



**KISH P & I LOSS PREVENTION CIRCULAR KPI-LP-07-2012**  
**(Guidelines concerning Management [ISM-TMSA] Issues)**

ISO workmanship standards & consequently ISM code are the core elements in maritime management systems.

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 must also provide adequate resources to ensure that the vessels are properly managed, crewed, operated and maintained by well-trained, competent personnel. Equipment must be properly maintained; incidents and near misses investigated to determine root causes so that corrective actions can be implemented.

There must also be systems in place to analyse risk to ensure exposure to risk is considered at every level of management.

TMSA (Tanker Management & Self Assessment) contains all of these elements and provides a structure to assist owners and operators assess the effectiveness of their own safety management system with suitable tools to measure and improve aspects identified as weak or ineffective.

The earliest edition of TMSA was originally intended for tankers of more than 500 GT subject to the requirements of the 1974 SOLAS Convention, and therefore the ISM Code. Four years of experience and comprehensive feedback from the oil industry brought about the publication of TMSA 2 in 2008, which was updated to widen its application to all tank vessels irrespective of size.

Participating companies also benefit from improvements to the on-line benchmarking procedures.

The widespread success of TMSA within the tanker sector has focussed the attention of some industry observers on the suitability of its application to other vessel types. A closer examination of the TMSA key performance indicators (KPI) and best practice guidance very quickly reinforces this view.

All twelve key elements of TMSA refer to aspects of ship management and operational activity that should feature in every safety management system. Circular receivers are strongly advised to review the content of TMSA in detail and consider using it as a good example of industry best practice, irrespective of vessel type.

**A) Improvement; performance monitoring & Benchmarking:**

Although ISM Code Section 12; Company verification, review and evaluation, requires that a company has procedures in place to ensure internal audits on safety and pollution prevention measures comply with the safety management system (SMS), there is little guidance on how this should be achieved leaving the company to form their own view on the effectiveness of their actions.

At the core of TMSA 2, is an opportunity for operators to review their practice and compare performance on a number of pre-determined aspects of ship operation with other companies who have adopted the principles of TMSA.

Benchmarking allows an operator to assess how well they are doing using a number of key performance indicators developed for twelve specific areas of ship management and operation.

**B) Continuous/Continual improvement :**

**The following is a version of PDCA(Plan-Do-Check -ACT) cycle:**



TMSA Key Performance Indicators (KPIs) help operators drive their continuous improvement programmes. The following paragraphs summarise the continuous– improvement cycle.

**Plan :** Effective strategies require clear purpose, policies, processes, roles and responsibilities. TMSA guidelines give vessel operators a clear indication of related processes and targets that will help them plan their goals.

**Act :** The twelve elements of TMSA 2 identify a number of key principles of ship management practice that routinely occur throughout the industry. In order for the organisation to achieve their improvement objectives there must be a consistent implementation of company plans. Operators should communicate plans to employees and then prioritise and target processes for improvement.

TMSA guidelines are designed to help operators apply continuous-improvement tools and techniques. Best practice guidance notes adjacent to each KPI identify processes that can be used to demonstrate the company is fulfilling this stage of development.

**Measure :** Chapter twelve of the ISM Code requires that companies evaluate their safety management system and perform internal safety audits to assess performance and compliance with existing procedures. Safety and environmental excellence requires processes to check and measure the organisation’s progress towards sustainable improvement. This segment of the continuous-improvement cycle indicates procedural compliance, as well as implementation and improvement efforts.

**Improve :** In order to improve, a company must be able to assess its performance and identify relevant goals that will keep the continuous improvement process evolving. 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 segment 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. It is also designed to provide vessel operators with a means by which they can demonstrate a strong commitment to safety and environmental excellence.

### **C) Management System Status :**

The status of a company’s management system is broken down into four key stages. The twelve elements of TMSA contain Key Performance Indicators (KPIs) and examples of best practice for each stage of the development process.

Stages one and two are often referred to as the lower stages and stages three and four described as the higher stages.

Generally, the higher stages build on the lower stages but this is not always the case. The vessel operator may already have addressed some of the higher stage activities without having all the underlying stages in place. The operator may also choose to address activities in a different order than the stages would suggest. However, it should be noted that the most benefit is achieved when the stages are completed in sequence.



Furthermore, if the lower stages have not been effectively addressed, assumptions made in completing higher stages may be unsound. The emphasis should therefore be on completing elements generally in the order presented.

Users will learn most and derive the most value when the processes described in TMSA are completed by their employees.

An example of a KPI (Key Performance Indicator) and corresponding best management practice is included in each of the paragraphs describing the twelve elements.

#### **D) Key Performance Indicators :**

TMSA provides Key Performance Indicators (KPIs) to measure the effectiveness of quality management systems, and progress towards achieving company goals and legislative responsibilities. The company should use KPIs to identify areas of operation that require improvement and lay down follow-up plans that identify the assignment of responsibility for implementing improvements deemed necessary.

As part of the self assessment process companies evaluate which of the four stages of process development best reflects their current operating practice. This forms the basis of the score submitted on the OCIMF on-line self-assessment database and provides the benchmark values for future goal setting and development work.

Operators are encouraged to study each of the four developmental stages of a process and determine whether they can readily provide evidence to demonstrate that they meet performance criteria.

Once adopted TMSA guidelines can form part of the company's safety management system and comprehensively fulfil a company's obligation under chapter twelve of the ISM Code.

A number of KPIs will be considered inappropriate for certain types of vessel operators. These will be primarily concerned with the size of vessel and geographical and operational parameters. These include but are not limited to:

- Inland waterway operations.
- Unmanned craft that do not permit KPI attainment.
- Incompatible management structures within a company of limited size.
- Operation limitations when emergency response is controlled by government agencies.

Following an audit, results can be used to drive a cycle of continuous improvement with clearly defined goals.

Benchmark comparison can be carried out with industrial peers using the TMSA benchmark comparison data.

#### **E) Elements of TMSA Guidelines :**

Guidelines define the twelve principles of management practice and provide a framework for operators wishing to achieve safety and environmental excellence.

► *Element 1 – Management, leadership and accountability:*



A statement of commitment from the company chief executive is a fundamental foundation of any safety management system. Element one acknowledges this fact and outlines the responsibilities of senior managers to provide a clear message on the future goals and ambitions in the CEO's mission statement. This should be supported with clear and concise documented procedures that identify unambiguous lines of authority and a demarcation of responsibility for everyone in the organisation. All employees should be provided with clear instructions on what is expected of them. This should take the form of a job description, agreed by the employee and documented as understood.

Example▼

Key Performance Indicator from TMSA Stage 2 : Safety and environmental excellence are fully understood and supported by vessel and shore-based management teams.

Best Practice Guidance :The company define safety and environmental excellence, establish communication links to encourage information sharing and promote best practices across the fleet. Improvement recommendations are tracked to ensure any necessary changes have been implemented.

►Element 2 – Recruitment and management of shore-based personnel:

A mechanism to control the assessment of competence and certification of seafarers has to some extent been addressed with the introduction and continued revision of STCW .

Element two of TMSA identifies the need for a similar approach to the qualification and appointment of shore based personnel.

A formalised pre-employment process should determine the suitability of applicants for all appointments to shore-side posts, procedures for validating certificates ashore are equally important as those for seafarers and should include recruitment personnel liaising with certificate issuing authorities and the applicant's previous employers.

Continuity, retention and the provision of continuous professional development opportunities for office and ship based staff are considered important steps in nurturing a robust, efficient and committed work force. When staff retention rates drop below 70% TMSA recommends a review takes place to determine why staff turnover is an issue.

The appointment of suitably trained individuals to key positions within the organisation should not be undertaken lightly. Selection processes should be clearly documented and appraisal procedures should include suitable supplementary training opportunities to encourage the development of individuals within the organisation.

Example▼

Key Performance Indicator from TMSA Stage 4: Senior on-board personnel are rotated through office assignments.

Best Practice Guidance : Rotation improves on-board understanding of the wider aspects within the shipping business and improves understanding of marine operations for non-mariner shore personnel. Personnel records should include a training portfolio for each member of staff, this can be used to ensure technical staff are kept up to date on recent developments within the industry and record the training undertaken by members of staff.



► *Element 3 – Recruitment and management of vessel personnel :*

The competence and motivation of a ship's crew have consistently been identified as critical factors in ensuring the safe and efficient operation of any vessel. Pre-recruitment checks by the employer need to determine the authenticity of an applicant's certificates and previous relevant experience. Pre-employment medical screening of crew members such as those offered by Various Associations have been shown to reduce significantly claim costs associated with medical and repatriation expenses.

Regular crew appraisal procedures adopted by an employer will help identify those individuals who work well as team and can be used to ensure crew members are provided with a programme of continuous professional development suitable for the individual's and company objectives. Individual training programmes can then be utilised to support crew weaknesses identified during appraisals and encourage ambitious staff to progress within the company and improve levels of staff continuity.

In situations where a manning agent is used, annual audits of agent premises should be carried out to ensure company procedures are reflected in operating practices.

Element 3 contains detailed advice on the types of procedures that will ensure the integration of suitable best management practices to support and develop a company's vessel crewing policy.

Example▼

Key Performance Indicator from TMSA Stage 3: The company organises senior officer seminars to promote, emphasise, and enhance the company's safety management system.

Best Practice Guidance :The company holds shore based seminars for senior officers at least every two years.

► *Element 4 – Reliability and maintenance standards:*

Well maintained ships contributes greatly to the safe and efficient transport of goods from one port to another. The outcome of vetting and port state inspections can have a significant impact on the efficiency and costs of vessel operation.

Operators are required by the ISM Code to establish and maintain procedures that identify mechanical, electrical and other items of equipment that, in the event of failure, may result in a hazardous situation. This 'critical equipment' will include main propulsion systems, steering gear and cargo handling equipment.

Efficient planned maintenance systems that incorporate defect reporting and close-out procedures will assist with maintaining a vessel's classification status and ensure that a suitable range of spares are available in a timely manner for the completion of planned work activity on board.

Effective systems require a close working relationship between a vessel's chief engineer and the fleet technical superintendant. Regular vessel inspections by superintendants combined with a common computer based planned maintenance programme improve this

relationship and enable both parties to work towards the completion of equipment manufacturers' recommended maintenance practices.

The International Association of Classification Societies (IACS), publication 'A guide to Managing Maintenance in accordance with the requirements of the ISM Code' is a useful guide for planning and implementing an effective maintenance management system.

Example▼



Key Performance Indicator from TMSA Stage 3: A common, computer-based maintenance system on board each vessel records all planned maintenance.

Best Practice Guidance: The maintenance and defect reporting system is held on computer for a better overview and easier editing. This only includes reference to the manufacturer's job description, not the instructions.

► *Element 5 – Navigational safety:*

Although the master is ultimately responsible for the safe navigation of the vessel, the company are obliged to establish and maintain navigational procedures that ensure the safety of the vessel. These are likely to reflect the content of publications such as the International Chamber of Shipping publication 'Bridge Procedures Guide', and ensure that a combination of navigational techniques appropriate to the circumstances of the voyage, are implemented fully. Best practice advice on these procedures includes employing the services of third party chart agent to monitor and support vessel chart catalogues. Electronic chart use should be supported by comprehensive officer training and chart correction software.

Regular reviews of on-board compliance with navigational plans should be performed by the master and crosschecked by the shore-based management team at frequent intervals. The effectiveness of bridge management teams should be included in crew reviews in order that additional training needs can be addressed satisfying TMSA element three.

Example ▼

Key Performance Indicator from TMSA Stage 3: Vessel operators provide bridge resource management training courses for all deck officers. These courses follow a set format.

Best Practice Guidance :Trainers are suitably qualified. Refresher training is conducted wherever needs are identified. Staff training records are documented.

► *Element 6 – Cargo, ballast and mooring operations :*

The structural safety of the vessel depends upon detailed planning of coordinated cargo and ballast operations. Stress, draught and trim must be regularly checked throughout cargo loading and discharge to ensure loading plans are being followed. Industry guidelines that include IMO publications, IBC Code, IMSBC Code, BLU Code, BLU Manual, CSS Code, and ICS publication ISGOTT, are among best practice guidelines that should be incorporated into all relevant cargo operations.

Loading computers should be regularly assessed against class approved criteria to ensure operational accuracy and records are maintained. Frequency of testing should be included in the vessel management documentation. Crew members should receive suitable training prior to being placed in charge of cargo and ballasting operations, this may include the use of computer based training software as part of shore based supplementary training courses. Personal injury accidents that occur during mooring operations are often exacerbated by poor working practices and a lack of a proactive safety culture on board. Crew familiarisation training and the supervision of mooring operations should emphasize the importance of avoiding 'snap back zones' and a thorough briefing of mooring equipment operation. OCIMF Guidelines and the UK MCA publication 'Code of Safe Working Practice for Merchant Seamen (COSWP)', Chapter 25 – Anchoring, mooring and towing operations - contain detailed guidelines on operational best practice.



Planned maintenance programmes should include an assessment of the suitability of all mooring equipment and incorporate winch brake testing and the number of spare mooring ropes and wires should reflect the trading pattern of the vessel.

Example▼

Key Performance Indicator from TMSA Stage 3: There is a documented system in place to ensure that junior officers/relevant vessel staff are actively involved in cargo planning and the execution of cargo and ballast operations.

Best Practice Guidance :Appraisal reports verify regular participation in support of the officers' training and development process.

►Element 7 – Management of change :

Change of any description within an organisation or on board a ship introduces the possibility of additional risk. An evaluation of the impact change may have on operational matters and procedural tasks will assist in identifying which aspects of the company will be affected most, this will also determine who should be responsible for managing the change and whether there may be preparatory work required to re-train or issue new equipment to those affected. Suitable risk assessment will then be necessary to control the implementation of this process.

COSWP Chapter 1 - Risk Assessment – provides detailed instructions on how this should be carried out. Technical changes may also require the provision of revised drawings, equipment, operational and technical maintenance manuals in order to maintain a detailed documented history of a vessel and provide crew members with the information they require to operate and maintain the vessel in a safe manner. Change therefore requires a documented process to ensure every aspect of the 'change process' has been addressed; this may well sit comfortably within the company's safety management system.

Objectives identified at the time of introducing change need to be assessed to determine their effectiveness. TMSA Element 7 recommends that this should take place on an annual basis and may form part of the organisation's twelve monthly review of their safety management system.

Example▼

Key Performance Indicator from TMSA Stage 2: The system ensures that the documentation supporting a change includes the reason for the change, a clear understanding of the safety and environmental implications, and the appropriate level of approval.

Best Practice Guidance: The company has a document process that ensures authorisation for any change is approved by senior vessel management/responsible person and not by the person directly involved in the change. The document includes reference to appropriate safety and environmental issues.

►Element 8 – Incident investigation and analysis :

Accident prevention requires a careful and thorough analysis of incidents to ensure that contributing factors can be avoided in the future. This requires a consistent approach by the organisation to accident reporting, investigation and analysis in order that lessons learned may be communicated to other vessels and departments.

Element 8 highlights the importance of crew members involved in accident investigation receiving suitable training and support from the company and third party subject specialists.



Training programmes should include suitable refresher training and this should form part of the individual's personal training programme.

Company reflection and review practices must ensure that incident information and analysis findings are promulgated efficiently to the other vessels within the fleet and details are discussed with crew members during safety committee meetings and onboard training drills.

Example▼

Key Performance Indicator from TMSA Stage 2: External training in incident investigation techniques, including root-cause analysis, is given to at least one of the shore-based management teams.

Best Practice Guidance: The company uses classification societies/ contracting companies to provide specific courses in incident investigation. Knowledge from the training courses may then be used to train other shore and vessel personnel.

► *Element 9 – Safety management :*

TMSA came about following inconsistencies in the development of individual safety management systems and apathy in their application. TMSA principles are intended to enhance the implementation of the spirit of the ISM Code and the adoption of a proactive safety culture on board.

Monitoring the implementation of safety management systems requires a document review by shore based managers of working practices carried out on board. Completed risk assessments should be reviewed by technically competent company representatives, common risk assessments introduced throughout the fleet and near miss reporting adopted to promote the safety culture on board.

Best practices include supplementing minimum STCW safety training with personalised training relevant to the role of individual crew members on board. Senior officers and visiting shore managers should lead by example in the use of appropriate personal protective equipment.

Example▼

Key Performance Indicator from TMSA Stage 3: Appropriate company representatives make extended visits to all vessels within the fleet to confirm safety standards and ensure that safety training programmes are effectively implemented.

Best Practice Guidance :Company representatives (possessing sufficient marine technical knowledge and background to properly evaluate and advise vessel personnel) should try to make a short voyage on the vessel at least annually, and should observe and advise the company of any required safety improvements and corrective actions.

► *Element 10 – Environmental management :*

Fundamental to effective environmental practice is the systematic identification and assessment of sources of marine and atmospheric pollution, reduction and safe disposal of potentially damaging residual waste. There should be reporting procedures for pollution and near miss incidents and contingency planning for potentially hazardous incidents. Reference in company protocols to the requirements of MARPOL Annexes and/or national and regional limitations should be supported by regular reviews of action necessary to ensure present and future compliance. An environmental action plan accredited for an international standard such as ISO 14001 should be reviewed annually and updated on a regular basis with company performance monitored quarterly and benchmarked across the fleet.



Environmentally critical equipment should be identified in planned maintenance procedures to ensure operational performance and the carriage of suitable spares is maintained. Company practices should be future-proof with procedures introduced to accommodate pending legislative changes and environmental waste reduction. Non-conformities should be addressed within the company auditing process.

Example▼

Key Performance Indicator from TMSA Stage 4: Environmental performance is benchmarked across the fleet and against the oil/marine industry as a whole.

Best Practice Guidance :Performance is monitored at least once per quarter within the company and annually across the industry.

►Element 11 – Emergency preparedness and contingency planning :

An effective response to on board emergency situations has been encouraged for many years within merchant shipping legislation requiring ships' crews to participate in training exercises on board. This was promoted further in ISM Section 8 – Emergency preparedness.

Stopping short of identifying individual scenarios that should be addressed on board, this legislation requires companies to develop a programme of drills and a shore based response team to participate in structured training activity.

Element 11 of TMSA expands on these requirements and 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 and provide shore based emergency response personnel with the resources they need to manage an incident. Contact details for relevant members of staff and third party salvage and towing specialists should be available to the person in charge to ensure suitable levels of cover are provided in the event of an emergency developing. Designated members of the team should receive media training to ensure the control of information passed to the press and a relationship established with media professionals to support company staff. Scenario planning on board should ensure that training exercises are credible, realistic and involve the shore based support team. Timing of exercises should include the testing of procedures outside the normal working hours of the office personnel. Exercises should reflect the nature of vessel and fleet operation and should be recorded on a company matrix.

Example▼

Key Performance Indicator from TMSA Stage 2: Lessons learnt from exercises and actual incidents are incorporated into the emergency response plans when they are updated.

Best Practice Guidance :The company records lessons learnt, subsequent improvements, corrective actions and resolution. In some jurisdictions, local authorities may take over the management of the response and may stipulate the response plan and define associated training requirements.

►Element 12 – Measurement, analysis and improvement :

Perhaps the most important feature of any effective safety management system is the dynamic nature of its implementation. TMSA refers to this as a 'living process at the core of the business'.

Operators must strive to ensure their system manuals do not sit on the shelves gathering dust; they should be used as a tool in the daily operation of the processes and procedures they refer to. The effectiveness of that tool must be reviewed and assessed on a regular basis to make sure that it accurately reflects the nature of the work in hand and has not become outdated and irrelevant. Vessel



inspections, checks on legislative compliance by ships' crews, and a review of actions closed out following audit will all give an indication of how well the system is performing. A fleet standard format of inspection that satisfies the requirements of industry best practice guidelines should be used for internal audits performed on all vessels and shore support offices associated with the system.

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. An analysis of inspection results and the operator's ability to satisfy ISM requirements as well as regulatory and legislative amendments should form part of a management review.

**Example▼**

Key Performance Indicator from TMSA Stage 3: The company analyses its inspection results and compares them with data from third-party inspections (such as the SIRE, CDI or EBIS systems) and makes comparisons between vessels within the fleet, particularly with any vessels built to a similar design and specification.

Best Practice Guidance :The company regularly compares its own inspection results with the results of inspections conducted by third parties. Where there are consistent anomalies, the company reviews and improves its vessel inspection process. The company also compares inspection results within its own fleet and between its vessel inspectors. The company uses these comparisons to monitor/improve fleet inspection standards.

**Conclusion :**

Although intended in the first instance as a 'best practice guide' for the tanker industry, TMSA has enormous potential for other operators to use to improve safety management by identifying Key Performance Indicators and examples of best practice equally applicable to other vessel types.

Using the International Safety Management (ISM) Code as its foundation, TMSA incorporates existing industry guidelines supported by practical examples of best practice and procedures that enable an operator to assess their own safety management system and benchmark their progress through four key stages of process development.

Implementing a comprehensive and effective safety management system is a significant challenge on its own. Maintaining it as a living document at the core of operational practice makes that challenge all the more difficult. Using TMSA as part of a consolidated approach to this task has been shown to succeed, providing a safer environment for those on board and reducing risk to the environment.