POSITION PAPER

Human Element

(Revision 1)

IACS
International Association of Classification Societies

Our Position

IACS is working towards enhancement of focus on the Human Element in respect of safety, security and environmental protection, with due consideration to digitalisation and decarbonisation aspects, identifying risks posed to and by the human in ship's entire life cycle and mitigating them at the design stage. Only where hazards cannot be designed-out or mitigated at the ship design stage, IACS will advise on other mitigation measures where appropriate.

IACS will strive to achieve technical solutions that aim to promote inherently safer designs (particularly if considering the human element), This includes adopting a human-centred design philosophy in the process of developing new IACS instruments.

BACKGROUND

Ships will require an extensive use of novel technologies, such as those needed for cutting carbon emissions by alternative means of propulsion and power generation, or those dealing with a high level of integration, interaction and automation onboard for routine operational matters, such as ship performance monitoring, routing, manoeuvrability and many other operations at sea and in port.

Although operating complex systems may add to the skill set of Engineers, Masters, Officers and crew, proper consideration of the Human Element stipulates that the systems themselves should assist people, not place additional demands on them. A human-centred approach applied from the earliest stages of design facilitates

- Proper consideration of those who interface with the system either directly or remotely,
- Makes the most of human knowledge, skills and abilities,
- Identifies what they will contribute to safe and effective operation

and only then the residual new skills or training (required to deal with normal operations, foreseeable abnormal situations and emergency conditions) need be introduced.

Rules and regulations should follow the same principles, in view of considering human element issues at the earliest stages of regulatory developments.

SUMMARY OF KEY ISSUES

IACS, aims to raise the awareness within the shipping industry about the complex interface between people and systems onboard. The objective is to ensure that people are not harmed, and that systems are not damaged by people or used in an unsafe, insecure or environmentally damaging way.

IACS POSITION

IACS' approach seeks to highlight and emphasise the importance of properly addressing human element aspects when developing new IACS requirements applicable to the ship and ship systems.

Scope of class

The increasing complexity of system-human interfaces introduces new risks that will impact classification aspects.

This will have an impact on the scope of class, moving from prescriptive to functional requirements capable of preventing and mitigating inherent risks, including those relating to the human element.

Model-based engineering, simulation, predictive techniques and risk assessment should be integrated with human centred design to support the classification of ship systems throughout the ship lifecycle.

Development of new IACS instruments

IACS routinely analyses human element issues, when developing any new IACS resolutions.

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Recent developments in ship digitalisation and decarbonisation, including use of alternative fuels; and the wider use of autonomous ships, require development of related classification rules and other regulating documents. These should include Human Element aspects and be based on the human-centred approach.

Approval of computer-based systems

IACS aims to encompass the entire lifecycle of computer-based systems, from design to operation, for identifying the accountable responsible roles, specifying their obligations and the relevant verification process.

Human-centred design applied to computer-based systems will enable a broader range of people to operate complex systems productively and safely. The aim is to design technology which is understandable and usable by people who work in the maritime industry.

SUMMARY OF WORK CARRIED OUT BY IACS ON THIS ISSUE TO DATE

Guidelines to address Human Element issues in IACS Working Groups

IACS guidelines have been developed to help working groups to identify and consider possible impacts of the human element, when developing new IACS resolutions. They require IACS working groups to adopt a human-centred approach, to consider how to take best advantage of human abilities and to compensate for human weaknesses, as well as to foresee risks posed by persons.

As part of the IACS *"Guidelines to address human element issues in all IACS Working Groups"*, IACS has developed a human element impact assessment checklist, which is to be used by IACS' Working Groups when developing new IACS instruments.

The structure of the proposed method of establishing human element competencies, and proposed assessments

A document, including a matrix, related to the identification of Human Element considerations and its competencies within IACS, has been produced.

This document provides information and identifies Human Element aspects in which IACS has competence and also identifies aspects in which IACS lacks competence. The lacking IACS' competence may be achieved with interaction and collaboration with other stakeholders within maritime industry such as Human Element Industry Group (HEIG).

White Paper on the Human Element

The scope of IACS White Paper on the Human Element is to focus on the human element and promote the application of a human-centred approach during the development of rules and regulations for the design, construction, and operation of ships.

Considering the fact that addressing the human element issues effectively need a concerted approach, and that input is needed from those who have real experience of systems operated on board and ashore, cooperation with Industry is set as a guiding concept in IACS White Paper on the Human Element.

IACS Human Element recommendations for structural design (Rec.132)

This recommendation provides information on industry best practices regarding human element considerations for structural design of various arrangements, including lighting, ventilation, vibration, noise, access and egress.

On going cooperation with other interested Parties

IACS seeks to cooperate with Industry, regulators and other stakeholders in the application of approaches that place humans at the heart of the design process, considering people as part of systems and seeks to understand their needs, behaviour and required experiences, considering what should be expected from them, and the need for skills/training.

Important work is being carried out by a Joint IACS/Industry Working Group on futureproofing the maritime safety regime, considering the ongoing digital transformation of the shipping industry, collecting evidence, and supporting examples covering safety considerations for complex systems that currently fall outside prescriptive requirements.

IACS also participates in the IMO/NGO Human Element Industry Group (HEIG) led by the Nautical Institute. So far the HEIG has been developing various documents mostly related to safe design of vessels and vessel's equipment such as cargo hold ladders, as well as safety issues related to entry into enclosed spaces.

IACS concept and experience in identification of Human Element impacts obtained in the application of IACS *"Guidelines to address human element issues in all IACS Working Groups"* has been presented to HEIG during HEIG meeting in June 2024.

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Guidelines to address Human Element Issues (Rec.192)

The purpose of this recommendation is to provide information on how IACS Working Groups consider the complex, multi-dimensional issue of the human element in development of resolutions, interpretations and recommendations. These guidelines may also be useful for other organisations in the shipping industry when developing similar documents (for example, policies, codes, conventions, standards).

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