* [2007] EWHC 2796 (Comm); [2008] 1 Lloyd's Rep 511.
- *Pan Atlantic Insurance Co Ltd v Pine Top Insurance Co Ltd. [1995] 1 AC 501; [1994]* 2 Lloyd's Rep 427.
- *Pratt v Aigaion Insurance Co SA [2008] EWCA Civ 1314; [2009]* Lloyd's Rep IR 149.
- *Universo Insurance Co of Milan v Merchants Marine Insurance Co Ltd [1897]* 2 QB 93.
- *Samuel v. Dumas, [1924]* A.C. 431 (1924).
- *Scott v Avery (1856)* 10 ER 1121.
- *Semco Salvage & Marine Pte Ltd v. Lancer Navigation Co Ltd (The Nagasaki Spirit), 1997* Lloyd 1 (1997).
- *Societe de Distribution de Toutes Merchandises en Cote-D'Ivoire v Continental Lines NV (The Sea Miror)* [2015] EWHC 1747; [2015] 2 Lloyd's Rep 395.
- *Spar Shipping AS v Grand China Logistics Holding (Group) Co* Ltd [2016] EWCA Civ 982.
- *Starlight Shipping Co v Allianz Marine & Aviation Versicherungs AG (The Alexandros T) [*2014] 2 Lloyds Rep 544 (CA).
- *Suez Fortune Investments Ltd v Talbot Underwriting Ltd (The Brillante Virtuoso)* [2019] EWHC 2599 (Comm); [2019] 2 Lloyd's Rep 485.
- *Thames & Mersey Marine Insurance Co v Hamilton, Fraser & Co, The Inchmaree* [1887] 12 App Cas 484.

- *Tidebrook Maritime Corporation v Vitol SA (The Front Commander)* [2006] 2 Lloyd's Rep 251 (CA).
- *Torvald Klaveness A/S v Arni Maritime Corporation (The Gregos)* [1995] 1 Lloyd's Rep 1.
- *Trafigura Beheer BV v Ravennavi SpA (The Port Russel)* [2013] EWHC 490 (Comm); [2013] 2 Lloyd's Rep 57.
- *Transnational Inc v Tanoh* [2015] EWHC 1874 (Comm).
- *The Alexandros T.2 [2014] Lloyds Rep 544 (CA).*
- *The Angelic Grace [1995] 1 Lloyd's Rep 87 (CA)*
- *The Antclizo (No. 2) [1992] 1 Lloyd's Rep 558.*
- *The Cythera* [1965] 2 Lloyd's Rep 454.
- *The Houda [1994]* 2 Lloyd's Rep 541.
- *The Ira [1995] 1 Lloyd's Rep 103.*
- *The Marika M* [1981] 2 Lloyd's Rep 622.
- *The Mount Apo and the Hanjin Ras Laffan* [2019] SGHC 57; [2019] 2 Lloyd's Rep 287.
- *The Playa Larga* [1983] 1 Lloyd's Rep 171 (CA).
- *The Prestige (No. 2)* [2015] 2 Lloyd's Rep 33.
- *The Pythia* [1982] 2 Lloyd's Rep 160.
- *The Sea Eagle* [2011] EWHC 1438 (Admlty); [2012] 2 Lloyd's Rep 37.
- *The Unique Mariner (No 2)* [1979] 1 Lloyd's Rep 37.
- *Transgrain Shipping (Singapore) Pte Ltd v Yangtze Navigation (Hong Kong) Co Ltd (The Yangtze Xing Hua)* [2017] EWCA Civ 2107.
- *Trygg Hansa Insurance Co Ltd v Equitas Ltd* [1998] CLC 979; [1998] 2 Lloyd's Rep 439.
- *Walkinshaw v Diniz* [2000] 2 All ER (Comm) 237.
- *Wells and Another (Paupers) Appellant v The Owners of the Gas Float Whitton No 2 Respondents (The Gas Float Whitton No 2)* [1896] P 42 (CA), [1897] AC 337 (HL).
- West Tankers Inc V Allianz SpA (The Front Comor) [2012] EWCA Civ 27.
- *Western Bulk Ship-owning III A/S v Carbofer Maritime Trading ApS (The Western Moscow)* [2012] EWHC 1224, 2 Lloyd's Rep 163.
- *Western Trading Ltd v Great Lakes Reinsurance* (UK) Plc [2015] EWHC 103 (QB).

- *Whistler International v Kawasaki Kisen Kaisha Ltd (The Hill Harmony)* [2001] 1 Lloyd's Rep 147.
- *Yorkshire Insurance Co Ltd v Nisbet Shipping Co Ltd* [1961] 1 Lloyd's Rep 479.
- *Youell v Bland Welch & Co* (No. 1) [1992] 2 Lloyd's Rep 127.
- *Yuzhny Zavod Metall Profil LLC v EEMS Beheerder BV (The Eems Solar)* [2013] 2 Lloyd's Rep 487.

d. Conferences

- Abaei, M. M., Arzaghi, E., Abbassi, R., & Garaniya, V. (2017). Human error risk assessment for shipping maintenance procedures in harsh environments. *In Proceedings of the 3rd Workshop and Symposium on Safety and Integrity Management of Operations in Harsh Environments (C-RISE3)* (pp. 1-6). Memorial University Newfoundland.
- Ahmad, M. R. (2011). The Manila Amendments to the STCW Convention and Code–An Overview. *The paper was presented at National Maritime Conference on The Manila Amendments to the STCW Convention and Code–How Do They Impact You*, Malaysia.
- Aksu, S., Vassalos, D., Tuzcu, C., Mikelis, N., & Swift, P. (2004). A risk-based design methodology for pollution prevention and control. *In International Conference on Design and Operation of Double Hull Tankers* (pp. 1-9).
- Alexopoulos A.B., (1998). Tanker Accidents as a Modern Factor in configuring the Chartering Market, *Proceedings: Safety of Maritime Transport*, University of Piraeus, 320-333 (in Greek).
- Alexopoulos, A. B., Katarelos, E. D., Fournarakis, N., Sakkas, K., & Avjiyannis, K. (2001, January). A Critical Analysis of the IMO's Conventions and Codes from the Techno-Economic & Managerial perspectives. *In Proceedings of International Conference on: Technology and Environment*, University of Piraeus.
- Alexopoulos, A. B., & Theotokas, I. N. (1998). Shipping Management in the post-ISM Code period. The case of dry bulk shipping companies. In *4th International Symposium in Quantitative Analysis, University of the Aegean* (pp. 7-9).

- Almeida, Maria Fatima Ludovico de, Mueller, Gabriela, & Garcia, Luciano Maldonado. (2009) *Evaluation model applied to TRANSPETRO's Marine Terminals Standardization Program.* Brazil.
- Bayer, P., & Aklin, M. (2020). The European Union emissions trading system reduced CO2 emissions despite low prices. *Proceedings of the National Academy of Sciences*, **117**(16), 8804-8812. DOI: https://doi.org/10.1073/pnas.1918128117.
- Beckman, R., & Davenport, T. (2012, May). The EEZ regime: reflections after 30 years. In *LOSI Conference papers* (Vol. 27).
- Bérengier, M., & Garai, M. (2001). A state-of-the-art of in situ measurement of the sound absorption coefficient of road pavements. In *11th International Congress on Acoustics*, Rome, Italy (Vol. 2).
- Björkman, A., & v Goethe, J. W. (1998, January). Lies and Truths about the M/V Estonia Accident. Monaco: EGC.
- Bovet, D. M. (1993). OPA 90 and the Shipowner. In *International Oil Spill Conference* (Vol. 1993, No. 1, pp. 733-738). American Petroleum Institute.
- Bovet, D. (1995). CERTIFICATES OF FINANCIAL RESPONSIBILITY: CAN THE TRAIN WRECK BE AVERTED? In *International Oil Spill Conference* (Vol. 1995, No. 1, pp. 245-247). American Petroleum Institute.
- Boviatsis M., Alexopoulos A.B., Polemis D. (2019) Problems related to Ship Recycling IMO Regulations - *Proceedings of the 16th International Conference on Environmental Science and Technology*. 4-7 September 2019. Rhodes, Greece.
- Boviatsis, M., Alexopoulos, A. B., & Theodosiou, M. (2019). A Proactive International Regulation System Based on Technological Innovations against Emerging Environmental Threats. *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.
- Boviatsis, M., Alexopoulos, A. B., Vlachos, G. P., and Samiotis, G. (2019). "Chemical Tanker Accidents and the 2010 HNS Convention." *In Proceedings of the 16th International Conference on Environmental Science and Technology*, 4 to 7 September 2019, Rhodes, Greece.
- Boviatsis, M., & Tselentis, B. (2019). A comparative analysis between EU MRV and IMO DCS—the need to adopt a harmonised regulatory system. *In*

Proceedings of the 16th International Conference on Environmental Science and Technology, 4 to 7 September 2019, Rhodes, Greece.

- Boviatsis, M., Alexopoulos, A.B. & Vlachos, G.P. (2020) An economic perspective of P&I Clubs' evolution as the dominant source of Insurance in the Shipping Market. *IAME* 2020.
- Boviatsis, M. 2021. "A Comparative Analysis upon the Utilization of Exhaust Gas Cleaning Systems, LNG Fuels or Conventional Fuels as the Most Viable Options to Comply with the New IMO Low Sulfur Cap Regulations." In Proceedings of the *17th International Conference on Environmental Science and Technology*, Athens, Greece, 1 to 4 September 2021. DOI: https://doi.org/10.30955/gnc2021.00854.
- Boviatsis M., Tselentis V., Polemis D. (2021). Practical impediments to the effective utilisation of Ballast Water Management Plan from Port facilities and Shipping practice, *17th International Conference on Environmental Science and Technology*, Athens, Greece, 1 to 4 September 2021. DOI: https://doi.org/10.30955/gnc2021.00536.
- Boviatsis, M. & Vlachos G. (2021) The Implementation of Risk Management processes as a contributing factor to the minimization of shipping disasters through the study of previous shipping accidents - *Proceedings of the 17th International Conference on Environmental Science and Technology*. 1-4 September 2021. Athens, Greece. DOI: https://doi.org/10.30955/gnc2021.00541.
- Boviatsis, M., Vlachos G. & Daniil G. (2021) Evaluation of environmental impact assessment factors in maritime industry - Proceedings of *the 17th International Conference on Environmental Science and Technology*. 1-4 September 2021. Athens, Greece.
- Bryant, D. L. (2017). Exxon Valdez and OPA 90: How congressional reaction to a major oil spill changed the US Coast Guard. *Coast Guard Journal of Safety & Security at Sea, Proceedings of the Marine Safety & Security Council*, **74**(2).
- Burmeister, H. C., Bruhn, W. C., Rødseth, Ø. J., & Porathe, T. (2014). Can unmanned ships improve navigational safety?. In *Proceedings of the Transport Research Arena*, TRA 2014, 14-17 April 2014, Paris.

- Caban, J., Brumerčík, F., Vrábel, J., Ignaciuk, P., Misztal, W., & Marczuk, A. (2017). Safety of maritime transport in the Baltic Sea. In *MATEC web of conferences* (Vol. 134, p. 00003). EDP Sciences.
- Celik, M. (2008, October). Setting the Concept of Integrated Contingency Management Execution Plan (ICMEP) for Shipping Business. In Issues in Global Business and Management Research: *Proceedings of the 2008 International Online Conference on Business and Management* (IOCBM 2008) (p. 345). Universal-Publishers.
- Chockalingam, G., Sivasami, K., & Thangalakshmi, S. (2022,). Ship Recycling-The Need of A Life Cycle Approach. In OCEANS 2022-Chennai (pp. 1-4). IEEE. DOI: 10.1109/OCEANSChennai45887.2022.9775343.
- Ciecko, A., Oszczak, S., & Jarmolowski, W. (2008, January). Official Voluntary Certification of GNSS Instruments and Observers for IACS On-the-Spot Checks. In *Proceedings of the 2008 National Technical Meeting of The Institute of Navigation* (pp. 614-619).
- Corbett, C. R. (1993). Vessel response plan requirements: Observations by intertanko. In *International Oil Spill Conference* (Vol. 1993, No. 1, pp. 259-262). American Petroleum Institute.
- Edwards, D. T., & Pascoe, D. B. (1991). Outcome of the IMO Conference on International Co-Operation on Oil Pollution Preparedness and Response. In *International Oil Spill Conference* (Vol. 1991, No. 1, pp. 357-360). American Petroleum Institute. DOI: https://doi.org/10.7901/2169-3358-1991-1-357.
- Fang, Y., & Mejia Jr, M. Q. (2012). Reinforcing the Legal Framework for the Environmentally Friendly Recycling of Ships: A Brief Look at the Hong Kong Convention. *International Proceedings of Economics Development and Research*, **48**(20), 91-95. DOI: 10.7763/IPEDR. 2012.V48. 20.
- Ferreira, F., Alves, J., Leporati, C., Bertolini, A., & Bargelli, E. (2018). Current regulatory issues in the usage of autonomous surface vehicles. In *2018 OCEANS-MTS/IEEE Kobe Techno-Oceans (OTO)* (pp. 1-9). IEEE.
- Gan, X., Li, K. X., & Zheng, H. (2010). Inspection policy of a port state control authority. In *Proceedings of the International Forum on Shipping, Ports and Airports (IFSPA) 2010* (pp. 330-336).

- Gao, Y., Ben Zid, I., Lou, X., & Parekh, M. (2019). Operational Security Modeling and Analysis for IACS. In *INFORMATIK 2019: 50 Jahre Gesellschaft für Informatik–Informatik für Gesellschaft (Workshop-Beiträge)*. Gesellschaft für Informatik eV. DOI: 10.18420/inf2019_ws31.
- Gao, Z., Lu, G., Liu, M., & Cui, M. (2008, June). A novel risk assessment system for port state control inspection. In *2008 IEEE International Conference on Intelligence and Security Informatics* (pp. 242-244). IEEE. DOI: 10.1109/ISI.2008.4565068.
- Ghosh, S., Bowles, M., Ranmuthugala, D., & Brooks, B. (2014). On a lookout beyond STCW: Seeking standards and context for the authentic assessment of seafarers. *15th Annual general assembly International Association of Maritime Universities*, 77-86.
- Gritsenko, D., & Vehkalahti, K. (2013, August). Varying patterns in vessel operation quality and their governance implications. In *Proceedings of the International Forum on Shipping, Ports and Airports (IFSPA)*, Hong-Kong June 3-5, pp. 473-484.
- Hetherington, A. S., & Steyn, H. A. (1977, January). TOVALOP/CRISTAL. where we are and where we are going.[Tanker Owners Voluntary Agreement Concerning Liability for Oil Pollution]. *In API Div. Transp. 1977 Tanker Conference Proceedings*;(United States) (No. CONF-7706212-).
- Horn, G. E., Arima, T., Baumans, P., Bøe, A., & Ocakli, H. (2013). IACS Summary of the IMO GBS and the Harmonised Common Structural Rules. In *TSCF 2013 Shipbuilders Meeting*.
- Ivanova, G. (2021, September). Analysis of the Specifics in Calculating the Index of Existing Marine Energy Efficiency EEXI in Force since 2023. In 2021 *13th Electrical Engineering Faculty Conference* (BulEF) (pp. 1-4). IEEE.
- Kacmaz, E., Kara, G., & Yıldız, M. (2016). Evaluation of marine pollution caused by tanker ships and preventing under focus of the international regulations. *Proceedings book*, 318.
- Kanamaru, H. (2020, September). Requirements for IT/OT Cooperation in Safe and Secure IACS. In *2020 59th Annual Conference of the Society of Instrument and Control Engineers of Japan (SICE)* (pp. 39-44). IEEE.
- Katarelos, E. D., & Alexopoulos, A. B. (2007). The master's role in relation to the safety of the port, particularly under the concept of the ISM and the ISPS

codes. In *International Symposium on Maritime Safety, Security and Environmental Protection*, Athens (Greece), 20th September.

- Keradinidis, G., Aidonis, D., & Manikas, I. (2012). Maritime Operations and New Business Models Elaboration. In *2nd International Conference on Supply Chains*, Katerini, Greece.
- Lange, E. R. (2022). Unmanned Vessels and the Law. In International Conference *on Dynamics in Logistics* (pp. 191-203). Springer, Cham. DOI: https://doi.org/10.1007/978-3-031-05359-7_16.
- Lau, Y. Y., Tam, K. C., Ng, A. K., Nguyen, H. O., & Nikolova, N. (2017). Cruise shipping accidents in Asia: The trends, causal factors and implications. *18th Annual General Assembly of the International Association of Maritime Universities*, 1, 372-382.
- López López, M. N., Campa Portela, R. M. D. L., Bouza Prego, M. D. L. Á., & Sánchez Girón, J. R. (2022, June). Covid-19 control measures and its impact on seafarers' mental health. In *Maritime Transport Conference* (No. 9). Universitat Politècnica de Catalunya. Iniciativa Digital Politècnica.
- Marchand, P. (2017). The International Law Regarding Ship-Source Pollution Liability and Compensation: Evolution and Current Challenges. In *International Oil Spill Conference Proceedings* (Vol. 2017, No. 1, pp. 193-210). International Oil Spill Conference.
- Merkouris-Stylopoulos J. and Alexopoulos A.B., (2017). The Commercial and Economic Effects of Fuel Additives in the Maritime Industry in a heavily environmentally Regulated Market, *in 5th IC-SIM Conference Proceedings on Strategic Innovative Marketing*, (eds.)
- Michel, J., Gilbert, T., Etkin, D. S., Urban, R., Waldron, J., & Blocksidge, C. T. (2005, May). Potentially polluting wrecks in marine waters. In *Annals of the 2005 International Oil Spill Conference, Maio* (Vol. 16, pp. 1-84).
- Moroza, N., Hudenko, J., & Jurgelane-Kaldava, I. (2020, October). The development of the Baltic Sea Region as a centre of global logistics: The situation report and future prospects. *In International Conference on Reliability and Statistics in Transportation and Communication* (pp. 678-690). Springer, Cham.
- Morris, P. (2001). Emerging Issues for Classification Societies. *Australian and New Zealand Maritime Law Journal*, 9-9.

- Nistor, F. (2013). The Importance Of International Registries For Naval Transport. In *International Scientific Conference dedicated to European Maritime Day of 20th of May*, **1**, pp. 100-104.
- Obermeier, S., Schierholz, R., Hadeli, H., Enderlein, R. R., Hristova, A., & Locher, T. (2013, November). Secure management of certificates for industrial control systems. In *39th Annual Conference of the IEEE Industrial Electronics Society* (IECON 2013).
- Othman, E., & Halawa, A. (2005, October). Towards effective implementation of the ISPS Code onboard ships. In *International Association of Maritime Universities (IAMU) 6th Annual General Assembly and Conference, World Maritime University*.
- Paik, J. K., Kim, B. J., & Seo, J. K. (2007, January). Evaluation of IACS common structural rules in terms of ultimate limit state design and assessment of ship structures. In *International Conference on Offshore Mechanics and Arctic Engineering* (Vol. 42681, pp. 151-161).
- Park, K. O. (2003). Ship Security Alert System. In *Proceedings of KOSOMES biannual meeting* (pp. 109-122). The Korean Society of Marine Environment and safety.
- Pegum, T. (2004). The ISPS Code: The Mutual Dependency of Shipping and Cargo Interests. *Australian and New Zealand Maritime Law Journal*.
- Peppa, S. (2021, April). The Importance of Measuring the Performance of IMO Member States. In *SNAME 7th International Symposium on Ship Operations, Management and Economics*. OnePetro.
- Popa, L., & Dragomir, C. (2014, November). Performance Assessment of Ship Manning Service in Crewing Companies. In *5th International Conference LUMEN Transdisciplinarity and Communicative Action* (pp. 21-22).
- Porathe, T. (2014). Remote Monitoring and Control of Unmanned Vessels–The MUNIN Shore Control Centre. In *Proceedings of the 13th International Conference on Computer Applications and Information Technology in the Maritime Industries (COMPIT '14)* (pp. 460-467).
- Puscaciu, V., & Odubo Ebiere, S. (2019). Current Trends in Maritime Insurance. *EIRP Proceedings*, **14**(1).

- Rachma, T. R. N., & Kardono, P. (2021, April). Application of GIS to define a juridical bay as part of Indonesia's internal waters. *In IOP Conference Series: Earth and Environmental Science* (Vol. 739, No. 1, p. 012093). IOP Publishing.
- Rizzo, C. M., & Lo Nigro, A. (2008, January). A review of ship surveys practices and of marine casualties partly due to aging effects. In *International Conference on Offshore Mechanics and Arctic Engineering* (Vol. 48197, pp. 807-818). DOI: https://doi.org/10.1115/OMAE2008-57847.
- Rødseth, H., & Mo, B. (2016). Integrated planning in autonomous shipping—application of maintenance management and KPIs. *In Proceedings of the 10th world congress on engineering asset management (WCEAM 2015)* (pp. 497-504). Springer, Cham.
- Rødseth, Ø. J., Psaraftis, H.N., Krause, S., Raakjaer, J., Coelho, N.F (2020). AEGIS: Advanced, Efficient and Green Intermodal Systems, IOP Conference Series, Materials Science and Engineering, 929 012030, presented at the *3rd International Conference on Maritime Autonomous Surface Ship* (ICMASS 2020) 11-12 November 2020, Ulsan, South Korea.
- Rose, H., Lange, A. K., Hinckeldeyn, J., Jahn, C., & Kreutzfeldt, J. (2022). Investigating the Requirements of Automated Vehicles for Port-internal Logistics of Containers. In *International Conference on Dynamics in Logistics* (pp. 179-190). Springer, Cham.
- RUAN, W. (2017). Reviews of International Maritime Safety Management Philosophies and Approaches. In *Management Information and Optoelectronic Engineering: Proceedings of the 2016 International Conference on Management, Information and Communication (ICMIC2016) and the 2016 International Conference on Optics and Electronics Engineering (ICOEE2016)* (pp. 9-18).
- Seltmann, A. (2019). Global marine insurance report 2019. *In International Union of Marine Insurance (IUMI) Conference.*
- Smith, D. M. (1995). VESSEL RESPONSE PLANS: A TILE IN THE MOSAIC OF THE NATIONAL RESPONSE SYSTEM. In *International Oil Spill Conference* (Vol. 1995, No. 1, pp. 926-926). American Petroleum Institute.

- Snider, W. D. (1978). *IMCO* Conference on Tanker Safety and Pollution Prevention. *Marine Technology and SNAME News*, **15**(03), 297-307. DOI: https://doi.org/10.5957/mt1.1978.15.3.297.
- Spaniol, M. J. (2022). The Road (map) Not Taken: Navigating Sustainable Shipping Transitions. *In 7th World Maritime Technology Conference*.
- Stenstrom, B. (1979). Meeting the new IMCO safety and pollution prevention requirements. *Tanker Bulker Int*.;(United Kingdom), 2(1).
- Terminella, E. J. (2017). Standards of Training, Certification, and Watchkeeping: Why, what, and how?. *Coast Guard Journal of Safety & Security at Sea, Proceedings of the Marine Safety & Security Council*, *74*(2).
- Tian, M., Cai, H., and Zou, H. 2018. "Reducing the Carbon Emission in Shipping Industry—Application and Development of LNG Fueled Ships in China." *In Proceedings of the 7th International Conference on Energy, Environment and Sustainable Development (ICEESD 2018)*, pp. 271-5. Amsterdam: Atlantis Press.
- Trenkner, P., & Cole, C. (2010). Raising the Maritime English bar: The STCW Manila amendments and their impact on Maritime English. *In Proceedings of the 22nd international maritime English conference* (pp. 3-16).
- Vlachos G.P.-A. Lazopoulos: Overcapacity and International Maritime Policy. A Case Study: Problems and Perspectives of the Small-medium size companies in the Ship repairing and Shipbuilding Zone of PERAMA., Article presented in the IAME, (International Association of Maritime Economics) Conference, London 1997.
- Vlachos G.P.: «Economics of Not-Conformity and the Role of Flag-State», Article presented at the «2nd International Congress of Safety of Maritime Transport for the Department of Shipping and Enterprising Decisions of the University of the Aegean» (June 2001).
- Vlachos G.P.: «Marine Environmental Pollution and Ship repairing Zone of Piraeus: Institutional and Economic Approach», Article presented at the «5th International Conference on Traffic Science – ICTS 2001» (Oct 2001, Slovenia and Venice).
- Vlachos G.P.-Vavouras J.-Papagiannoulis K.: «Effects of the Globalization in Modern Merchant Shipping», Article presented at the «International Scientific

Congress of the University of Piraeus, Globalization: Illusions and Reaity» (Nov 2001).

- Vlachos G.P.-Nikolaidis Em.: «Policy and Measures against Social Cost Originating from the Operation of Shiprepairing Enterprises», Article presented at the «First Scientific Conference of the European Federation of Marine Science and Technology Societies – E.F.M.S.» Athens 2002.
- Vlachos G.P.-Nikolaidis Em.: «Analysis of Primary Causes Concerning Shipping Safety – Owner's and Ship Master's Point of View», Article presented at the «Annual Conference of IAME» (International Association of Maritime Economists) Panama 2002.
- Vlachos G.P.-Nikolaidis Em.-Konomos G.: «Application of the Analytical Hierarchy Process, Methodology on the Classification of Shipbuilding and Shiprepairing Markets», Article Presented at the «International Conference of International Association of Maritime Economists» Izmir, Turkey, June 2002.
- Vlachos G.P.-Nikolaidis Em.: «The Greek Shipbuilding Industry and the Necessity for Revision of the EU Shipbuilding Policy» Article presented at the «International Conference of International Maritim
- Vlachos G.P.-Nikolaidis Em.-Konomos G.-Maniati M.: «Multi – Criteria Method Application on the Main Tanker Ship Owner Policy» Article presented at the «International Conference of I.C.T.S. – 9th International Conference on traffic Science» Slovenia, 2005.
- Vlachos G.P.-Nikolaidis Em.: «The Volatility of the Tanker Markets and Their Correlation with the Oil Benchmarks during 2003-2006», Article presented at the «International Conference of I.C.T.S. – 10th International Conference on Traffic Science» Slovenia, 2005.
- Vlachos G.P.-Lema E.: «Labor Crisis in Today's Maritime Industry», Article presented at the «2nd International Scientific Maritime Conference, Human Resources in the Shipping Industry: New Trends and Challenges in the 21st Century» Limassol, 2008.
- Vlachos G.P.: «Human Factor in Shipping, Evaluation of its importance in Liner Shipping Operations and the Effects of Hogh level Quality Attributes of Personnel on Liner Shipping Companies Overall Performance» Article presented at the «2nd International Scientific Maritime Conference, Human

Resources in the Shipping Industry: New Trends and Challenges in the 21st Century» Limassol, 2008.

- Vlachos G.P.-Lema Eva: «Green Shipping Practices: Empirical Results from the Implementation of Ship Energy Efficiency Management Plan» Article presented at the «IAME Conference» Norfolk, USA, 2014.
- Vlachos G.P.-Zikos Dimitrios-Lema Eva: «Investigation of Coinciding Shipping Accident Factors with the Use of Partitioned Clustering Methods» Article presented at the «7th ACM International Conference on Pervasive Technologies Related to Assistive Environments» Rhodes, Greece, 2014.
- Waldron, J. K. (2005). EVOLVING POLLUTION-RELATED REQUIREMENTS INTERNATIONALLY AND IN THE UNITED STATES. *In International Oil Spill Conference* (Vol. 2005, No. 1, pp. 865-868). American Petroleum Institute.
- Wen, F., Pray, J., McSweeney, K., & Gu, H. (2019, April). Emerging inspection technologies–enabling remote surveys/inspections. In *Offshore Technology Conference*. OnePetro.
- Yorucu, V., & Mehmet, O. (2022). International Evidence in Maritime Dispute Settlement in Small Islands: Problems with UNCLOS. *Small Islands in Maritime Disputes: Greek Turkish Energy Geo-politics*, 53-82. DOI: 10.1007/978-3-031-05732-8_4.
- Zincir, B. (2020, November). A short review of ammonia as an alternative marine fuel for decarbonised maritime transportation. *In Proceedings of international conference on energy, environment and storage of energy* (ICEESEN2020) (pp. 19-21).

e. Internet Sources

- ABS, (2021). "ABS PORT STATE CONTROL QUARTERLY REPORT – Q4 2021". Available at: https://ww2.eagle.org/content/dam/eagle/rules-and-resources/Flag-and-Port-State-Information/psc-quarterly-report-q4-2021.pdf, last accessed: 24-7-2022.
- Arbitration Act, (1996). Competence of tribunal to rule on its own jurisdiction, Article 30. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.

- Arbitration Act, (1996). Domestic arbitration agreements. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.
- Arbitration Act, (1996). Enforcement of the award, Article 66. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.
- Arbitration Act, (1996). General principles. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.
- Arbitration Act, (1996). Recognition and enforcement of New York Convention awards. Available at: Arbitration Act 1996 (legislation.gov.uk), last assessed: 29-8-2022.
- Bakhsh N., (2020). "Seafarer abandonment cases at record high". Available at: https://lloydslist.maritimeintelligence.informa.com/LL1135170/Seafarer-abandonment-cases-at-record-high, last accessed: 24-7-2022.
- BIMCO, (2006). Non-Payment of Hire Clause for Time Charter Parties. Available at: Non-Payment of Hire Clause for Time Charter Parties 2006 (bimco.org), last assessted: 29-8-2022.
- BIMCO, (20210). COVID-19 Crew Change Clause for Time Charter Parties 2020. Available at: COVID-19 Crew Change Clause for Time Charter Parties 2020 (bimco.org), last assessed: 3-7-2022.
- BIMCO, (2016). GENERAL AVERAGE: YORK-ANTWERP RULES 2016. Available at: General Average: York-Antwerp Rules 2016 (bimco.org), last assessed; 29-8-2022.
- BIMCO, (2016). PARIS MOU PSC - NEW INSPECTION REGIME. Available at: Paris MoU PSC - New Inspection Regime (bimco.org), last assessed: 28-8-2022.
- BIMCO. (2017). BARECON 2017. Available at: BARECON 2017 (bimco.org), last assessed: 29-8-2022.
- BIMCO, (2021), "BIMCO PUBLISHES EEXI TRANSITION CLAUSE AHEAD OF IMO EFFICIENCY REGULATION". Available at: BIMCO publishes EEXI Transition Clause ahead of IMO efficiency regulation, last assessed: 22-8-2022.
- BIMCO, (2022). «BIMCO COVID 19 WEEKLY REPORT DATED 8 APRIL 2022». Available at: https://www.bimco.org/news/ports/20220408-bimco-covid-19-weekly-report, last accessed: 24-7-2022.

- BIMCO, (2022). General Average Clause. Available at: General Average Clause (bimco.org), last assessed: 30-8-2022.
- BIMCO, (2021). Coronavirus (Covid-19), Available at: Coronavirus (COVID-19) (bimco.org), last assessed: 3-7-2022.
- BIMCO, (2021), "EEXI TRANSITION CLAUSE FOR TIME CHARTER PARTIES 2021". Available at: EEXI Transition Clause for Time Charter Parties 2021 (bimco.org), last assessed: 22-8-2022.
- BIMCO, (2022). Infectious or Contagious Diseases Clause for Time Charter Parties 2022, Available at: Infectious or Contagious Diseases Clause for Time Charter Parties 2022 (bimco.org), last assessed: 3-7-2022.
- CLC Convention, 1992, Article II. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.
- CLC Convention, 1992, Article III. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.
- CLC Convention, 1992, Article V. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.
- CLC Convention, 1992, Article VII. Available at: Liability_Convention_1992.pdf (arcticportal.org), last assessed: 15-8-2022.
- Comite Maritime International (CMI) (2002). Available at: no.-2-1.pdf (comitemaritime.org), last assessed: 28-8-2022.
- DNV-GL, (2019). Forecasting the effects of world fleet decarbonization options. Available at: Forecasting the effects of world fleet decarbonization options - DNV, last assessed: 30-8-2022.
- EMSA. (2021). "Ship Recycling", available at: http://emsa.europa.eu/csn-menu/csn-how-it-works/items.html?cid=150:ship-recycling&id=3003, last assessed 12-1-2022.
- EMSA, (2022). Mission Statements. Available at: About - Mission Statements - EMSA - European Maritime Safety Agency (europa.eu), last assessed: 30-8-2022.
- EMSA, (2022). SAFEMED IV - C1 Flag State Implementation. Available at: Tag: SAFEMED IV - C1 Flag State Implementation - EMSA - European Maritime Safety Agency (europa.eu), last assessed: 30-8-2022.

- EMSA, (2022). Sustainability at work. Available at: About - Environmental Management - EMSA - European Maritime Safety Agency (europa.eu), last assessed: 30-8-2022.
- EUR-Lex, (2022). *Treaty establishing the European Community* (Consolidated version 1997). Available at: EUR-Lex - 11997E/TXT - EN - EUR-Lex (europa.eu), last assessed: 28-8-2022.
- European Maritime Safety Agency, (2021). "COVID – 19. Impact on Shipping". Available at: http://emsa.europa.eu, last accessed: 23-7-2022.
- European Union, (2016). MRV Regulation Assessment of Impacts of Delegated and Implementing Acts. Available at: ImpactAssessmentDelegatedImplementingActs (europa.eu), last assessed: 29-8-2022.
- GARD, (1999). The International Group Agreement - A review. Available at: https://www.gard.no/web/updates/content/52427/the-international-group-agreement-a-review, last assessed: 29-8-2022.
- GARD, (2022). An introduction to the International Group of P&I Clubs. Available at: https://www.gard.no/web/content/an-introduction-to-the-international-group-of-p&i-clubs, last assessed: 23-8-2022.
- GARD, (2022). Corporate Governance. Available at: https://www.gard.no/web/about-gard/corporate-governance, last assessed: 29-8-2022.
- GARD, (2022). Corporate Governance Manual. Available at: INTRODUCTION (gard.no), last assessed: 26-8-2022.
- Global Maritime Forum, (2022). Ammonia as a shipping fuel. Available at: Ammonia as a shipping fuel (globalmaritimeforum.org), last assessed: 30-8-2022.
- Global Maritime Forum, (2022). "Neptune Declaration Crew Change Indicator". Available at: https://www.globalmaritimeforum.org/neptune-declaration/crew-change-indicator, last accessed: 23-7-2022.
- Global Maritime Forum. (2022). The Scale of Investment Needed to Decarbonize International Shipping. Available at: The scale of investment needed to decarbonize international shipping (globalmaritimeforum.org), last assessed: 30-8-2022.

- IACS, (2022). *IACS Code of Conduct for Member Societies.* Available at: Code of Conduct - IACS, last assessed: 29-8-2022.
- IACS, (2022). Safer and Cleaner Shipping. Available at: Safer and Cleaner Shipping - IACS, last assessed: 28-8-2022.
- IACS, (2022). Ship/Company Data. Available at: Ship/Company Data - IACS, last assessed: 29-8-2022.
- International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea. (2010). 2010 HNS Convention. Available at: 2010-HNS-Convention-English.pdf (hnsconvention.org), last accessed: 13-8-2022.
- International Chamber of Shipping, (2021). "The COVID-19 pandemic: The crew change crisis". Available at: https://www.ics-shipping.org/current-issue/the-covid-19-pandemic-the-crew-change-crisis/, last accessed: 23-7-2022.
- International Court of Justice, (2022). History of the Court. Available at: The Court | International Court of Justice (icj-cij.org), last assessed: 28-8-2022.
- ICS. (2019). A review of the STCW Convention 2020, available at: A review of the STCW Convention 2020 | International Chamber of Shipping (ics-shipping.org), last assessed: 14-8-2022.
- International Group of P&I Clubs (2017). International Group Guidelines for Correspondents 2017. Available at: International Group Guidelines for Correspondents 2017 - The International Group of P&I Clubs (igpandi.org), last assessed: 26-8-2022.
- IGP&I, (2022), About the International Group. Available at: About us - The International Group of P&I Clubs (igpandi.org), last assessed: 29-8-2022.
- IGP&I, (2022), Group Clubs. Available at: Group Clubs - The International Group of P&I Clubs (igpandi.org) , last assessed: 29-8-2022.
- International Group of P&I Clubs, (2022). *Group Agreements*. Available at: Group Agreements - The International Group of P&I Clubs (igpandi.org), last assessed: 28-8-2022.
- IIMS. (2022). What's new with SOLAS 2024? Available at: https://www.iims.org.uk/whats-new-with-solas-2024/, last assessed: 29-8-2022.

- ILO, (1979). R160 - Occupational Safety and Health (Dock Work) Recommendation, 1979 (No. 160). Available at: Recommendation R160 - Occupational Safety and Health (Dock Work) Recommendation, 1979 (No. 160) (ilo.org), last assessed: 29-8-2022.
- ILO, 2014, Amendments (2014) to the Maritime Labour Convention, available at: Seafarers: Amendments (2014) to the Maritime Labour Convention (ilo.org), last assessed: 16-8-2022.
- ILO, 2016, Amendments (2016) to the Maritime Labour Convention, available at: Tire-a-part Amendements 3-1A E.indd (ilo.org), last assessed: 16-8-2022.
- ILO, 2018, Amendments (2018) to the Maritime Labour Convention, available at: Amendements Code MLC Signature E-F.indd (ilo.org), last assessed: 16-8-2022.
- ILO, 2018, Amendments (2018) to the Maritime Labour Convention, available at: wcms_848492.pdf (ilo.org), last assessed: 16-8-2022.
- ILO. (2022). Maritime Labour Convention, 2006. Available at: https://www.ilo.org/global/standards/maritime-labour-convention/lang--en/index.htm, last assessed: 2-9-2022.
- ILO, (2022). The ILO and the multilateral system. Available at: The ILO and the multilateral system, last assessed: 2022.
- IMO, (2002). Resolution 1 - *Adoption of Amendments to the Annex to the International Convention for the Safety of Life at Sea, 1974 – (Adopted on 12 December 2002)*. Available at: Resolution 1 - Adoption of Amendments to the Annex to the International Convention for the Safety of Life at Sea, 1974 – (Adopted on 12 December 2002) (imorules.com), last assessed: 28-8-2022.sessed: 2022.
- IMO, (2010). "The Manila Amendments to the annex to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978". Available at: file:///C:/Users/user/Downloads/33%20(1).pdf, last accessed: 24-7-2022.
- IMO, (2016). Energy Management Plans and Systems. Available at: M6 energy management plan and system final.pdf (imo.org), last assessed: 29-8-2022.
- IMO, (2019). Air Pollution, Energy Efficiency and Greenhouse Gas Emissions. Available at: Air Pollution, Energy Efficiency and Greenhouse Gas Emissions (imo.org), last assessed: 30-8-2022.

- IMO. (2019). Construction Requirements for Oil Tankers - Double Hulls. Available at: https://www.imo.org/en/OurWork/Environment/Pages/constructionrequirements.aspx, last assessed: 29-8-2022.
- IMO. (2019). Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. Available at: https://www.imo.org/en/OurWork/Environment/Pages/London-Convention-Protocol.aspx, last assessed: 25-8-2022. Article 3.
- IMO. (2019). IGC Code. Available at: https://www.imo.org/en/ourwork/safety/pages/igc-code.aspx, last assessed: 27-8-2022.
- IMO. (2019). International Convention on Civil Liability for Bunker Oil Pollution Damage (BUNKER). Available at: International Convention on Civil Liability for Bunker Oil Pollution Damage (BUNKER) (imo.org), last assessed: 13-8-2022.
- IMO. (2019). IMO 2020 – cutting sulphur oxide emissions. Available at: IMO 2020 – cutting sulphur oxide emissions, last assessed: 30-8-2022.
- IMO, (2019). Prevention of Air Pollution from Ships. Available at: Prevention of Air Pollution from Ships (imo.org), last assessed: 30-8-2022.
- IMO. (2019). SOLAS amendments entering into force 1 January 2020. Available at: https://www.imo.org/en/MediaCentre/PressBriefings/pages/35-SOLAS-EIF-2020.aspx#:~:text=%E2%80%8BMeasures%20aimed%20at%20preventing,launching%20appliances%20and%20release%20gear, last assessed: 28-8-2022.
- IMO, (2020). "Circular Letter No.4204/Add.18 26 May 2020 - Joint Statement IMO-ICAO-ILO on designation of seafarers as key workers". Available at: https://wwwcdn.imo.org/localresources/en/MediaCentre/HotTopics/Documents/COVID%20CL%204204%20adds/Circular%20Letter%20No.4204-Add.18%20-%20Joint%20Statement%20Imo-Icao-Ilo%20On%20Designation%20Of%20Seafarers.pdf, last accessed: 23-7-2022.
- IMO. (2020). International Convention for the Prevention of Pollution from Ships (MARPOL). Available at: https://www.imo.org/en/about/Conventions/Pages/International-Convention-

for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx, last assessed: 27-8-2022.

- IMO. (2020). A set of important amendments to the International Convention for the Safety of Life at Sea (SOLAS) and various codes enter into force on 1 January 2020. Available at: https://www.imo.org/en/MediaCentre/PressBriefings/Pages/35-SOLAS-EIF-2020.aspx, last accessed 16-8-2022.
- International Maritime Organisation, (2020). "RESOLUTION MEPC.324(75) - Procedures for sampling and verification of the sulphur content of fuel oil and the Energy Efficiency Design Index (EEDI)". Available at: https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Air%20pollution/MEPC.324%2875%29.pdf, last accessed: 23-7-2022.
- IMO, (2022). Autonomous shipping. Available at: Autonomous shipping (imo.org), last assessed: 28-8-2022.
- IMO, (2022). Conferences. Available at: Conferences (imo.org), last assessed: 29-8-2022.
- IMO, (2022). Convention on Limitation of Liability for Maritime Claims (LLMC). Available at: Convention on Limitation of Liability for Maritime Claims (LLMC) (imo.org), last assessed: 29-8-2022.
- IMO, (2022). Council. Available at: IMO Council, last assessed: 28-8-2022.
- IMO, (2022). Facilitation Committee. Available at: Facilitation Committee (imo.org), last assessed: 29-8-2022.
- IMO, (2022). IMO and the Sustainable Development Goals. Available at: IMO and the Sustainable Development Goals, last assessed: 30-8-2022.
- IMO. (2022). International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Available at: https://www.imo.org/en/ourwork/humanelement/pages/stcw-conv-link.aspx, last assessed: 28-8-2022.
- IMO, (2022). The International Safety Management (ISM) Code. Available at: The International Safety Management (ISM) Code (imo.org), last assessed: 30-8-2022.
- IMO, (2022). Long-range identification and tracking (LRIT). Available at: Long-range identification and tracking (LRIT) (imo.org), last assessed: 29-8-2022.

- IMO, (2022). Marine Environment Protection Committee (MEPC). Available at: Marine Environment Protection Committee (MEPC) (imo.org), last assessed: 29-8-2022.
- IMO. (2022). Maritime Safety Committee (MSC). Available at: https://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/Pages/MSC.aspx, last assessed: 20-8-2022.
- IMO, (2022). New World Maritime Theme highlights environmental legacy. Available at: International Maritime Organisation (imo.org), last assessed: 28-8-2022.
- IMO, (2022). Resolution MEPC.325(75) - Amendments to the International Convention for the Control And Management of Ships' Ballast Water and Sediments, 2004. Available at: Resolution MEPC.325(75) - Amendments to the International Convention for the Control And Management of Ships' Ballast Water and Sediments, 2004 - (adopted on 20 November 2020) (imorules.com), last assessed: 30-8-2022.
- IMO, (2022). SOLAS. Available at: SOLAS (imo.org), last assessed: 29-8-022.
- IMO, (2022). SOLAS XI-2 and the ISPS Code. Available at: SOLAS XI-2 and the ISPS Code (imo.org), last assessed: 27-8-2022.
- International Oil Pollution Compensation Funds (IOPC Funds), 2018, Article 2,3,4,10. Available at: Text-of-Conventions_e.pdf (iopcfunds.org), last assessed: 18-8-2022.
- IMO, (2022). SOLAS XI-2 and the ISPS Code. Available at: SOLAS XI-2 and the ISPS Code (imo.org), last assessed: 29-8-2022.
- IMO, (2022), Status of Conventions. Available at: Status of Conventions (imo.org), last accessed: 23-8-2022.
- Intercargo, (2022). “The Neptune Declaration on Seafarer Wellbeing and Crew Change”. Available at: https://www.intercargo.org/neptune-declaration/, last accessed: 24-7-2022.
- INTERNATIONAL CONVENTION ON SALVAGE, (1989). Available at: Salvage-Convention-1989.pdf (iflos.org), last assessed: 26-8-2022.
- International Convention Relating to the Arrest of Sea-Going Ships (1952). Available at: International Convention Relating to the Arrest of Sea-Going Ships (Brussels 1952) (admiraltylawguide.com), last assessed 27-8-2022.

- International Oil Pollution Compensation Funds (IOPC Funds), 2022, The Old Regime: the 1969 Civil Liability Convention and the 1971 Fund Convention. Available at IOPC FUNDS | The Old Regime: the 1969 Civil Liability Convention and the 1971 Fund Convention, last assessed: 21-8-2022.
- IOPC Funds (2022). STOPIA & TOPIA. Available at: IOPC FUNDS | STOPIA and TOPIA, last assessed: 28-8-2022.
- International Oil Pollution Compensation Funds (IOPC Funds), 2022, The 1992 Civil Liability Convention. Available at: IOPC FUNDS | 1992 Civil Liability Convention, last assessed: 21-8-2022.
- International Oil Pollution Compensation Funds (IOPC Funds), 2022, The 1992 Fund Convention. Available at IOPC FUNDS | 1992 Fund Convention and Supplementary Fund Protocol, last assessed: 21-8-2022.
- International Salvage Union, (2022). No cure – no pay. Available at: No cure – no pay – The International Salvage Union – Saving Lives, Ships and Cargo (marine-salvage.com), last assessed: 29-8-2022.
- International Salvage Union, (2022). The origins of Lloyd's Form. Available at: The origins of Lloyd's Form – The International Salvage Union – Saving Lives, Ships and Cargo (marine-salvage.com), last assessed: 29-8-2022.
- International Transport Workers' Federation, (2021). "Seafarers' Bulletin no 35/2021". Available at: https://www.itfseafarers.org/sites/default/files/node/resources/files/SeafarersBulletin2021_EN.pdf, last accessed: 22-7-2022.
- Lloyd's Market Association (2022) Joint Cargo Committee (JCC). Available at: Cargo Clauses Page (lmalloyds.com), last assessed: 29-8-2022.
- Lloyd's Open Form (LOF), (2022). Available at: Lloyd's Open Form LOF - Lloyd's (lloyds.com), last assessed: 26-8-2022.
- INTERNATIONAL CONVENTION ON SALVAGE, (1989). Available at: Salvage-Convention-1989.pdf (iflos.org), last assessed: 26-8-2022.
- Josephs J., Russon M.A., (2021). "Coronavirus: Seafarers stuck at sea 'a humanitarian crisis'". Available at: https://www.bbc.com/news/business-55802514, last accessed: 23-7-2022.
- Kantharia R., (2021). "What Is Safety Management System (SMS) On Ships?". Available at: https://www.marineinsight.com/marine-safety/what-is-safety-management-system-sms-on-ships/, last accessed: 24-7-2022.

- Lloyd's, (2020). SPOPIC CLAUSE. Available at: SCOPIC (lloyds.com), last assessed: 29-8-2022.
- Lloyd's Register, (2022). EU MRV Regulation. Available at: EU MRV Regulation (lr.org), last assessed: 29-8-2022.
- Lloyd's Register, (2022). "Significant crew safety and well-being lessons to be learned from survey". Available at: https://www.lr.org/en/latest-news/significant-crew-safety-and-well-being-lessons-to-be-learned-from-industry-wide-survey/, last accessed: 24-7-2022.
- Marine Insurance Act, (1906). Insurable interest, Article 5. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
- Marine Insurance Act, (1906). The Policy, Articles 22-31. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
- Marine Insurance Act, (1906). Assignment of Policy, Article 50-51. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
- Marine Insurance Act, (1906). The Premium, Articles 52-54. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
- Marine Insurance Act, (1906). Included and excluded losses, Article 55. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
- Marine Insurance Act, (1906). Salvage charges. Article 65. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 29-8-2022.
- Marine Insurance Act 1906 (2022), *Modification of Act in case of mutual insurance*. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 27-8-2022.
- Marine Insurance Act 1906 (2022), Suing and labouring clause. Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed: 27-8-2022.
- MARPOL, (2022). EEDI & SEEMP. Available at: EEDI & SEEMP explained - Website of marpol-annex-vi!, last assessed: 30-8-2022.
- MARPOL, (2022). MARPOL Annex VI NOx Technical Code & SOx explained. Available at: MARPOL Annex VI NOx Technical Code explained - Website of marpol-annex-vi!, last assessed: 30-8-2022.
- Marshall Islands, (2018), Economic Substance Regulations. Available at: Economic-Substance-Regulations-2018-courtesy-copy-published-by-the-

Registrar-of-Corporations-through-29-August-2019-amendments.pdf (register-iri.com), last assessed: 28-8-2022.

- MASS 400. (2022). It's time for the Mayflower Autonomous Ship. Available online at: Mayflower Autonomous Ship (mas400.com), last assessed 5-6-2022.
- McCulloch E., (2020). "New BIMCO clause to permit deviation for crew changes". Available at: https://www.westpandi.com/publications/news/archive/new-bimco-clause-to-permit-deviation-for-crew-chan/, last accessed: 24-7-2022.
- MEPC.324(75), (2018). Procedures for sampling and verification of the sulphur content of fuel oil and the Energy Efficiency Design Index (EEDI). Available at: MEPC.324(75).pdf (imo.org), last assessed: 30-8-2022.
- Marine Insurance Act. 1906.Available at: Marine Insurance Act 1906 (legislation.gov.uk), last assessed; 29-8-2022.
- MUNIN, (2016). MUNIN's Rationale. Available at: MUNIN's Rationale | MUNIN (unmanned-ship.org), last assessed: 30-8-2022.
- Nielsen A.C.F., (2020). « COVID-19 SEAFARERS' MENTAL HEALTH». Available at: https://www.bimco.org/ships-ports-and-voyage-planning/crew-support/covid-19-seafarers-mental-health, last accessed on 19th April 2022.
- Norwegian Maritime Authority, (2014). Registration of ship in the NIS. Available at: Registration of ship in the NIS - Norwegian Maritime Authority (sdir.no), last assessed: 30-8-2022.
- Ocean Health Index Science, 2022. Available at: https://ohi-science.org/data/, last accessed: 16-11-2021.
- OCIMF, (2017). TMSA 3 Fast Facts. Available at: eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.eyJzdWIiOiJ0bXNhMy1mYXN0LWZhY3RzIiwiaWF0IjoxNjMwNjc2Mjg4LCJleHAiOjE2MzA3NjI2ODh9.bbPAzTlk_hK9DQ1wxKpdTKIY6E0dZ9OvvPC7GYemCVM (ocimf.org), last assessed: 30-8-2022.
- OCIMF, (2022). International Safety Guide for Oil Tankers and Terminals (ISGOTT 6). Available at: International Safety Guide for Oil Tankers and Terminals (ISGOTT 6) (ocimf.org), last assessed: 27-8-2022.
- OCIMF, (2022). Management Self-Assessment. Available at: Management Self Assessment (ocimf.org), last assessed: 28-9-2022.

- OCIMF, (2022). SIRE. Available at: SIRE (ocimf.org), last assessed: 29-8-2022.
- OECD, (2019). LNG Market Trends and Their Implications. Available at: LNG Market Trends and Their Implications: Structures, drivers and developments of major Asian importers | READ online (oecd-ilibrary.org), last assessed: 30-8-2022.
- OECD, (2022). Aid for Trade 2022: Empowering connected, sustainable trade. Available at: Home page - OECD, last assessed: 30-8-2022.
- Paris MoU, (2022). Flags meeting low risk criteria. Available at: Flags meeting low risk criteria | Paris MoU, last assessed: 29-8-2022.
- Paris MoU, (2022). Inspection Search. Available at: Inspection Search | Paris MoU, last assessed: 30-8-2022.
- Paris MoU, (2022). Organisation. Available at: Organisation | Paris MoU, last assessed: 29-8-2022.
- Paris MoU, (2022). PSCO. Available at: PSCO | Paris MoU, last assessed: 29-8-2022.
- Regulation (EC) No 593, (2008). Rome I. Available at: European Civil Code (civil-code.com), last assessed: 29-8-2022.
- Safety4Sea, (2014) IACS Council meeting outcome. Available at: IACS Council meeting outcome - SAFETY4SEA, last assessed: 29-8-2022.
- Safety4Sea editorial team, (2021). “Why do seafarers quit their job?”. Available at: https://safety4sea.com/cm-why-do-seafarers-quit-their-job/, last accessed: 24-7-2022.
- Safety4Sea editorial team, (2022). “Report: Maritime training severely affected by COVID-19”. Available at: https://safety4sea.com/report-maritime-training-severely-affected-by-covid-19/, last accessed: 24-7-2022.
- ShipBreaking.info. (2020). "Ship Breaking around the word", available at: https://shipbreakingbd.info/ship-breaking-around-the-world/, last assessed: 8-1-2022.
- The Mission to Seafarers, (2021). “Seafarers Happiness Index 2021”. Available at: https://www.happyatsea.org/wp-content/uploads/2021/10/SHI_Q3_2021.pdf, last accessed: 24-7-2022.
- Tokyo MoU, (2022). Criteria for Attribution of RO Responsibility. Available at: Criteria for Attribution of RO Responsibility | Inspections & Detentions |

Memorandum of Understanding on Port State Control in the Asia-Pacific (tokyo-mou.org), last assessed: 29-8-2022.

- Tokyo MoU, (2022). Inspections and Detentions. Available at: Inspections & Detentions | Memorandum of Understanding on Port State Control in the Asia-Pacific (tokyo-mou.org), last assessed: 30-8-2022.
- Tokyo MoU, (2022). Member Authorities. Available at: Contact us | Organisation | Memorandum of Understanding on Port State Control in the Asia-Pacific (tokyo-mou.org), last assessed: 29-8-2022.
- Tokyo MoU, (2022). New Inspection Regime (NIR). Available at: NIR | Inspections & Detentions | Memorandum of Understanding on Port State Control in the Asia-Pacific (tokyo-mou.org), last assessed: 30-8-2022.
- UK Maritime Coastguard Agency, (2022). "MIN 656 - Understanding the long-term impacts of the COVID-19 pandemic on seafarer wellbeing". Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1059196/MIN_656.pdf, last accessed: 24-7-2022.
- UNCLOS Convention, 1982, Article 3, Breadth of the territorial sea. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 8, Internal waters. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 15, Delimitation of the territorial sea between States with opposite or adjacent coasts. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 17, Right of innocent passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 18, Meaning of passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 19, Meaning of innocent passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

- UNCLOS Convention, 1982, Article 33, Contiguous zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 45, Innocent passage. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 55, Specific legal regime of the exclusive economic zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 56, Rights, jurisdiction and duties of the coastal State in the exclusive economic zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 57, Breadth of the exclusive economic zone. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 86, Application of the provisions of the Part VII. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 87, Freedom of the high seas. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 88, Reservation of the high seas for peaceful purposes. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 94, Duties of the flag state. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 121, Regime of islands. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCLOS Convention, 1982, Article 186, Seabed Disputes Chamber of the International Tribunal for the Law of the Sea. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.

- UNCLOS Convention, 1982, Article 221, Measures to avoid pollution arising from maritime casualties. Available at: UNCLOS: United Nations Convention on the Law of the Sea, last assessed: 12-8-2022.
- UNCTAD. (1985). Handbook of International Trade and Development Statistics 1985 Supplement. Available at United Nations Digital Library: https://digitallibrary.un.org/record/100012?ln=en, last assessed: 28-12-2022.
- UNCTAD, (2021). "COVID-19 cuts global maritime trade, transforms industry". Available at: https://unctad.org/news/covid-19-cuts-global-maritime-trade-transforms-industry, last accessed: 23-7-2022.
- UNCTAD, (2022). Prosperity for all. Available at: Topics | UNCTAD, last assessed: 27-8-2022.
- UNEP, (2022). International Day of Clean Air for Blue Skies. Available at: UNEP - UN Environment Programme, last assessed: 29-8-2022.
- United Nations Commission on International Trade Law, (2022). UNICITRAL LAW. Available at: http://www.uncitral.org/uncitral/en/uncitral_texts/arbitration/1985Model_arbitration_status.html, last assessed: 29-8-2022.
- United Nations Conference on trade and development, (1986) United Nations Convention on Conditions for Registration of Ships. Available at: United Nations Convention on Conditions for Registration of Ships 1986 (unctad.org), last assessed: 28-8-2022.
- United Nations Conference on Environment and Development, Rio de Janeiro, Brazil. (1992). *Environment and sustainable development – "The Earth Summit"*. Available at: https://www.un.org/en/conferences/environment/rio1992#:~:text=A%20new%20blueprint%20for%20international,from%203%2D14%20June%201992, last assessed: 28-12-2022.
- United Nations. (2015) *The SDGS in action*. Available at: https://www.undp.org/sustainable-developmentgoals#:~:text=What%20are%20the%20Sustainable%20Development,people%20enjoy%20peace%20and%20prosperity, last assessed: 28-12-2022.

- United Nations General Assembly, (2022). United Nations General Assembly Resolutions. Available at: 1961 United Nations General Assembly Resolutions (worldlii.org), last assessed: 27-8-2022.
- UNIDO, (2022). Progress by Innovation. Available at: UNIDO | United Nations Industrial Development Organisation, last assessed: 27-8-2022.
- United Nations Brundtland Commission. (1987). Report of the World Commission on Environment and Development: Our Common Future. Available at: http://www.un-documents.net/our-common-future.pdf. Last assessed: 28-12-2022.
- United Nations, (2018). Resolutions of the 72nd session. Available at: Resolutions of the 72nd session - UN General Assembly, last assessed: 29-8-2022.
- United Nations, (2022). Charter of the United Nations. Available at: Chapter I: Article 1 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Membership. Available at: Chapter II: Article 5 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter III — Organs. Available at: Chapter III: Article 7 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter IV — The General Assembly. Available at Chapter IV: Article 9 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter IV — The General Assembly. Available at: Chapter IV: Article 18 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter IV — The General Assembly. Available at: Chapter IV: Article 20 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.

- United Nations, (2022). Chapter V — The Security Council. Available at Chapter V: Article 23 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter V — The Security Council. Available at Chapter V: Article 28 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter X — The Economic and Social Council. Available at Chapter X: Article 61 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter XIII — The Trusteeship Council. Available at Chapter XIII: Article 86 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter XV — The Secretariat. Available at Chapter XV: Article 97 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Chapter XV — The Secretariat. Available at Chapter XV: Article 101 — Charter of the United Nations — Repertory of Practice of United Nations Organs — Codification Division Publications, last assessed: 28-8-2022.
- United Nations, (2022). Model United Nations. Available at: UN Family of Organisations | United Nations, last assessed: 30-8-2022.
- United Nations, (2022). The Sustainable Development Agenda. Available at: The Sustainable Development Agenda - United Nations Sustainable Development, last assessed: 29-8-2022.
- United Nations Commission On International Trade Law, (2022). UNCITRAL Model Law on International Commercial Arbitration (1985), with amendments as adopted in 2006. Available at: Status: UNCITRAL Model Law on International Commercial Arbitration (1985), with amendments as adopted in

2006 | United Nations Commission On International Trade Law, last assessed: 29-8-2022.

- UNFCCC, (2022). Race To Zero Campaign. Available at: Race To Zero Campaign | UNFCCC, last assessed: 29-8-2022.
- United States Coast Guard, (2022). Oil Pollution Act of 1990 (OPA). Available at: Oil Pollution Act of 1990 (uscg.mil), last assessed: 30-8-2022.
- Verifavia Shipping, (2018). EU MRV vs. IMO fuel consumption data collection system. Available at: EU MRV vs. IMO fuel consumption data collection system Verifavia Shipping (verifavia-shipping.com), last assessed: 29-8-2022.
- Wankhede A., (2021). "What ISM Certificates You Require to Start a Shipping Company?". Available at: https://www.marineinsight.com/marine-safety/what-ism-certificates-you-require-to-start-a-shipping-company/, last accessed: 24-7-2022.
- Wood Mackenzie, (2018). Global Fuel Costs to Surge from 2020. Available at: Wood Mackenzie: Global Fuel Costs to Surge from 2020 - Offshore Energy (offshore-energy.biz), last assessed: 30-8-2022.
- World Health Organisation, (2021). Air Pollution. Available at: Air Pollution | WHO | Regional Office for Africa, last assessed: 29-8-2022.
- World Health Organisation, (2022). WHO Coronavirus overview. Available at: https://covid19.who.int/, last accessed: 22-7-2022.
- World Maritime University, (2022). "MarTID 2022: 2021 Training Practices Report". Available at: https://magazines.marinelink.com/NWM/Others/MarTID2021#page/1, last accessed: 24-7-2022.
- YORK-ANTWERP RULES (2016). Rule A1: "There is a general average act when, and only when, any extraordinary sacrifice or expenditure is intentionally and reasonably made or incurred for the common safety for the purpose of preserving from peril the property involved in a common maritime adventure". Available at: YAR-2016-English-with-Rule-XVII-correction.pdf (comitemaritime.org), last assessed: 27-8-2022.
- YORK-ANTWERP RULES (2016). Available at: YAR-2016-English-with-Rule-XVII-correction.pdf (comitemaritime.org), last assessed: 27-8-2022.