Safety Updates for Relevant IACS work

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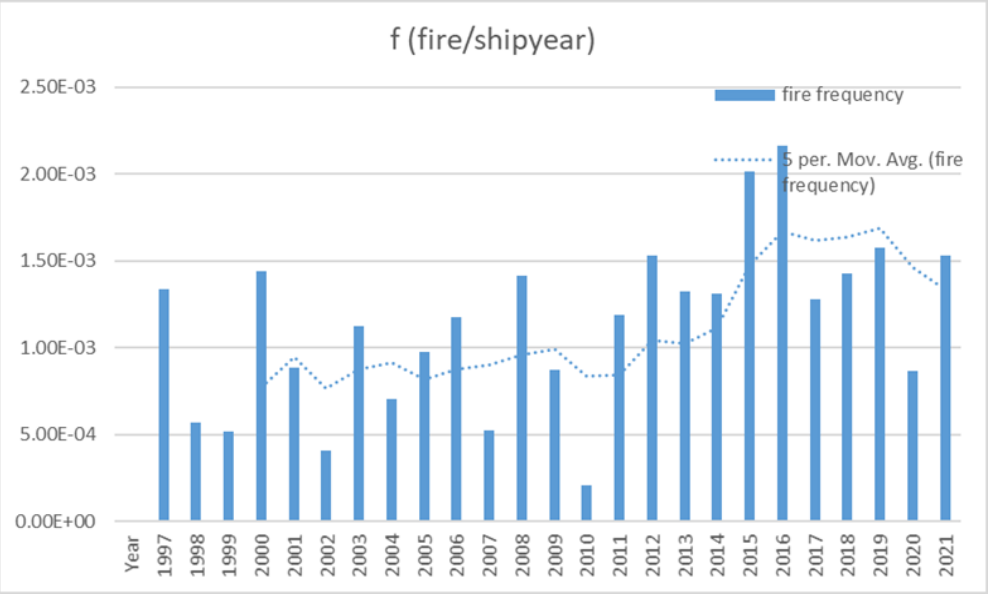
1. Containership Safety
2. Underwater Radiated Noise from ships
3. Remote Surveys
4. Human Element

1. Containership Safety

Background

- Fire is in the focus of containership safety (origin of fire: ~50% machinery and ~50% cargo)
- Cargo fires:
  - SOLAS II-2/10.7 amendments require for deck cargo “mist lance” & “water monitors” (ships > 1 January 2016)
  - However, insurances observe still very high consequences and concerns raised regarding the effectiveness of the regulations.



CARGOSAFE (2023): frequency of cargo fires

Machinery Fire

- IACS is developing an IMO submission to MSC 109 proposing a New output on the draft amendments to SOLAS regulation II-2/4 (Probability of ignition) related to low-pressure fuel pipes (e.g. better piping arrangement onboard, human elements aspects)
- Data providing insights in number of accidents as well as root causes (till year 2018, being updated until 2022)

Cargo fires: Timeline

2021

- MSC 103 agreed new output for SSE relating to detection and control of fires in cargo holds and on deck of containerships
- EMSA: Initiated CARGOSAFE study, which is an FSA on this topic (planned duration 60 weeks)

2022

- SSE 8: Postponed any discussion until FSA becomes available

2023

- IACS High-Level Position Paper (Jan.)
- CARGOSAFE study reports published by EMSA (March)
- IMO EG/FSA reviewed CARGOSAFE in October (IACS participation)

2024

- *SSE 10 will commence work in WG (DL: 03/31 December 2023)*

IACS Position

- Development of new or update requirements should be based on risk analysis (SSE 8/10, SSE 8/10/3). IMO Formal Safety Assessment is the appropriate process.
- Consider CARGOSAFE as basis for IMO discussion. If needed, perform further analysis to identify additional risk mitigating measures or further develop measures considered by CARGOSAFE.
- Collect additional data/information on fire casualties as well as risk mitigation measures to support development of new IMO requirements
- No additional (competing) FSA is to be conducted

CARGOSAFE

- Study based on a sample considering Containerships > 1980 and ≥ 500 GT
- Number of fire casualties since 1997: 124 (non-serious/serious) (only 25 investigation reports)
- Risk analysis and analysis of risk mitigation measures for three ref. vessel: 18,000 TEU, 7,500 TEU and 3,500 TEU
- Risk mitigating measures

Category	No RCM	Considered in RCOs	No RCO
Prevention	18	7	5
Detection	13	9	5
Fire-fighting	26	17	5
Containment	15	6	4

CARGOSAFE: CBA

GCAF
NCAF

Cost effective RCOs (acc. IMO criterion)

	RCO	Twin Is.	Single Is.	Feeder
P4	Improved control of lashing[1]	Yes		
D2	Heat detection looking at individual container temp. rise	Yes	Yes	
D5	Portable IR cameras[2]	Yes	Yes	
F2	Imp. manual fire fighting tools for individual cont. breaching	Yes	Yes	
F3	Manual firefighting tools that increase reach[3]	Yes	Yes	
F4	Methods for unmanned fire fighting	Yes	Yes	Yes
C1	Active protection underneath hatch covers to protect from fire spread towards the deck	Yes		
C2	Passive protection to protect from fire spread towards the deck	Yes	Yes	

[1] Eugene Maersk (2013), Zim Kingston (2021)
Consider: Top Tier JIP (05-2021 to 04.2024); CCC work on “tracking of lost containers”
[2] Also proposed by SSE 8/10/1
[3] Consider water mist lance (self cutting; F2) in combination with telescopic lift (SSE 8/10/2)

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- IACS Expert Group FSA reviewed CARGOSAFE study regarding the requirements for an FSA (MSC-MEPC.2/Circ.12/Rev.2):
  - Study in compliance with recommendations of MSC-MEPC.2/Circ.12/Rev.2
  - For some of the RCOs quantification could have been better described
  - Several RCOs on prevention collected but not considered in CBA (“out of scope”)
  - CARGOSAFE introduced a new parameter for CBA (Benefit Cost Ratio: BCR>1)
- IACS participated in IMO Expert Group meeting

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- IACS commenced review of risk mitigating measures considered in CARGOSAFE study with respect to:
  - Feasible, effective and efficient?
  - Improvement of proposed measures
  - Identify additional risk mitigating measures (if any)

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- Aspects for further consideration (selection):
  - General:
    - review current requirements (STCW, SOLAS) for training and drill (fire-fighting) with respect to adequacy for containerships/large containerships
    - review IMDG Code with respect to
      - quantity limits of dangerous goods (when declaration necessary)
      - stowage location of class 5.1 cargo
      - test methods for self-heating cargo
  - Improve proposed RCOs
    - Use modern sensors in existing smoke detection system (reduce detection time)
    - Temperature sensors for containers with class 4.1/4.2 cargo
    - Improved performance requirements for manual fire-fighting equipment

Recommendations

Cargo fires:

- CARGOSAFE provides the basis for IMO discussion, e.g.
  - Identify additional risk-mitigating measures
  - Potential for improving risk mitigating measures (reduce costs, improve performance, retroactive implementation)
- IMO discussion
  - Amendments should consider adequate performance requirements
  - Consider review of
    - fire-fighting requirements for training and drill (adequate for containerships/large containerships)
    - IMDG Code
- IACS is submitting a paper to SSE 10 on IACS' technical evaluation of the CARGOSAFE FSA study and IACS' initial deliberations on the risk-mitigating measures proposed therein

Machinery space fires:

- IACS will propose a new output (MSC) to MSC 109 to amend SOLAS regulation II-2/4 related to low pressure fuel pipes

2. Underwater Radiated Noise from ships

Why the increased interest ?

Underwater Radiated Noise

1. The audible range of hearing for marine fauna spans from as low as 5 Hz up to about 200 kHz. Marine mammals and fish use hearing as their primary sense and are highly dependent upon sound for navigation, communication, finding food, reproduction and hazard detection.

2. Acoustic masking occurs when the presence of one sound (noise) reduces the ability of an animal to perceive a second sound (of interest). Acoustic masking is a threat to marine fauna, especially those species that communicate on the same frequencies as the noise radiated by ships.

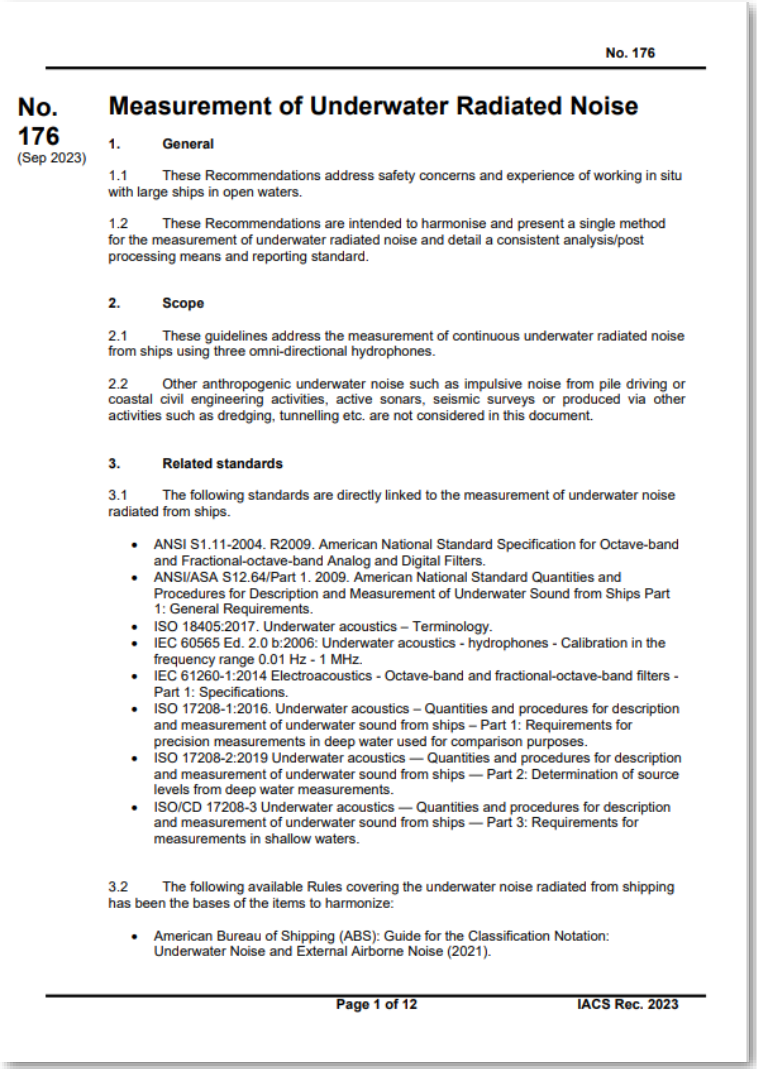
   Therefore, an excessively high level of ambient noise in the low frequency range can have a negative impact on their population.

Why Underwater Noise Notations?

- Control of shipping-related noise initiatives such as:
  - Vancouver Fraser Port, Prince Ruppert Port: Discounts on harbour fees.
  - Environmentally marked sensitive areas within Northern America and Europe
- Enable shipowners and operators to demonstrate environmental stewardship.
  - Permits access to noise sensitive areas
- Proactive in meeting potential upcoming IMO provisions to underwater noise.
  - Underwater noise is receiving increased focus from IMO (updated 2023 URN Guidelines)
  - Regional considerations

Measurement of URN

- IACS has published a new IACS Recommendation No. 176 (Sept. 2023).
- The new Recommendation aims at:
  - Harmonizing the methods of measurement of underwater radiated noise (URN) from ships.
  - Providing a consistent analysis/post processing means and reporting standard.



No. 176

No. 176 (Sep 2023)

Measurement of Underwater Radiated Noise

1. General

1.1 These Recommendations address safety concerns and experience of working in situ with large ships in open waters.

1.2 These Recommendations are intended to harmonise and present a single method for the measurement of underwater radiated noise and detail a consistent analysis/post processing means and reporting standard.

2. Scope

2.1 These guidelines address the measurement of continuous underwater radiated noise from ships using three omni-directional hydrophones.

2.2 Other anthropogenic underwater noise such as impulsive noise from pile driving or coastal civil engineering activities, active sonars, seismic surveys or produced via other activities such as dredging, tunnelling etc. are not considered in this document.

3. Related standards

3.1 The following standards are directly linked to the measurement of underwater noise radiated from ships.

- ANSI S1.11-2004. R2009. American National Standard Specification for Octave-band and Fractional-octave-band Analog and Digital Filters.
- ANSI/ASA S12.64/Part 1. 2009. American National Standard Quantities and Procedures for Description and Measurement of Underwater Sound from Ships Part 1: General Requirements.
- ISO 18405:2017. Underwater acoustics – Terminology.
- IEC 60565 Ed. 2.0 b:2006: Underwater acoustics - hydrophones - Calibration in the frequency range 0.01 Hz - 1 MHz.
- IEC 61260-1:2014 Electroacoustics - Octave-band and fractional-octave-band filters - Part 1: Specifications.
- ISO 17208-1:2016. Underwater acoustics – Quantities and procedures for description and measurement of underwater sound from ships – Part 1: Requirements for precision measurements in deep water used for comparison purposes.
- ISO 17208-2:2019 Underwater acoustics — Quantities and procedures for description and measurement of underwater sound from ships — Part 2: Determination of source levels from deep water measurements.
- ISO/CD 17208-3 Underwater acoustics — Quantities and procedures for description and measurement of underwater sound from ships — Part 3: Requirements for measurements in shallow waters.

3.2 The following available Rules covering the underwater noise radiated from shipping has been the bases of the items to harmonize:

- American Bureau of Shipping (ABS): Guide for the Classification Notation: Underwater Noise and External Airborne Noise (2021).

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Further Harmonization Efforts

Deep water

- ISO 17208-1 (Part 1: Requirements for precision measurements in deep water used for comparison purposes)
- Detailed, rather comprehensive, depth > 150m or 1.5x ship length
- Three hydrophones (the deepest at 1 x ship length)

Shallow water

- ISO/CD 17208-3 (Draft: Requirements for measurements in shallow water)
- Correction based on detailed numerical calculation of the Propagation loss
- An IACS project team continues to consider the measurement of underwater noise with a view of harmonizing the measurements procedures proposed to date under the different class notations, taking industry and ISO developments into account.

Summary of IACS work to date

- IACS has published a new Recommendation No. 176 on the Measurement of Underwater Radiated Noise (September 2023).
- IACS actively participated in the IMO expert workshop on the relationship between energy efficiency and underwater radiated noise (September 2023).
- IACS actively participated in the IMO SDC 9 correspondence group on underwater radiated noise.
- IACS actively participated in the Enhancing Cetacean Habitat and Observation (ECHO) Program Workshop convened by the Vancouver Fraser Port Authority (October 2020).
- IACS actively participated in underwater noise related meetings organized by ICS together with ISO working groups representatives and industry stakeholders.

3. Remote Surveys

IACS Provisions for Remote Surveys

- Throughout the COVID-19 pandemic the shipping industry has faced serious challenges in arranging surveys and inspections that involve physical attendance of surveyors on board the ship.

- IACS worked closely with IMO and flag States from the outset of the pandemic in providing guidance on safety of ships and crews and partnered effectively with industry associations including IUMI.

- Classification Societies adopted their own approaches to deal with the the COVID-19 situations beyond the control of owner or the Society.

IACS Outputs on Remote Surveys

- Recognizing the expectations of industry stakeholders, IACS initiated a Project Team (PT) under Survey Panel in 2021

- As the outcome of the Project, IACS UR Z29 has been developed and was published on 25 March 2022 to ensure that all IACS members have uniform guidance and requirements on remote surveys. This UR came into force on 1 January 2023.

Scopes of Remote Surveys (IACS UR Z29)

- A remote survey is a process of verifying that a ship and its equipment are in compliance with the applicable statutory regulations and rules of the Classification Society where the verification is undertaken, or partially undertaken, without attendance on board by a surveyor.

- IACS UR Z29 has been developed with an objective that remote survey will only be appropriate provided the level of assurance is not compromised, and the survey is carried out with the same effectiveness as and is equivalent to, a survey carried out with attendance on board by a Surveyor.

- Remote surveys are generally to be carried out with internet connection allowing a live streaming visual examination, although, at the discretion of the Surveyor, a combination of remote survey methods (recorded videos, photos, other data and/or supporting documents etc.) may be used.

IACS Activities on Remote Surveys

Supports to IMO and Industry:

- IACS has cosponsored III 8/12/1 Development of guidance on assessments and applications of remote surveys, ISM audits and ISPS code verifications (submitted by European Commission et al).

- IACS has submitted information paper to IMO III 8/INF.19 on the draft guidance on remote statutory surveys and performance of ISM/ISPS remote audits/verifications.

- IACS continues to participate in the IMO CG to develop guidance on remote surveys.

- For the MLC inspection, IACS proposed that the IMO and the Member States consider approaching the ILO to encourage the commencement of creation and issuance of guidelines for remote MLC inspections.

4. Human element

Purpose of the Guidelines

Guidelines to address human element issues in IACS working groups' work

- The purpose of these guidelines is to help IACS working groups to identify and consider possible impacts on the human element when developing new IACS resolutions and recommendations.

- Use of these guidelines will help to ensure that IACS working groups consistently consider and identify any human element impacts of the resolution/recommendation.

Background of the Guidelines

In accordance with Principles defined by IMO in Resolution A.947(23) on Human Element vision, principles and goals for the Organization, the human element is:

"Complex multi-dimensional issue that affects maritime safety, security and marine environmental protection. It involves the entire spectrum of human activities performed by ships crews, shore-based management, regulatory bodies, recognized organizations, shipyards, legislators, and other relevant parties, all of whom need to cooperate to address human element issues effectively."

IACS Activity Impact on Human Element

IACS Members have an impact on the human element onboard vessels, within shipping Companies and in relation to other stakeholders in shipping in the following aspects:

- interaction between IACS Members personnel and ship/Company personnel
- ensuring compliance with IACS Members rules
- development of IACS requirements, instructions and recommendations
- integration of IMO instruments and performance standards
- statements by IACS in relation to the Human Element, Human Factors, Ergonomics and Human-Centered Design.

IACS Activity Impact on Human Element

IACS activity impact on human element is the process which should consider two aspects:

- effect **ON** the people by the system due to
  - new or modified individual tasks and organizational requirements
  - new or modified operations
  - new or modified technologies
  - new or modified maintenance requirements
  - new or modified knowledge and training requirements
- effect **OF** the people to the system due to
  - excessive workload, fatigue and stress
  - inadequate communication and organization
  - inadequate knowledge and training

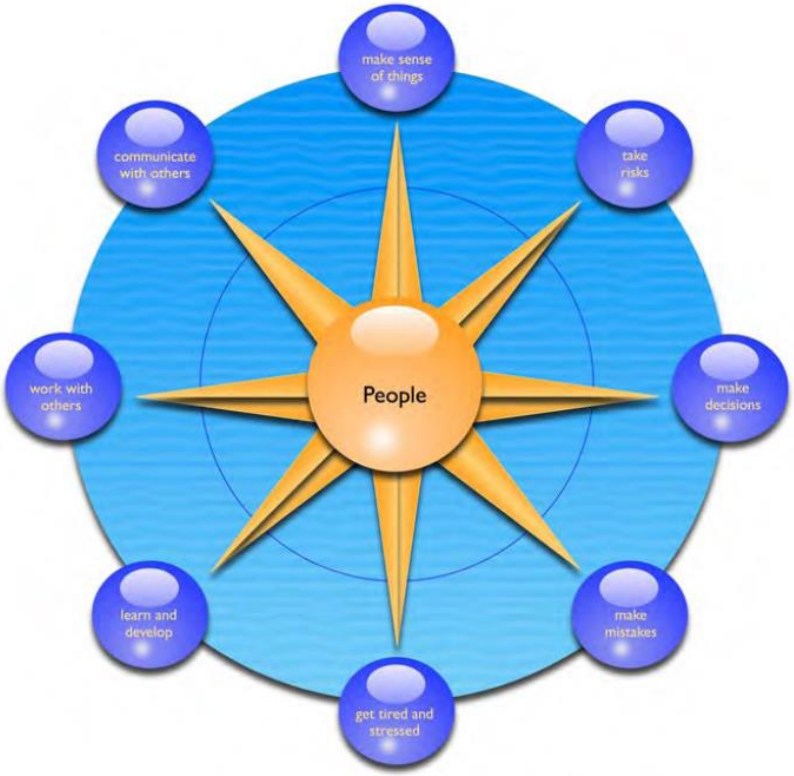
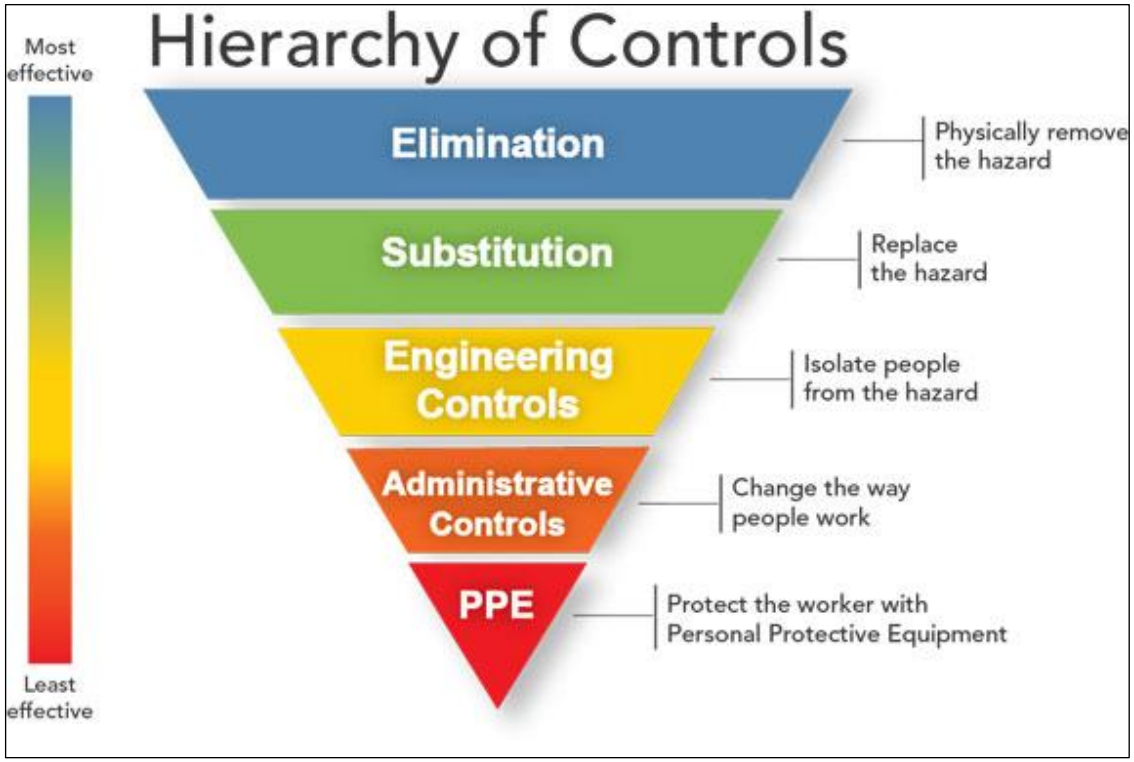


Image source: UK MCA: *"The Human Element a guide to human behavior in the shipping industry"*

Identification of Hazard Control Measures

Consideration of hazards should recognize that there may be alternative means by which risks may be addressed. These means differ in their effectiveness as illustrated by the following Hierarchy of Hazard Controls (originated by the National Institute for Occupational Safety and Health, United States of America (Ref. MSC-MEPC.1/Circ.5/Rev.4 Annex 5))

- Elimination
- Substitution
- Engineering controls
- Administrative controls
- Personal protective equipment (PPE)



Identification of Hazard Control Measures

Hazard Control Measures:

At the end of this process, IACS requirements and recommendations should provide information to IACS Members, shipping companies and other interested stakeholders with a proper understanding of:

- impact on personnel, processes and organizations
- technical requirements including maintenance
- requirements for additional knowledge, training and familiarization and
- hazard control measures to be adopted.

Aspects For Consideration

For IACS:

- **early identification of Human Element risks**
- **identification of applicable hazard control measures**
- **integration of hazard control measures in IACS instruments**
- **adequate information to industry on human element hazard control measures identified in IACS instruments**

For Industry

- **proper understanding and implementation of required human element hazard control measures**

Overall goal is the further reduction of accidents and incidents related to human element in shipping.

Thank you!