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TMSA & KPIs – THE IMPLEMENTATION AND THE CHALLENGES IN THE SHIPPING INDUSTRY

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The approval of the Masters' dissertation by the Department of Maritime Studies, University of Piraeus does not imply acceptance of the author's opinions.

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<u>Abstract</u>

The main purpose of this thesis is to highlight the importance of TMSA Programme (Tanker Management and Self Assessment) and the effect of their results on a company's performance, economic growth, long term sustainability and commercial transactions with first-class oil majors. TMSA, which is a part of the tanker vetting scheme, was created as a tool to lead to continued improvement in the Management system of a company. The tanker management company is expected to develop a comprehensive plan for full compliance with both the key performance indicators and the best practices identified in the TMSA Programme. As presented in this essay, TMSA assesses the management system and Major oil companies then reviews SIRE reports and TMSA submissions and use these results as a baseline when performing management audits to determine if the tanker management company is, in fact, operating in accordance with expectations. In the second chapter, the third edition of TMSA is explanatorily analyzed as well as the relevant revised Key Performance Indicators and the revised best practices guidance. The results of self-assessment can be used to develop an improvement plan basing on four stages, in order to achieve safety and environmental excellence. Also, the 13 elements of TMSA3 are presented concerning all operations activities that a tanker operator follows or must follow. Finally, the benefits of the implementation of TMSA3 are shown in the last Chapter.

Chapter 1: OCIMF - TANKER VETTING

1.1 OCIMF HISTORY

The Oil Companies International Marine Forum (OCIMF) is a voluntary association of oil companies having an interest in the shipment and what is called "terminalling" of crude oil, oil products, petrochemicals, and gas. OCIMF was formed in April 1970. It was initially the oil industry's response to increasing public awareness of marine pollution, particularly by oil, after the grounding of the tanker Torrey Canyon in 1967 that was a shock to the maritime industry, the political system and public at large. The severe environmental consequences of the accident marked the beginning of a much stronger focus on the environmental aspects of shipping.

Although many safety and environmental protection rules and regulations are attributed to the grounding of the Torrey Canyon, a more recent trace of increased public awareness of marine pollution, in particular, oil pollution, is attributed to the sinking of the oil tanker Erika on December of 1999, with the loss of some 20,000 tonnes of heavy fuel oil into the sea, the Erika was charted by the company Total, a European oil major company, and classed by Rina, which is a European Classification Society. The findings of the French court ruling on the loss of the Erika and resultant pollution included an implied criticism of the charterer's tanker vetting process. This implied criticism was towards a voluntary practice, performed out of the due diligence of the charterer, that practice was deemed inadequate at providing the charterer with the best holistic picture of the safety management of the company to decide on whether the ship is to be charted or not.

OCIMF's mission is to be the foremost authority on the safe and environmentally responsible operation of oil tankers, terminals, and offshore support vessels, promoting continuous improvement in standards of design and operation. The current membership of OCIMF comprises 109 companies worldwide.

Through OCIMF, the oil industry was able to play a stronger and more coordinating role in response to these initiatives, making its professional expertise widely available through cooperation with governments and intergovernmental bodies.

OCIMF was granted consultative status at the IMO in 1971 and continues to present oil industry views at IMO meetings. Since then, its role has broadened to take into account the changing maritime activities of its membership. Its remit now covers tankers, barges, offshore support vessels and terminals and its advice extends to issues like shipping in ice and large-scale piracy, which rarely troubled the oil industry when OCIMF was first created in the 1970s.

Governments had reacted to this incident by debating the development of international conventions and national legislation and the oil industry has tried to play its part by making its professional expertise available and its views known to governmental and inter-governmental bodies. The role of OCIMF has broadened over the intervening period. Most recently the organization has contributed to the EU discussion on tanker safety and the draft EU Directive on Environmental Liability, and has provided support to the European Union (EU) and the International Maritime Organization (IMO) debate on the accelerated phasing out of single-hull tankers and on the carriage of heavy grades of oil.

Today, OCIMF is widely recognized as the voice of the oil industry providing expertise in the safe and environmentally responsible transport and handling of hydrocarbons in ships and terminals and setting standards for continuous improvement. Membership is extensive and includes oil majors in the world along with the majority of National Oil Companies.

Not only has OCIMF contributed to a substantial quantity of regulation at the IMO aimed at improving the safety of tankers and protecting the environment, but it has introduced important new guidance on pressing current issues such as piracy and Arctic shipping. With the process of introducing new Internationally-accepted regulation necessarily slow as it crosses many individual countries and jurisdictions, OCIMF is in the unique position of being able to leverage the expertise of its membership to press ahead with much-needed guidance on important industry issues. This provides the means to improve practices in the membership and the wider industry, and serves as a valuable reference for developing regulation. In addition to its extensive publications library, OCIMF has a rich portfolio of tools including its Ship Inspection Report (SIRE) programme and Tanker Management and Self Assessment tool (TMSA), both of which have gained worldwide recognition and acceptance.

Also, OCIMF has developed the MTIS system intending to fill the gaps that exist in the international standards for terminals and also that would complement the similar work already being done by OCIMF and its members to improve ship safety and environmental protection. MTIS is a strictly voluntary programme, run by OCIMF for the benefit of its member

The officers of OCIMF comprise a Chairman and three Vice-Chairmen, all of whom are elected at the Annual General Meeting of OCIMF member companies. A committee structure with the Executive Committee at its head and four main committees reporting to it was established. The four main Committees are the General Purposes Committee (GPC), the Ports and Terminals Committee, the Offshore Marine Committee and the Legal Committee. The senior standing committees may establish Sub-Committees or Forums as necessary. Sub-Committees, Forums, work groups and task forces composed of members' representatives and assisted by the Secretariat. The Executive Committee is the senior policymaking Committee of OCIMF. The membership of the Executive Committee is limited to a maximum of 15 members plus the Chairman and Vice-Chairmen who are ex officio members. Members of the Executive Committee are elected at the Annual General Meeting.

OCIMF's trusted, neutral and fully independent status within the global industry is essential to capturing and sharing information and best practice aimed at raising standards of safety and environmental protection. OCIMF is not a training organization, but this is a good example of how it can bring together and share best practice from its members and elsewhere to guide personnel training, which can, in turn, improve safety and environmental protection standards worldwide.

1.2 TANKER VETTING - SIRE

A voluntary process is known in the shipping industry as "vetting" has been implemented to determine whether the characteristics of ships and its crew enable safe transport of their cargo. The overall screening process inspection of the vessels is performed by the charterer or an assigned third party. Ship vetting involves sourcing all relevant data (such as owner/operator profile, the vessel's history, Port State Control record) and evaluating the potential risks by using available research resources. Although vetting inspection is non- mandatory, and an oil tanker does not pass or fail it, it is one of the most important steps in the evaluation process.

For the oil industry, the vetting inspections are, in general, undertaken by the individual oil major (e.g. Shell, Exxon-Mobile, BP). However, to assure some degree of harmonization, the OCIMF has established the internet-based database Ship and Barge Inspection Report Exchange [SIRE] and within this system the vetting reports are stored and accessible for potential charterers. It is a large database of objective technical and operational information about the range of vessels used for carrying oil, gas, and chemicals.

The SIRE Programme is a unique tanker risk assessment tool of value to charterers, ship operators, terminal operators and government bodies concerned with ship safety. It was originally introduced in 1993 to provide a standardized inspection format and it has now gained industry-wide acceptance as benchmark for vessel inspections. Today, SIRE inspections take place all over the world and are widely recognized as an invaluable tool for raising ship safety standards.

By establishing an objective inspection process, SIRE has been contributed to the improvement of operational standards reducing the number of incidents. It has also played a key role in the reduction in the number of repeat inspections on the same vessel, thereby reducing the burden on the vessel's crew.

The SIRE programme requires a uniform inspection protocol that is predicated by the following:

• Vessel Inspection Questionnaire for Bulk Oil/Chemical Carriers and bulk Oil Carriers(VIQ) which is required for Inspectors to compile and submit SIRE inspection

information .The VIQ addresses questions of certification, crew management, navigation cargo handling, mooring, engine room and steering gear and other aspects associated with safety and pollution. The VIQ is designed to be completed in electronic form by an attending inspector using a computer and specially developed OCIMF software and then submitted electronically to the OCIMF Member commissioning the inspection.

- Barges Inspection Questionnaire (BIQ)

- Uniform SIRE Inspection Report Harmonized

- Vessels Particulars Questionnaire for Bulk Oil/Chemical Carriers and Gas Carriers (VPQ) which provides the means whereby ship operators compile ship particulars data using OCIMF software for electronic submission to SIRE, or directly online trough the SIRE web site. The submission of VPQ data is obligatory if a VIQ is to be deposited. The VPQ contains many questions that deal with customary on-board documents and ship's particulars of permanent or semi-permanent nature that will reduce the inspector's time on board. This information will also assist a vetting department during vessel assessment and should reduce the need to complete separate technical questionnaires for individual charterers

- Barge Particulars Questionnaire (BPQ)

- Sire Enhanced Report Manager [SERM]

SIRE Reports and VPQs are available via the internet 24 hours a day, 365 days per year to qualified Recipients using the Sire Enhanced Report Manager interface (Web SERM). SIRE recipients are kept abreast of details of reports held in the database by means of a computerized index, which is updated continuously.

These features have been established to make the programme more uniform and user-friendly and to provide a level of transparency unique in the marine transportation industry. Providing technical and operational information to the Charterers and other programme users, it helps to better ascertain whether the vessels are well managed and maintained. The vetting produce is no doubt leading to improvements in quality of ship, accelerating the continuing drive for safer ships and cleaner seas.

Inspection reports are maintained on the index for a period on 12 months from the date of receipt and are maintained on the database for 12 years. SIRE records are available to OCIMF members, port and canal authorities, oil traders companies and bulk oil terminal operators

who charter a vessel for their business. Also, it is available to Governmental bodies which supervise safety and pollution prevention of sea.

Considering that many charter parties contain vetting clauses and that failure to obtain vetting approval may result in costs, it is important to take all necessary steps to demonstrate to the inspectors that cargo can be transported safely, responsibly and competitively. The clause provides that the ship owner will only warrant that the vessel maintain "oil major approval". In addition the clause sets out the owners' obligation if a vessel is unacceptable to oil major, giving the Ship owner the opportunity to take corrective actions and re-inspect the vessel.

The International Association of Independent Tanker Owners [INTERTANKO] has proposed the following clause:

a) Owners warrant that at the time of delivery:
(i) The Vessel will have a SIRE report available through the OCIMF system which has been issued within the last 6 months.
(ii) The Vessel is not unacceptable to [insert companies]

(b) If, during the currency of the charter, the Vessel is found to be unacceptable following a vetting inspection performed under the SIRE system, Owners will take corrective action and will promptly report such actions to the inspecting company concerned and the Charterers will be informed. If required Owners will have the Vessel inspected again as soon as reasonably practicable. Owners, however, shall not have any obligation to make any changes to the Vessel's design.

(c) If the Vessel is found to be unacceptable following a vetting inspection performed under the SIRE system by any of the abovementioned companies, that shall not of itself entitle the Charterers to put the Vessel off-hire or to claim damages. However, should the Vessel be found unacceptable on 3 consecutive vetting inspections by any of the abovementioned companies, the Charterers shall have the option to cancel the charter with immediate effect within 7 days of the result of the third inspection becoming known.
If, at that time, the Vessel is committed for a voyage such cancellation will take effect from the completion of discharge.

1.3 TANKER VETTING - TMSA

The introduction of the International Safety Management (ISM) Code in July 1998 required companies to develop and implement a safety management system (SMS) for vessels within their fleet. However, inconsistencies in the application of the Code from one company to another soon became apparent to vessel inspectors and oil company ship vetting departments. To help address this imbalance the OCIMF introduced Tanker Management Self Assessment (TMSA).

The TMSA should be considered in relation to the tanker vetting. It was developed to include also the tanker operator into the vetting process. TMSA provides a measurement that quantifies how effective was the SMS (or the QMS of the company) in achieving the conditions of a quality management system.
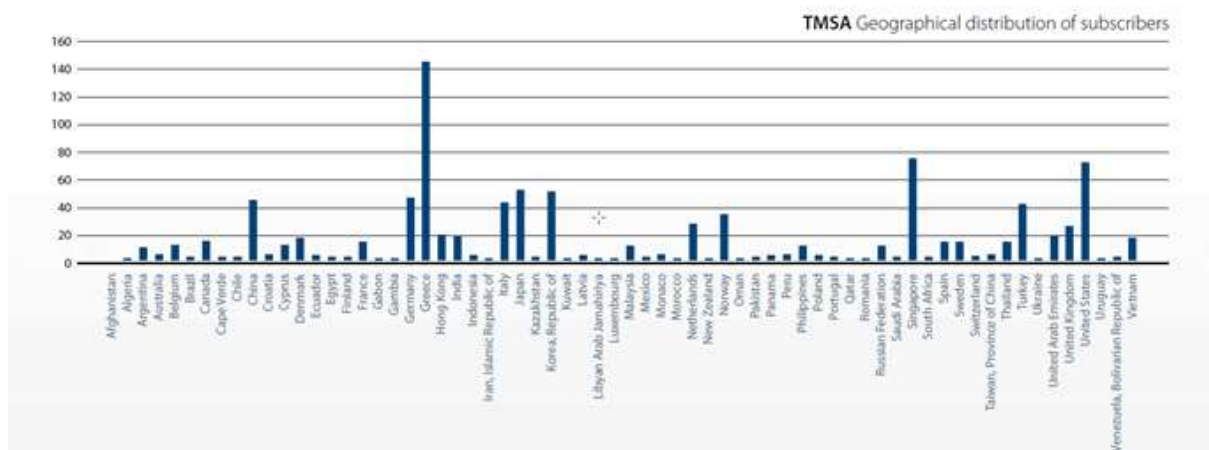

Figure (1): Geographical distribution of subscribers (Source – OCIMF)

TMSA was promoted as being a tool that is Methodical, systematic and structured in its approach. Considerable emphasis on the structure of the TMSA was given. Many vessel operators have already welcomed TMSA due to the benefits it has given them, as it provides a useful framework for improving their management systems continuously.

TMSA is a safety measure concerning vessel owners, which involves a self-audit of vessel ship owners. The measure is based on businesses best practices from the point of view of oil majors. The ship owners wishing to trade with the oil majors must file the necessary documentation regarding their operations for the oil majors to be able to evaluate the safety of the tankers. The oil majors perform an audit of vessel owners for vetting which provides a

tangible commercial incentive for the ship owners to commit to safety. TMSA has been the best deterrent for compliance with safety regulations, as far as ship operators are concerned, because it provides a great commercial incentive for vessel operators if they wish to trade with oil majors, and for this, they have to pass the vetting requirements. Thus, ship operators have to re-examine, not only the operating practices but also their philosophy, by taking safety issues seriously.

Additionally, the TMSA helps operators understand the expectations of the charterers, oil major and vetting inspectors. The oil majors impose very strict vetting requirements on tanker companies and have imposed TMSA as a self-regulation instrument with which all the shipping companies must voluntarily comply. Oil companies do not accept any additional legal responsibility for tanker operators, which have implemented all the best practice guides. Many skeptical tanker operators see TMSA as a way for oil companies to pass the liability for accidents onto them. If an oil company ever charters a ship, which has a major accident, it is likely to be worried about its loss of public image than any legal action. The general public, on the other hand, is unlikely to treat an oil company nicely because of how it chartered its ships.

Moreover, one of the motives behind the introduction of TMSA is the lack of confidence of charterers in the certification process of the ISM Code, i.e. if the certification process will provide an evidence of the "quality" of the implementation process. ISM may show that a management system is available, but there is no indication of the quality and content of the system and its effective application and TMSA also provides some sort of evidence to the charterer that the operator is in full compliance with the requirements of the ISM Code.

Chapter 2: TMSA

2.2 Overview of TMSA

Historically, Tanker Management and Self Assessment program was released in 2004 by OCIMF as a tool for tanker operators to measure, improve and evaluate their safety management systems. The initial version of the TMSA was intended for tankers of at least 500 GT following the 1974 SOLAS Convention requirements, and as that, of the ISM Code. Four years of experience and comprehensive feedback from the oil industry brought about the publication of TMSA 2 in 2008. TMSA 2 was updated to widen its application to all tank vessels, irrespective of size. The third edition of TMSA (TMSA 3) was introduced in April 2017. TMSA 3 revised and updated all of the thirteen existing elements and introduced a thirteenth – 'Maritime Security'. This latest edition has been updated to provide clarity of wording, improve consistency of language and make conducting the self-assessment much easier. This edition of TMSA reflects current legislation, emerging issues and incorporates feedback from shipping companies worldwide.

The introduction of TMSA 3 coincided with the integration of the TMSA system directly into the Ship Inspection Report Programme (SIRE) application. Previously, the SIRE and TMSA systems had been operated separately. The new combined SIRE/TMSA programme provides an improved, single area to maintain all data related to a tanker's technical operator.

TMSA system is designed to help companies continually improve their SMS through developed phased improvements, determined from self-assessment and audit results. Mainly, the TMSA provides a standard framework of self-assessment of a company's SMS which is a basic pillar of the guidance and aids the understanding of the nature of the guidance as well as its orientation. The process of a company's self-assessment is conducted according to the listed key performance indicators and best practice guidance on how to acquire appropriate standards of safety performance. The results from this assessment can then be used to develop an improvement plan, using the stages of achievement described in the programme, to achieve safety and environmental excellence

The TMSA3 sets out 13 elements of management practice those are important for the successful vessel's operation and for a sufficient management system. Each element defines

the Aims and KPIs required meeting the main objective, together with examples of best practice for each stage of the development process. The new edition makes an effort to overhaul the measure performance process, not only with the streamline of KPIs but also with the introduction of non-financial measurements and the assessment of soft skills. Furthermore, TMSA3 introduces a different approach by focusing on the human element and behavioral safety suggesting that crew competence is the tool for crew retention and development.

Within this chapter is presented the key components of TMSA3 which are the continuous improvement cycle, KPIs, 13 elements TMSA and the assessment process.

2.2 Continuous improvement

The continuous improvement cycle is an essential part of TMSA, since it is a product of the actions required by management system. With the start of the TMSA cycle of continues improvement, the company should realize the benefits of identifying weakness, decide in actions to be taken to correct these weaknesses and then monitor the effects of these actions.

The key stages of continuous–improvement cycle are named Plan, Act, Measure and Improve and illustrated in below figure ( )

Figure (2): Key components of a continual improvement cycle (Source – OCIMF TMSA A Best Practice guide 3rd Edition)

o   Plan

A development plans are required for the improvement of company which include efficient strategies and provide clarity in company's policies, purpose, processes, roles and responsibilities. TMSA guidelines give vessel operators an indication of such procedures, objectives and targets that will help them achieve their goals.

o   Act

Achieving its improvement objectives a company, there must be consistent and effective implementation of plans. Operators should clearly communicate plans to all staff and then prioritize and target processes for improvement, providing clear definition of objectives and outcome measurements.

o   Measure

The twelfth Chapter of the ISM Code (Company verification, review and evaluation) requires that companies have to check and evaluate their safety management system and perform internal safety audits to assess performance and compliance with existing procedures. The safety and environmental excellence requires processes to check and measure the organization's progress towards sustainable improvement. Through, this segment of the continuous-improvement cycle indicates procedural compliance, as well as implementation and improvement efforts.

o   Improve

In order to improve, a company must be able to assess its performance and define their targets that will keep the continuous improvement process evolving. This is the way in which a company is able to actually improve both in the short term and the long term. The results of this assessment can then provide the foundation for an improvement plan that highlights areas where maximum benefit can be achieved. The plan should be agreed by staff and focus on long term targets and objectives that can best benefit the operator.

This part of the continuous improvement cycle aligns actions with process targets and ensures that individual improvement plans are regularly reviewed and updated. The TMSA programme complements industry quality codes and is intended to encourage self-regulation and promote continuous improvement.

2.3 SHIPPING KEY PERFORMACE INDICATOR

A Key Performance Indicator [KPI] is a measurable value that demonstrates how effectively a company is achieving key business objectives. Furthermore, KPIs offer any assistance a company needs to be guided in accomplishing the objectives they have set and fulfill the obligations they have towards the legislative system. A management operator company should use these KPIs in order to determine in which fields of their operating activity need the greater assistant and they should focus their efforts for improvement. Management operators should also make good use of the KPIs in facilitating their efforts on building development strategies used to clarify which persons should be assigned with which responsibilities for materializing the improvements that are necessary to achieve the company's objectives and goals.

Organizations use KPIs at multiple levels to evaluate their success at reaching targets. High-level KPIs may focus on the overall performance of the business, while low-level KPIs may focus on processes in departments such as sales, marketing, HR, support and others.

The Shipping Key Performance Indicator project was launched in 2006 with the objective to set up an internationally accepted industry standard in order to measure a company's performance and, thus, increase the transparency on quality, safety and environmental performance in ship operation. It is expected that this will improve the performance within the maritime industry and provide a platform for the shore based and onboard performance measurement. In recent decades, since the KPI standard has been set up, benchmarking procedures were established and industry awareness was created. At the end of 2010, a milestone was reached, the development stage of the KPIs was formally finalized and all interested parties were invited to start using the Shipping KPIs. An internet-based software has been set up uploading the data and benchmarking thus the industry input. In December 2010, there were 270 ships participating within the Shipping KPI project and, thus, providing information for the ultimate goal of benchmarking. Nowadays, The Shipping KPI System is a

global tool for defining, measuring and reporting information on a ship's operational performance in order to boost the performance improvements with companies engaged in ship operation activities and to provide an efficient communication platform on ship operation performance to internal and external stakeholders.

The Shipping KPI Standard is established on 8 Shipping Performance Indexes (SPIs), 33 Key Performance Indicators and 64 Performance Indicators (PIs). There is a mathematical relation between SPIs (high level indexes) which are calculated from Key Performance Indicators, and KPIs which are calculated from Performance Indicators (lowest level). On the lowest level there are the PIs, which are based on data capture (measurements or counters) directly from a ship or from the shipping management. Data is collected once and re-used within the Shipping KPI Standard in order to reduce the amount of data. On KPI level a form of normalisation take place. The KPI are scaled into a range from 0-100, where zero indicates unacceptable and 100 is outstanding performance. This makes it possible to compare ships with different characteristics or amount of data captured. Finally, on the highest level the KPIs are combining into Shipping Performance Indexes in order to express performance within specific main areas.

The Shipping Performance Indexes are weighted averages of the used KPIs within a particular area and their objective is to give external stakeholders information about the overall performance of a ship in one of the following areas:

- Environmental Performance
- Health and Safety Performance
- HR Management Performance
- Navigational Safety Performance
- Operational Performance
- Security Performance
- Technical Performance
- Port State Control Performance

The KPIs ratings form the basis for the Shipping Performance Index (SPI) score. The KPIs can be expressed in two ways, a KPI Value which is a mathematical combination of relevant Performance Indicators Values and a KPI Rating which is an expression of the KPI Value on

the scale between 0 and 100 where a high rating (100) is a result of high/excellent performance.

A KPI is:

•   a numerical, objective measure of performance

•   key to the strategic business objective

•   actionable and influenced by the relevant stakeholder/manager

•   accountable to stakeholder/manager

•   output oriented, not focused on input or activity

•   possible to calculate with limited efforts and within limited time

The objectives of KPIs are to measure the continuous improvement, the internal and external benchmarking and to set incentives.

The PIs are the foundation of the KPI project. They are used to calculate all the KPIs and SPIs. The PIs are directly observable parameters for each ship under management, e.g. Number of dismissals, Number of collisions and Number of fire incidents. The PIs are used on the lowest level to collect the data, and therefore, these data can be used repeatedly to calculate specific KPIs. Consequently, the amount of data is reduced and one common basis is formed which reduces the risk of continuative errors. These PIs are then consolidated to specific KPIs.
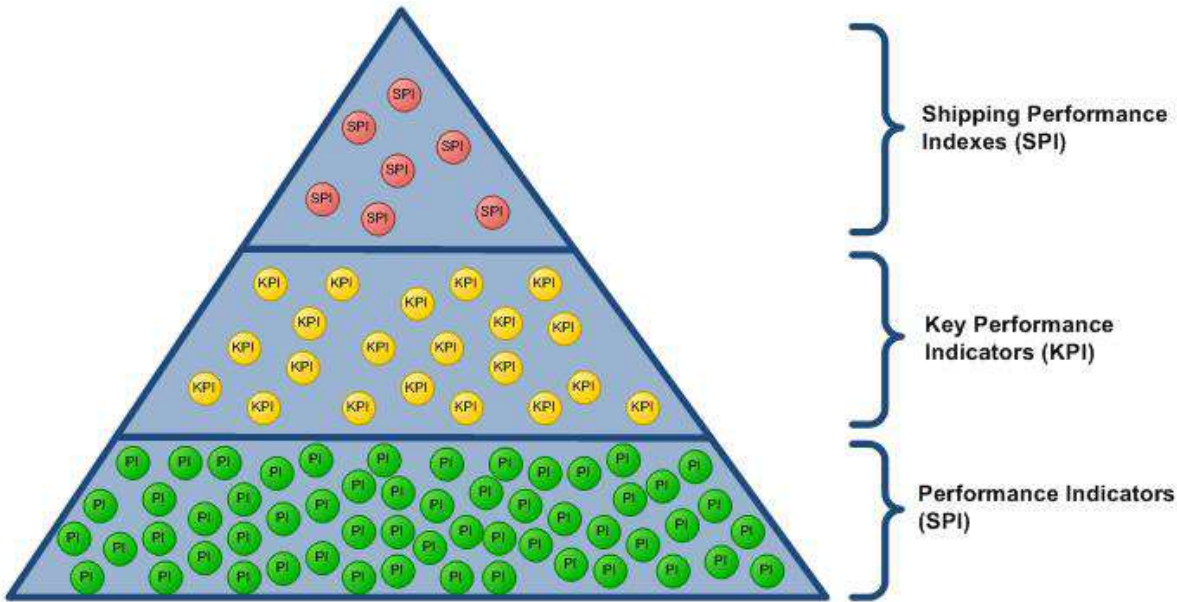

Figure (3): Shipping KPI structure (Source –BIMCO Shipping KPI)

In the context of the TMSA, KPIs are used to measure a management system. The information contained in the documents can assess the management system and demonstrate a level of achievement that ranks from 1 to 4 for each of the 13 elements. Every KPI will not be applicable in all cases and it is depends on company's size and structure, special trade and local regulations, custom and conditions. In addition, in case of a company decide that a KPI is not applicable; they should enter "yes" when completing the assessment online. However, the company has to justify the reason for considering the KPI is not applicable and to revert back with documentary evidence. Entering "No" will lead the TMSA software to record the element as incomplete. Since the self-assessment has been completed, the company will have a clear picture of their performance. Therefore, they can specify gaps and make plans for their improvement.

Specifically, TMSA3 introduces 85 new KPIs in total, 25 KPIs have moved to a lower level and there are indexes concerning customer focus, leadership and engagement of people.

2.4 TMSA Elements

As mentioned, TMSA have established a standard framework for assessment which is based on 13 elements of management practice. Each one of these elements is associated with a clear objective and a set of supporting KPIs to support operators. Operators by following these elements demonstrate their commitment to constant improvement in safety and environmental protection within the tanker industry.

 The 13 elements of TMSA 3 are the following:
1.	Leadership and the Safety Management System
2.	Recruitment and management of shore-based personnel
3.	Recruitment and management of vessel personnel
4.	Vessel reliability and maintenance including Critical Equipment
5.	Navigational safety
6.	Cargo ballast, Tank Cleaning, Bunkering, mooring and anchoring operations
7.	Management of change
8.	Incident reporting, investigation and analysis
9.	Safety management

10.   Environmental and energy management

11.   Emergency preparedness and contingency planning

12.   Measurement, analysis and improvement

13.   Maritime security

In this section, a briefing of each of 13 elements is given as well as an example of a KPI with relevant best practice guidance for each one.

Element 1 and 1A: Leadership and the Safety Management System

The first element relates to the leadership's ability to navigate the company into achieving excellence in the fields of health, safety, security and the environment (HSSE). Company as leadership is responsible for defining policies, procedures and best practices and ensuring an dynamin and efficient Safety Management System. Those procedures have to be fully understood and implemented across the fleet while tracking improvement recommendations. Furthermore, management's commitment is to provide clear and concise documented procedures that identify the roles, responsibilities for all staff, ashore and onboard. Also procedures for efficient communication between shore-based management and the fleet have to be established. This commitment from the company is paramount for any safety management system to meet TMSA 3 standards and key performance indicators.

Example:

Key Performance Indicators from TMSA 3 Stage 4:	Best Practice Guidance:
Senior management demonstrates a clear commitment to implementing the SMS.	*Mission statements contain the high-level and long-term goals and aspirations. The company defines what HSSE excellence means and aims to achieve this through continual improvement Long-term goals and aspirations may include:* • *Zero spills or releases to the environment.* • *Zero incidents.* • *Reduction in permitted emission*

Element 2 – Recruitment and Management of Shore-Based Personnel

The second element deals with the qualification and appointment of key shore-based personnel, such as the DPA, CSO, superintendents, technical manager, HR manager and HSSE manager. Its main objective is to ensure that the fleet is supported by sufficient, skillful and motivated shore-based personnel who are committed to the effective development and implementation of the SMS. The pre-recruitment procedures have to ensure that the candidates are medically fit, technically competent, suitable qualified and experienced to undertake the duties required for their position and to meet the current and the future needs of company. Also the procedures for evaluation, the training and the continuous development opportunities of employees should be integral part of SMS. Personnel records should include a training portfolio for each member of staff, which can be used to ensure that they are kept up to date on recent developments within the industry.

Example:

Key Performance Indicators from TMSA 3 Stage 3:	Best Practice Guidance:
Key personnel retain core technical skills through training, refresher training and participation in industry forums, seminars and conferences.	*Individual training plans and records are maintained.* *The value and effectiveness of these activities are reviewed.*

Element 3 and 3A – Recruitment Management and Wellbeing of Vessel Personnel

The third element focuses on the required processes and best practices for the development of a tanker company's crewing policy and strategies concerning the recruitment, management, and wellbeing of vessel personnel. The vessel has to be manned with seafarers who are fully understand their roles and responsibilities and are capable of working as a team in order to carry out a safe and reliable operation on the vessel. Best practices are achieved through monitoring, training, and providing appraisals and medical screening of crew members while running safety drills and annual audits by manning agents or third parties. Pre-recruitment checks by the employer need to determine the accuracy of an applicant's qualifications and experience. Regular crew evaluation procedures adopted by an employer help check who work as a team and identify the weaknesses in competence and also can encourage and

develop candidates for promotion. Attention is paid on conditions of crew on board, the working hours, the rest hours and the numbers of personnel on board are determined. As well the crew's needs, health, well-being and safety have to be ensured. Finally, basis on this element the regulations of STCW Convention for the minimum basic requirement on training and certification for seafarers have to be followed.

Example:

Key Performance Indicators from TMSA 3 Stage 4: *A documented procedure to conduct vessel health-risk assessments is in place.*	Best Practice Guidance: *Risk assessment may include:* *Exposure to cargo vapours* *Noise and vibration levels* *Hazardous material* *Extremes of temperature and humidity* *Ergonomics* *Lighting.* *Stressful conditions* *These experience factors are considered when commissioning new builds.*

Element 4 and 4A: Vessel reliability and maintenance including Critical Equipment

The fourth element refers to the maintenance and repair procedures so that the vessel operates safely, efficiently, reliably and costly. Procedures for additional inspections, measurement, performance monitoring and physical overhauling of mechanical, electrical and other equipment that could cause an incident are required. A planned maintenance system [PMS] must be established which provides a complete overview of all tasks and enables the company to be kept up-to-date on all planned or unscheduled maintenance work. This system can provide a defect reporting and close-out procedures monitoring by both onboard and ashore. Effective PMS should also ensure that the suitable spares are available for the timely completion of planned work. Another important part of vessel maintenance is the certifications and class documentation which have to be valid. The vessels have to be

compliant with all statutory and trading certificates, while the procedures help the company to be stay up-to-date with automatic triggers and alerts for certificates requiring action. The main target of this element is to avoid incidents, sudden failure, unnecessary delays or pollution and for this reason the main propulsion systems, steering gear and the cargo handling equipment have been identified as "critical equipment". All the procedures of the fourth element of TMSA 3 require a close relationship between a vessel's crew and the designated superintendent, notably in the special cases such as dry-docking, the collaboration between ship and shore staff. Regular vessel visits by superintendents reinforce this relationship.

Example:

Key Performance Indicators from TMSA 3 Stage 2: *Superintendents verify maintenance and defect records during ship visits.*	Best Practice Guidance: *There is a procedure in place requiring appropriately qualified Superintendents to visit and, whenever possible, sail on the vessel to confirm maintenance standards. The procedure may include:* • *Scope of visit.* • *Frequency of visits.* • *The report format including photographic records.* • *Records of visits.* *During the visit, superintendents:* • *Verify that reported maintenance has been carried out, through random cross-checks of records and machinery* • *Observe engineering practices, engine room management standards and machinery space housekeeping* • *Verify al defects have been recorded and reported as required*

Element 5: Navigation safety

This element aims to safety vessel's navigation at all times. Although the master has the fully responsibility for the safe navigation of vessel, the company is liable to establish and maintain navigational procedures that ensure the safety of the vessel. These procedures follow the content of the International Chamber of Shipping publication "Bridge Procedures Guide" and combine navigational techniques suitable to the circumstances of the voyage which should be implemented fully. In respect of best practices guidance, they have included comprehensive navigational audits conducted on passage by qualified and experienced company representatives. Company's audits should be analyzed and to be assessed in order to avoid any weaknesses maintaining the navigational high standards. Finally, the bridge team has to be appropriated trained and the navigational equipment such as updated electronic charts and navigation software should be supported.

Example:

Key Performance Indicators from TMSA 3 Stage 1:	Best Practice Guidance:
Comprehensive procedures to ensure safe navigation are in place	*These procedures may include:* • *Charts and publications management.* • *Berth-to-berth passage planning* • *Under keel clearance requirements.* • *Electronic aids to navigation including ARPA, AIS and ECDIS.* • *Actions upon equipment failure.* • *Actions upon encountering adverse weather, restricted visibility or ice.* • *Supporting checklists.*

Element 6 and 6A: Cargo, Tank Cleaning, Bunkering, Mooring and Anchoring Operation

Through the sixth element planning and operational procedures are established to ensure that on board operation associated with cargo, bunkering and mooring operation are conducted in a safe and efficient manner. The main target of planning and execution of these operations is the safety of the vessel and the crew as well as the protection of the environment. Although the master is responsible for these operations, the company is obliged to establish procedures for accuracy cargo operation and maintenance of high standards. These procedure need to be understood and applied by all relevant staff. Junior officers should be actively engaged in the cargo, bunkering and mooring operations, as part of their personal development plans. Crew members should receive suitable training prior to being placed in charge of cargo, ballasting and bunkering operations, this may include the use of computer-based or simulator training ashore. The most frequent incidents occur during the mooring operation and they are caused by poor working practices and a lack of a proactive safety culture. The procedures provide full range of mooring and anchoring operation activities for any type of berth as well as the necessary equipment for that operation. Planned maintenance programs should include an assessment of suitable equipment and checking whether the number of spares is efficient.

Example:

Key Performance Indicators from TMSA 3 Stage 2:	Best Practice Guidance:
Procedures are in place for the inspection, maintenance and replacement of wires, ropes, tails and ancillary equipment.	*The procedures may include:* • *Inspection methods and frequency* • *Maintenance requirements.* • *Retirement criteria.* • *Minimum spares.* • *Stowage requirements.* • *Record keeping.* *The records may include:* • *Date of bringing ropes/wires into service.* • *Identification and tagging of all equipment.* • *Certification for all ropes/wires/tails/joining shackles.* • *Dates of end for ending.*

Element 7: Management of Change

A temporary or permanent change of any description within the company or onboard procedures could increase the risk of an accident. The seventh element provides procedures for evaluation of the impact that each change may have on operational matters and for identification on which area or personnel will be affected more. The implementation of best practice guideline aims to mitigate the impact of change. Mainly, a risk assessment is necessary to prepare the personnel for the change. The required changes need to be properly recorded and effectively linked with the vessel's document system. In this way, important controlled documentation will remain relevant and up-to-date. The personnel have to be informed in time for any change and a proper training has to be provided to them. The procedures of seventh element require a periodic review of all implemented changes, and evaluation of outcome of those changes.

Example:

Key Performance Indicators from TMSA 3 Stage 4:	Best Practice Guidance:
For major changes to the shore organization, management of change procedures ensure that manning, competency and experience levels are maintained so that there is no deterioration in supervision and the management of key processes.	*Such major changes might include:* • *Significant increase or decrease in fleet size.* • *Introduction of a new vessel type to the fleet.* • *Merger and/or acquisition.* • *Restructuring.*

Element 8: Incident Reporting, Investigation and Analysis

The eight element concerns the incidents. The fundamental principle is that all incidents are preventable. Therefore, the company needs to have procedures in place that incident and near missed are reported, investigated and assessed so as to prevent recurrence. A completely investigation and a root cause analysis are required. As well, measures for the elimination and for the prevention of further incident should be implied. The procedures of this element give emphasis to the human factor and determine that the staff and the crew involved in accident investigation should receive appropriate training by the company's representatives or third-party specialists and should take part on training drills.

Example:

Key Performance Indicators from TMSA 3 Stage 1:	Best Practice Guidance:
Procedures ensure the fleet is rapidly notified of urgent information related to incidents and near misses	*Where an incident has occurred and the company has identified immediate issues of concern to other fleet vessels, then procedures to ensure that immediate investigative and preventative actions are addressed on board. The company verifies that the actions have been completed on each vessel.*

Element 9 and 9A: Safety Management

That element highlights the importance of implementation of the ISM Code and the adoption of proactive safety culture both on board and ashore. This safety culture is enhanced by a continuous review of ISM implementation by shore-based managers, a common risk assessment throughout the fleet and a near miss reporting. For the effectiveness of SMS it is required a systematic identification of potential hazards and measures to reduce risks to the lowest level. Best practices include the introduction of structured work planning, the supplemented minimum STCW safety training of crew and regular inspection by qualified shore-based personnel evaluating the standards of safety. Also, determined emergency procedures must be followed in the event of fire, collision, grounding, flooding, heavy weather or exposure.

Example:

Key Performance Indicators from TMSA 3 Stage 2:	Best Practice Guidance:
Appropriate training in hazard identification and risk assessment is provided to vessel personnel	*Various levels of training are provided based upon individual roles and responsibilities*

Element 10: Environment and Energy Management

This element focuses on environment protection. An environmental and energy management is promoted which contributes to reducing the impact of vessel's operation on the environment. Environmental practices such as the systematic identification, assessment and elimination of sources of marine and atmospheric pollution have major significance. Also equally important is the implementation of measures to avoid or minimizing the potential adverse environmental impact and waste generation ensuring the safe and responsible disposal of residual wastes. The tenth element of TMSA 3 encourages the implementation of reporting procedures and contingency planning in order to cover hazardous incidents. The company monitors must monitor its performance quarterly and provide benchmarks across the fleet to ensure environmental action plans meet standards such as ISO 14001 & MARPOL Annexes. A long term environmental plan should be reviewed and updated regularly. The environmental management plan should include fleet-wide energy efficiency and fuel management practices. Ship recycling practices should adhere to environmentally sound principles.

Example:

Key Performance Indicators from TMSA 3 Stage 3:	Best Practice Guidance:
The potential environmental impact of all company and vessel activities is subjected to evaluation	*The evaluation may include:* • *Measurement and recording of all emissions* • *Acceptable impact levels* • *Procedures and mitigating measures to minimize the environmental impact* • *Impact upon marine life*

Element 11: Emergency preparedness and contingency planning

The eleventh element refers to an emergency response system that deals with the emergencies needs of onboard personnel and company. The procedures ensure that the company can respond to and effectively manage any incidents. Companies are required to develop safety

drills along with shore-based response teams as well as procedures for the recovery following a major incident. The crew is required to take part in training exercises in order to accomplish effective responses to the emergency situation on board. This element identifies the need for media training and security management arrangements to be considered by the company. Plans for incident management must account for the twenty four hour operational practices of most companies. Contact details for relevant members of company and external staff including third party salvage and towing specialists should be available to the person in charge. Designated members of the team should receive media training appropriate to their role, to ensure the control of information passed to the press. A relationship should be established with media professionals to support company staff.

Example:

Key Performance Indicators from TMSA 3 Stage 4:	Best Practice Guidance:
There is a formal business continuity plan identifying and addressing events that may result in serious disruption to the business	*The plan is based on a risk-based assessment of identified credible scenarios. Procedures to enable the company to maintain shore-based operations may include:* • *Personnel and fleet notification procedures* • *The ability for personnel to work remotely and/or alterative premises* • *Remotely located IT facilities including back-up servers* • *Testing the plan at regular intervals*

Element 12 and 12A – Measurement, Analysis and Improvement

One of the most vital aspects of a successful safety management system is the dynamic nature of its implementation. TMSA 3 on the twelfth element refers to an effective SMS as a "living document at the core of the business". The company must ensure that the system manual is utilized as a part of daily vessel's operations. The effectiveness of that manual must be

regularly reviewed and assessed in order to ensure that it works accurately and that it has not become outdated. Through the frequent inspections and audit programmes, the company can monitor the vessel condition and identify the compliance of SMS. The analysis of the results of inspections and internal audits can leads to continual improvement. Staff members with responsibility for performing audits should be suitably experienced and given formal auditor training, a record of audits performed should be held for future reference by management and numbers of audits performed in keeping with those planned monitored. The effectiveness and status of corrective actions recommended in previous audits need to be assessed as part of this process and systems should include a documented process that can be used for this purpose.

Example:

Key Performance Indicators from TMSA 3 Stage 1:	Best Practice Guidance:
An inspection plan covers all vessels in the fleet, with at least two inspections of each vessel a year.	*The inspection is conducted by suitably experienced superintendent(s) and may be carried out in conjunction with other inspections/audits. Following each inspection a repost is made and is reviewed / signed off by shore management. The inspection process provides company management with a comprehensive overview of the condition of the fleet at specified intervals. Records are kept of the inspections and reviews.*

Element 13 – Maritime Security

It is noticeable that for the first time, this self-assessment tool introduces maritime security referring to cyber security. The thirteenth and newest element of TMSA deals with the Maritime Security which is mainly consist of the use of Risk assessment. In order to monitor and manage the changes the ship operator needs to have an effective security management system in place. This system can identify any threat in all areas of the company's business

activities and mitigate to lowest levels. Security management should be included in the internal audit programme while an external specialist can involves if necessary. Vessels should be provided with enhanced security and monitoring arrangements and provisions should be in place to consider, test and install innovative security measures onboard existing and new build ships where appropriate. Nowadays, one of the common threats is cyber threat. Cyber security must be ensured so procedures for the identification of the threat to onboard and company electronic systems are necessary. These procedures should include guidance on cyber security awareness and measures to counteract threats posed by cyber attacks.

Example:

Key Performance Indicators from TMSA 3 Stage 3: *Security procedures are updated taking into account current guidance.*	Best Practice Guidance: *Industry guidance may include:* *• Best Management Practices for Protection against Somalia Based Piracy.* *• Drug Trafficking and Drug Abuse (ICS).* *• Maritime Security - Guidance on the ISPS Code (ICS).* *• Security planning charts.* *• Guidelines on cyber security from industry and Class.* *• Large Scale Rescue Operations at Sea (ICS).* *• Regional Guide to Counter Piracy and Armed Robbery Against Ships in Asia (ReCMP-ISC}.* *Company vessels are provided with the latest editions of relevant security related publications.*

2.5 Self Assessment process

Tanker companies are encouraged to perform regular self-assessment reviews and compare the results against TMSA key performance indicators to implement improvement plans. They then must align their policies and procedures with the industry best practices to achieve performance improvement alongside high standards of safety and pollution prevention.

The companies should match their SMS to KPIs with the four levels. Stages one and two are often referred to as the lower stages and stages three and four described as the higher stages. The higher stages build on the lower stages. The higher the lever they match, the closer they are to fully meeting the objective of that element.

Important factor in the efficiency of assessment is the personnel involved in processes described in TMSA. The assessment of the level of attainment should be as accurate and substantive as possible. Overstating the status of a management system is counter-productive and may lead to inaccuracies in the report.

To achieve the most benefit, the stages should be completed in sequence. Since each level has been completed, relevant documentation is prepared to support the assessment. Failing attainment of an element or stage, a review has to be conducted to develop performance improvement actions.

As per TMSA, companies are advised to review and update assessments in TMSA online tool on an annual basis. Major changes within the company or on its management structure are recommended to improve the existing SMS and to achieve a higher level in any element.

INTERTANKO believes that the system of self-assessment can be relied upon to be successful and assist in the reduction of multiple inspections. This is an aim that every ship owner aspires for and the reason is that by reduced inspections time utilization of the vessel can be maximized and consequently profit margins as well.

Within the given flowchart, it can be seen how the process within a TMSA should be conducted. It can also be seen that a failure to fulfill stage one would have to lead to a revision of the SMS and the ISM Code incorporation within the company.
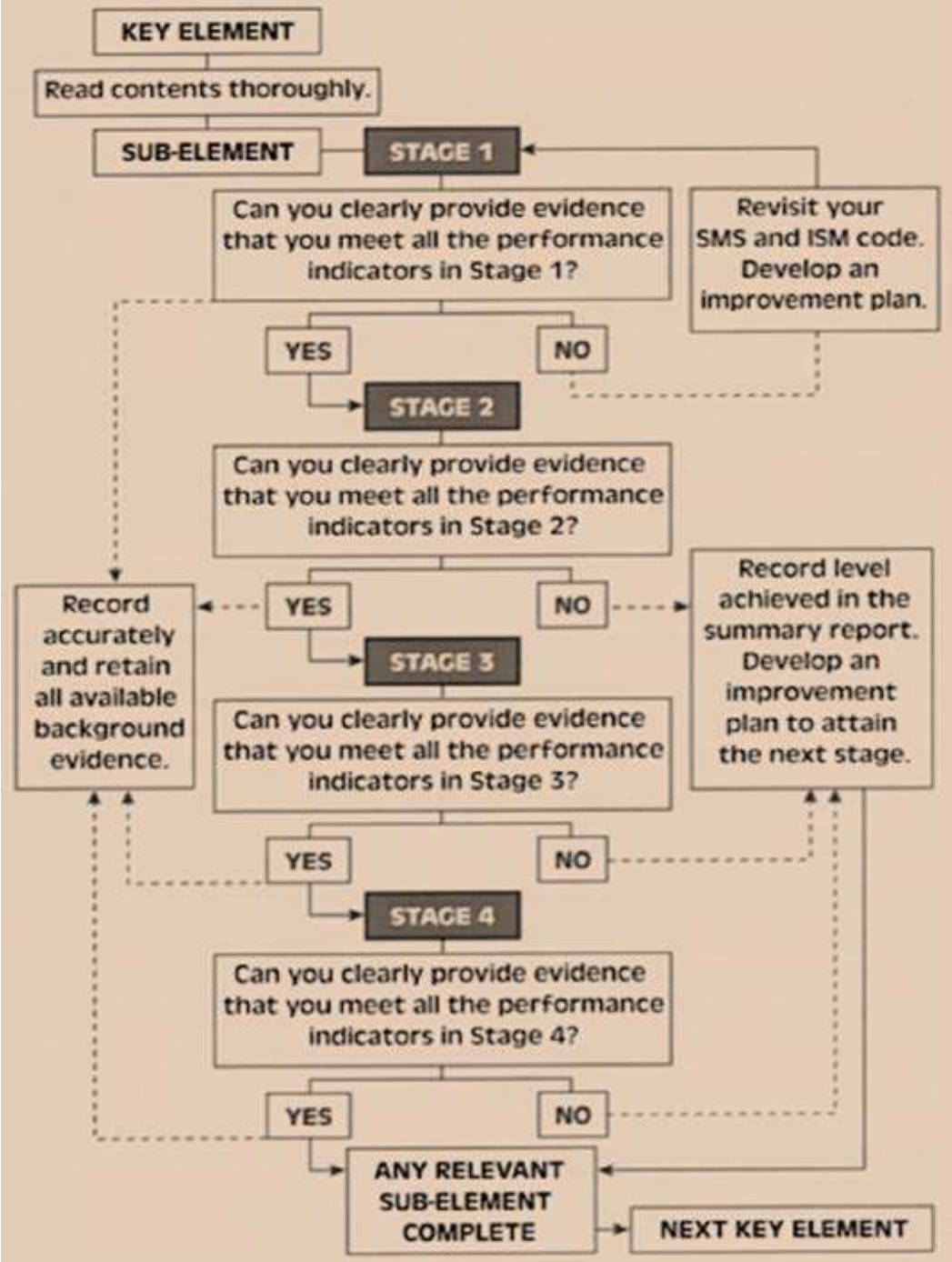

Figure (4): TMSA Development Process – Key Steps (Source – OCIMF)

Chapter 3: CONCLUSION

To be effective, a management system needs to be much more than just procedures. The company leadership/management should define the company's values and aspirations and detail how the company intends to achieve the objectives of their stated policies. Management should provide adequate resources to ensure that the vessels are properly managed, crewed, operated and maintained. The management system should also include procedures which ensure that incidents and near misses are investigated to determine root causes, so that corrective and preventative actions can be implemented. There should be systems in place to analyze risk to ensure exposure to risk is considered at every level of management.

TMSA contains all of these elements and provides a structure to assist owners and operators to assess the effectiveness of their own safety management system with suitable tools; so as to measure and improve aspects identified as being sub-standard or weak.

The benefits of the TMSA to vessel operators are clear:
• Helps to drive up the standards of safety management systems, leading to fewer incidents.
• Encourages a continuous improvement approach to safety management.
• Embeds a preventative approach to maintenance, reducing unplanned stoppages and delays for repairs.
• The reduced the risk of incidents and delays/breakdowns feeds back over time into higher performance in terms of safety and environmental protection and enhances the reputation of the company.
• Companies that incorporate the TMSA guidelines into their management systems are considered to have an active assessment process, even if not being inspected under SIRE or having adopted ISM.
• Reduced risk of incidents feeds back over time into lower insurance costs and higher earnings.
• The process is not imposed upon vessel operators from outside. It is owned and managed by the operators themselves and the resulting data remains fully under their control.

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