

Human element knowledge & skills framework – Technical

Traditionally the crew will identify something and ask engineers to fix it. Increasing constructional and system complexity, especially the use of software, means that some sorts of change can no longer be made on the ship. However, if properly described and justified, a change or replacement can be considered by the company, or the manufacturer. Both ships' engineers and service engineers are in a position to identify the need for revisions.

Technical Directors/Superintendents/Chief Engineers

Be fully conversant with and fully understand the need to implement:

- pertinent IMO, ILO, WHO and other regional instruments relevant to maritime safety and protection of the marine environment
- international codes, guidelines and standards in the context of SOLAS 1974 (as amended), STCW 1978 (as amended), and MARPOL 73/78 (as amended)
- the provisions of the ILO Maritime Labour convention 2006 (MLC, 2006)
- other regional instruments relevant to maritime safety and protection of the marine environment
- Company regulations relevant to the safe conduct of the ship, the safe and timely delivery of its cargo and the health, safety and wellbeing of the crew
- IMO Guidelines for Engine-Room Layout, Design and Arrangement (MSC/Circ.834), as appropriate

Superintendents

Fully understand the need to:

- take account of the human element in the acquisition, supply and operation of systems and the management of services
- include human element issues in decision making, trade-off and risk management studies, in order to mitigate the risk to safe and effective ship and company operation
- ensure that human element issues arising from the technical operation, support and maintenance of the ship and its systems are given sufficient attention
- ensure that the human element is given sufficient attention throughout the introduction and validation of a new system
- facilitate information feedback, exchange and other communication about human element issues, including the provision of human element data in standard formats
- effectively involve and consult crew and support staff on each significant aspect of the ship and its systems in order to improve its usability, health and safety, or technical performance
- ensure that modifications to the ship and its equipment take account of human element issues identified in service, and that the human element is managed during major work originating from the company office
- present the needs and represent the interests of the crew and support staff to naval architects, designers, equipment manufacturers in the specification, design and acceptance of a ship or its systems
- provide data on ship technical operations in order to improve staffing provision and deployment, ship and system design, and operational deployment
- ensure the usability of a system, by selecting and applying appropriate practices that use human element data
- ensure that all manufacturers' handbooks and ship system operating procedures are written in the native language of the reader and are not technically complicated or difficult to understand
- ensure that all technical officers have the necessary experience and skills base to translate their certificates of competency from a point assessment into genuine capability to perform their functions onboard at the required level

Recognise:

- the importance of safety at sea, prevention of human injury or loss of life, and avoidance of damage to the environment, in particular to the marine environment and to property, in accordance with the requirements of the ISM Code
- the Master's responsibility with regard to: implementing the safety and environmental-protection policy of the Company; motivating the crew in the observation of that policy; issuing appropriate orders and instructions in a clear and simple manner; verifying that specified requirements are observed; and reviewing the safety management system and reporting its deficiencies to the shore-based management
- that the master has the overriding authority and the responsibility to make decisions with respect to safety and pollution prevention and to request the Company's assistance as may be necessary

Chief Engineer

Recognise:

- the importance of properly addressing the human element in the provision of a safe, efficient, effective and acceptable working environment.
- the importance of safety at sea, prevention of human injury or loss of life, and avoidance of damage to the environment, in particular to the marine environment and to property, in accordance with the requirements of the ISM Code
- his/her responsibilities with regard to scope and use of the safety and work management systems; motivating the crew in the observation of the policy; planning work, issuing appropriate orders and instructions in a clear and simple manner; and ensuring that specified requirements are observed

Ensure that:

- the overall performance of the ships and its systems is consistent with required capability
- ship maintenance and maintainability requirements for support are met by the ship and its systems in conformity with the provisions of relevant rules and regulations and Company instructions
- crew are effectively involved and consulted on each significant aspect of the ship and its systems so as to improve its usability, health and safety, or performance and are notified of changes made to design, operation, training or manning as a result of their input
- the technical officers, ratings and officer trainees are aware of human element issues and are engaged in the feedback process.
- all technical officers, ratings and officer trainees are fully conversant with the Company's safety and work management systems the identity and role of the DPA, and the results of audits and reviews
- newly-joined technical officers, ratings and officer trainees are familiar with their duties
- all technical officers, ratings and officer trainees have an adequate understanding of relevant rules, regulations, codes and guidelines
- non-conformities, accidents and hazardous situations are reported in accordance with the SMS, timely corrective action is taken on deficiencies identified in audits and reviews
- appropriate training (including onboard continuation training) is provided for all technical officers, ratings and officer trainees
- all work to be carried out by technical staff is effectively planned and controlled
- relevant information is provided in (a) language(s) understood by crew members
- technical officers, ratings and officer trainees are able to communicate effectively in the execution of their duties
- plans and instructions for shipboard technical operations are available; tasks involved are defined and assigned to qualified crew members
- procedures are in place to identify, describe, prepare for and respond to potential machinery breakdowns and emergency shipboard situations
- valid documents are available on board; changes to documents are reviewed and approved by authorized personnel; obsolete documents

are promptly removed. All documents and data relevant to the safety and work management systems are properly controlled.

- handover documents to provide continuity in the completion of scheduled inspection and maintenance programmes and in the smooth functioning of the technical department are prepared by all technical officers

Technical officers

Be fully conversant with and fully understand the need to implement:

- the provisions of MARPOL 73/78 (as amended)
- other regional instruments relevant to maritime safety and protection of the marine environment
- Company regulations relevant to the safe conduct of the ship, the safe and timely delivery of its cargo and the health, safety and wellbeing of the crew
- the principles of Engine Room Resource Management, safe working and Ergonomics.
- procedures for responding to system failures and emergency situations
- the importance of properly addressing the human element in the provision of a safe, efficient, effective and acceptable working environment

Ensure that:

- ship systems are maintained in a workable and controllable condition.
- all work is effectively planned and controlled in accord with the requirements of the safety, environmental and work management systems
- handover documents are prepared, to provide continuity in the completion of scheduled inspection and maintenance programmes and in the smooth functioning of the technical department
- he/she is aware of human element issues and is engaged in identifying and reporting these
- crew are effectively involved and consulted on each significant aspect of the ship and its systems so as to improve its usability, health and safety, or performance

Specialists/service engineers

Be aware of:

- regulatory requirements and guidance on the installation and testing of equipment to ensure its safe and effective operation
- particular requirements for installation and training associated with equipment required for regulatory compliance

Fully understand the need to:

- ensure that the location of equipment accords with regulations for layout, relevant handover information and documentation
- ensure that equipment is in accordance with ship, working practices and documentation processes
- collect feedback/information on usability and suitability of equipment
- ensure that installed and maintained systems are properly (re)integrated with other equipment and systems
- ensure that the installation report includes usability and ergonomic issues and how these were addressed

