MARITIME SAFETY COMMITTEE
109th session
Agenda item 22

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REPORT OF THE MARITIME SAFETY COMMITTEE ON ITS 109TH SESSION

Attached are annexes 1 to 24 and 26 to 33 to the report of the Maritime Safety Committee on its 109th session (MSC 109/22).

(See document MSC 109/22/Add.2 for annex 25)

LIST OF ANNEXES

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ANNEX 1

RESOLUTION MSC.566(109)
(adopted on 6 December 2024)

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.5(48), by which it adopted the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk ("the IGC Code"), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), and subsequent amendments adopted to the IGC Code,

NOTING ALSO article VIII(b) and regulation VII/11.1 of the Convention concerning the procedure for amending the IGC Code,

HAVING CONSIDERED, at its 109th session, amendments to the IGC Code proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1 ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the IGC Code, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 January 2026, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet have notified their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 2026 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5 ALSO REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

CHAPTER 16
USE OF CARGO AS FUEL

1 Paragraph 16.9.2 is replaced by the following:

"16.9.2 The use of cargoes requiring carriage in type 1G ships, as identified in column "c" in the table of chapter 19, shall not be permitted. If acceptable to the Administration, cargoes identified as toxic products in column "f" which are required to be carried in type 2G/2PG ships in column "c" in the table of chapter 19 may be used as fuel, provided that the same level of safety as natural gas (methane) is ensured in accordance with the relevant provisions of this Code, including those in 1.3, and taking into account the guidelines developed by the Organization*, after special consideration has been given by the Administration."

* Refer to the guidelines to be developed by the Organization.

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ANNEX 2

RESOLUTION MSC.567(109)
((adopted on 6 December 2024)

AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR SHIPS USING GASES OR OTHER LOW-FLASHPOINT FUELS (IGF CODE)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.391(95), by which it adopted the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code), which has become mandatory under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), and subsequent amendments adopted to the IGF Code,

NOTING ALSO article VIII(b) and regulation II-1/2.28 of the Convention concerning the procedure for amending the IGF Code,

HAVING CONSIDERED, at its 109th session, amendments to the IGF Code proposed and circulated in accordance with article VIII(b)(i) of the Convention:

1 ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the IGF Code, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2027, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet have notified the Secretary-General of their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2028 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5 ALSO REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR SHIPS USING GASES OR OTHER LOW-FLASHPOINT FUELS (IGF CODE)

PART A

2 General

2.2 Definitions

1 The following new paragraph 2.2.44 is added after paragraph 2.2.43:

"2.2.44 *Ship constructed on or after 1 January 2028* means:

.1 for which the building contract is placed on or after 1 January 2028; or

.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2028; or

.3 the delivery of which is on or after 1 January 2032."

PART A-1
Specific requirements for ships using natural gas as fuel

5 Ship design and arrangement

5.3 Regulations – General

2 The following new paragraph 5.3.3.5.1 is inserted after paragraph 5.3.3.5 and before paragraph 5.3.3.6:

"5.3.3.5.1 For ships with suction wells installed in fuel tanks, the bottom of the suction well may protrude into the vertical extent of the minimum distance specified in 5.3.3.5, provided that such wells are as small as practicable and the protrusion below the inner bottom plating does not exceed 25% of the depth of the double bottom or 350 mm, whichever is less."

3 In sub-paragraph 5.3.4.2, the definition of "*H*" is replaced by the following:

"*H* is the distance from baseline, in metres, to the lowermost boundary of the fuel tank excluding the suction well, if installed; and"

7 Material and general pipe design

7.3 Regulations for general pipe design

4 The following new paragraph 7.3.1.4 is inserted after paragraph 7.3.1.3 and the subsequent paragraphs 7.3.1.4 and 7.3.1.5 are renumbered as 7.3.1.5 and 7.3.1.6 accordingly:

"7.3.1.4 For ships constructed on or after 1 January 2028, pressure relief valves discharging liquid or gas from the piping system shall discharge into the fuel tanks whenever the tank MARVS pressure is lower than the setting of the pressure relief valves in accordance with the arrangements in 9.4.2, and shall be designed to ensure that the required discharge capacity is met. Alternatively, they may discharge to the vent mast, if means are provided to detect and dispose of any liquid that may flow into the vent system."

9 Fuel supply to consumers

9.4 Regulations on safety functions of gas supply system

5 The following new paragraph 9.4.2 is inserted after paragraph 9.4.1 and the subsequent paragraphs 9.4.2 to 9.4.10 are renumbered as 9.4.3 to 9.4.11 accordingly:

"9.4.2 For ships constructed on or after 1 January 2028, fuel tank inlets from pressure relief valve discharge lines, protecting the piping system according to 7.3.1.4, shall be provided with non-return valves in lieu of valves that are automatically operated when the safety system required in 15.2.2 is activated. Safe means for tank isolation during maintenance shall be available according to 18.3 without affecting the proper operation of pressure relief valves."

11 Fire safety

11.3 Regulations for fire protection

6 Paragraph 11.3.2 is replaced by the following:

"11.3.2.1 Any boundary of accommodation spaces, service spaces, control stations, escape routes and machinery spaces, facing fuel tanks on open deck, shall be shielded by A-60 class divisions. The A-60 class divisions shall extend up to the underside of the deck of the navigation bridge. For ships constructed on or after 1 January 2028, any such boundary facing the fuel tank on the open deck which is separated by a minimum distance, as determined to the satisfaction of the Administration through a heat analysis to provide protection equivalent to an A-60 class division, shall be considered acceptable, and intermediate structures providing heat protection to the above spaces may also be considered acceptable. Notwithstanding the above-mentioned requirements:

.1 for oil tankers and chemical tankers constructed on or after 1 January 2028, A-60 insulation, required by SOLAS regulation II-2/9.2.4.2.5, shall be considered to meet the above-mentioned requirements provided that the fuel tank is located in the cargo area forward of accommodation spaces, service spaces, control stations, escape routes and machinery spaces. Consideration for the protection of accommodation block sides may be necessary; and

.2 for ships constructed on or after 1 January 2028, where no source of gas release from the fuel containment system is considered possible, e.g. a type C tank in which tank connections are in a tank connection space, A-60 class shielding is not required.

11.3.2.2 Fuel tanks shall be segregated from cargo in accordance with the requirements of the International Maritime Dangerous Goods (IMDG) Code where fuel tanks are regarded as bulk packaging. For the purposes of stowage and segregation requirements of the IMDG Code, a fuel tank on the open deck shall be considered as a class 2.1 package."

7 Paragraph 11.3.3.1 is replaced by the following:

"11.3.3.1 Notwithstanding the last sentence in paragraph 11.3.3, for ships constructed on or after 1 January 2028, the fuel storage hold space may be considered as a cofferdam provided that:

.1 the type C tank is not located directly above machinery spaces of category A or other rooms with high fire risk; and

.2 the minimum distance to the A-60 boundary from the outer surface of the insulation system of a type C tank or the boundary of the tank connection space, if any, is not less than 900 mm. For the vacuum insulated type C tank, outer surface of the insulation system means outer surface of the outer shell."

12 Explosion prevention

12.5 Hazardous area zones

12.5.2 Hazardous area zone 1

8 Sub-paragraph 12.5.2.3 is replaced by the following:

".3 For ships constructed on or after 1 January 2028, areas on open deck, or semi-enclosed spaces on deck, within 3 m of any fuel tank outlet, gas or vapour outlet,* bunker manifold valve, other fuel valve, fuel pipe flange, ventilation outlets from zone 1 spaces and fuel tank openings for pressure release provided to permit the flow of small volumes of gas or vapour mixtures caused by thermal variation;

* Such areas are, for example, all areas within 3 m of fuel tank hatches, ullage openings or sounding pipes for fuel tanks located on open deck and gas vapour outlets."

9 The following new sub-paragraph 12.5.2.4 is inserted after sub-paragraph 12.5.2.3 and the subsequent sub-paragraphs 12.5.2.4 to 12.5.2.9 are renumbered as 12.5.2.5 to 12.5.2.10 accordingly:

".4 for ships constructed on or after 1 January 2028, areas on open deck, or semi-enclosed spaces on open deck above and in the vicinity of a fuel tank vent mast outlet within a vertical cylinder of unlimited height and 6 m radius centred upon the centre of the outlet, and within a hemisphere of 6 m radius below the outlet. Where it is not possible to maintain the above distances due to the size and layout of the ship, a reduced zone can be accepted based on a dispersion analysis, using 50% LEL criteria. The zone dimensions shall never be less than those given in 12.5.2.3, and shall include a surrounding zone 2 hazardous area meeting the dimensions given in 12.5.3.1."

12.5.3 Hazardous area zone 2

10 The following new paragraph 12.5.3.3 is added after paragraph 12.5.3.2:

"12.5.3.3 In lieu of 12.5.3.1, for ships constructed on or after 1 January 2028, this zone includes spaces 4 m beyond the cylinder and 4 m beyond the hemisphere defined in 12.5.2.4".

13 Ventilation

13.3 Regulations – General

11 Paragraph 13.3.5 is replaced by the following:

"13.3.5 For ships constructed on or after 1 January 2028, air inlets for hazardous enclosed spaces shall be taken from areas that, except for the inlets, would be non-hazardous. Air inlets for non-hazardous enclosed spaces shall be taken from non-hazardous areas at least 1.5 m away from the boundaries of any hazardous area."

12 The following new paragraph 13.3.8 is inserted after paragraph 13.3.7 and the subsequent paragraphs 13.3.8 to 13.3.10 are renumbered as 13.3.9 to 13.3.11 accordingly:

"13.3.8 For ships constructed on or after 1 January 2028:

.1 where the ventilation ducts serving non-hazardous spaces pass through a hazardous space, the ducts shall be gastight and have overpressure relative to that hazardous space; and

.2 where the ventilation ducts serving hazardous spaces pass through less hazardous or non-hazardous spaces, the ducts shall be gastight and have underpressure relative to the less hazardous or non-hazardous spaces. Ventilation pipes serving hazardous spaces that pass through less hazardous or non-hazardous spaces are acceptable without the need for underpressure, provided that they are fully welded and designed in accordance with chapter 7."

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ANNEX 3

REVISED ROAD MAP FOR DEVELOPING A GOAL-BASED CODE FOR MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

SESSIONS OF MSC	WORK PLAN
MSC 110 (June 2025)	- Consideration of the outcome of the MASS-CG, established at MSC 108 - **Further develop the non-mandatory MASS Code** - Update this road map
MASS-ISWG 4 (2nd half 2025)	- **Further develop the non-mandatory MASS Code**
MSC 111 (May 2026)	- **Consideration of the outcome of MASS-ISWG 4** - **Finalization and adoption of the non-mandatory MASS Code** - Invite relevant sub-committees to review the non-mandatory Code - Update this road map
MSC 112 (December 2026)	- Develop a framework for an experience-building phase (EBP) post adoption of the non-mandatory MASS Code
MSC […] (2028)	- **Commence development of the mandatory MASS Code, based on the non-mandatory Code and results from the EBP and review conducted by the relevant sub-committees, and consider amendments to SOLAS (new chapter) for the Code's adoption**
MSC […]	- Adoption of the mandatory Code (latest 1 July 2030 for entry into force on 1 Jan 2032)

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ANNEX 4

DRAFT MSC RESOLUTION

AMENDMENTS TO CHAPTER II-1 OF THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO article VIII(b) of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), concerning the amendment procedure applicable to the annex to the Convention, other than to the provisions of chapter I,

HAVING CONSIDERED, at its [110th] session, amendments to the Convention proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1 ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on [1 July 2026], unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet have notified the Secretary-General of their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on [1 January 2027] upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5 ALSO REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

DRAFT AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

CHAPTER II-1

CONSTRUCTION - STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART A
General

Regulation 2 – Definitions

1 The following new sub-paragraph is added after existing sub-paragraph 29:

".30 *Gaseous fuel* means any fluid used as fuel which:

.1 has a vapour pressure exceeding 0.28 MPa absolute at a temperature of 37.8°C; or

.2 is completely gaseous at 20°C at a standard pressure of 101.3 kPa."

PART G
Ships using low-flashpoint fuels

2 The existing title of part G is replaced by the following:

"**PART G**
Ships using gaseous fuels or low-flashpoint fuels"

Regulation 56 – Application

3 Paragraphs 1 to 4 are replaced by the following:

"1 Except as provided for in paragraphs 4 and 5, this part shall apply to ships using gaseous fuels or low-flashpoint fuels:

.1 for which the building contract is placed on or after 1 January 2017;

.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or

.3 the delivery of which is on or after 1 January 2021.

Such ships using low-flashpoint fuels shall comply with the requirements of this part in addition to any other applicable requirements of the present regulations.

2 Except as provided for in paragraphs 4 and 5, a ship, irrespective of the date of construction, including one constructed before 1 January 2009, which converts to using gaseous fuels or low-flashpoint fuels on or after 1 January 2017 shall be treated as a ship using gaseous fuels or low-flashpoint fuels on the date on which such conversion commenced.

3 Except as provided for in paragraphs 4 and 5, a ship using gaseous fuels or low-flashpoint fuel, irrespective of the date of construction, including one constructed before 1 January 2009, which, on or after 1 January 2017, undertakes to use gaseous fuels or low-flashpoint fuels different from those which it was originally approved to use before 1 January 2017 shall be treated as a ship using gaseous fuels or low-flashpoint fuels on the date on which such undertaking commenced.

4 This part shall not apply to gas carriers, as defined in regulation VII/11.2:

.1 using their cargoes as fuel and complying with the requirements of the IGC Code, as defined in regulation VII/11.1; or

.2 using other gaseous fuels provided that the fuel storage and distribution systems design and arrangements for such gaseous fuels comply with the requirements of the IGC Code for gas as a cargo."

Regulation 57 – Requirements for ships using low-flashpoint fuels

4 The existing title of regulation 57 is replaced by the following:

"**Regulation 57 Requirements for ships using gaseous fuels or low-flashpoint fuels**"

5 The paragraph is replaced by the following:

"Except as provided in regulations 56.4 and 56.5, ships using gaseous fuels or low-flashpoint fuels shall comply with the requirements of the IGF Code."

APPENDIX

CHECK/MONITORING SHEET FOR THE PROCESS OF AMENDING THE CONVENTION AND RELATED MANDATORY INSTRUMENTS (PROPOSAL/DEVELOPMENT)

Part III – Process monitoring to be completed during the work process at the Sub-Committee and checked as part of the final approval process by the Committee (refer to paragraph 3.2.1.3)

1	The Sub-Committee, at an initial engagement, has allocated sufficient time for technical research and discussion before the target completion date, especially on issues needing to be addressed by more than one Sub-Committee and for which the timing of relevant sub-committees meetings and exchanges of the result of consideration needed to be carefully examined.	Yes
2	The scope of application agreed at the proposal stage was not changed without the approval of the Committee.	Yes
3	The technical base document/draft amendment addresses the proposal's issue(s) through the suggested instrument(s); where it does not, the Sub-Committee offers the Committee an alternative method of addressing the problem raised by the proposal.	N/A
4	Due attention is to be paid to the *Interim Guidelines for the systematic application of the grandfather clause* (MSC/Circ.765).	N/A
5	All references have been examined against the text that will be valid if the proposed amendment enters into force.	Yes
6	The location of the insertion or modified text is correct for the text that will be valid when the proposed text enters into force on a four-year cycle of entry into force, as other relevant amendments adopted might enter into force on the same date.	Yes
7	There are no inconsistencies in respect of scope of application between the technical regulation and the application statement contained in regulation 1 or 2 of the relevant chapter, and application is specifically addressed for existing and/or new ships, as necessary.	Yes
8	Where a new term has been introduced into a regulation and a clear definition is necessary, the definition is given in the article of the Convention or at the beginning of the chapter.	Yes
9	Where any of the terms "fitted", "provided", "installed" or "installation" are used, consideration has been given to clarifying the intended meaning of the term.	N/A
10	All necessary related and consequential amendments to other existing instruments, including non-mandatory instruments, in particular to the forms of certificates and records of equipment required in the instrument being amended, have been examined and included as part of the proposed amendment(s).	Yes
11	The forms of certificates and records of equipment have been harmonized, where appropriate, between the Convention and its Protocols.	N/A
12	It is confirmed that the amendment is being made to a currently valid text and that no other bodies are concurrently proposing changes to the same text.	Yes
13	All entry-into-force criteria (building contract, keel laying and delivery) have been considered and addressed.	Yes
14	Other impacts of the implementation of the proposed/approved amendment have been fully analysed, including consequential amendments to the "application" and "definition" regulations of the chapter.	Yes
15	The amendments presented for adoption clearly indicate changes made with respect to the original text, so as to facilitate their consideration.	Yes
16	For amendments to mandatory instruments, the relationship between the Convention and the related instrument has been observed and addressed, as appropriate.	Yes
17	The related record format has been completed or updated, as appropriate.	Yes

RECORD FORMAT

The following records should be created and kept updated for each regulatory development.

The records can be completed by providing references to paragraphs of related documents containing the relevant information, proposals, discussions and decisions.

1 Title (number and title of regulation(s))
Draft amendments to the International Convention for the Safety of Life at Sea, 1974. Chapter II-1 on Construction - Structure, Subdivision and Stability, Machinery and Electrical Installations, Part A Definitions, Regulation 56 Application and Regulation 57 Requirements for ships using low-flashpoint fuels.
2 Origin of the requirement (original proposal document)
MSC 108 noted (MSC 108/20, paragraphs 5.30 to 5.33) that the title of the IGF Code stated that it should apply to fuels that were gases or had a low-flash point, while, in SOLAS chapter II-1, Part G, the IGF Code applies to ships using low-flashpoint fuels regardless of whether they are in liquid or gaseous form. The Committee also noted that the definition of low-flashpoint fuel in SOLAS regulation II-1/2 was *"Low-flashpoint fuel means gaseous or liquid fuel having a flashpoint lower than otherwise permitted under regulation II-2/4.2.1.1"*. The Committee further noted the need to clarify whether or not the IGF Code applied to ships using gas as fuel irrespective of flashpoint and referred this issue as an urgent matter to CCC 10 for consideration and advice to MSC 109 accordingly. In September 2024, CCC 10 endorsed the principle that IGC Code ships using liquefied gases as fuel, including liquefied gases not carried as cargo, are subject to the requirements of the IGC Code in lieu of the IGF Code (CCC 10/4, paragraph 19).
3 Main reason for the development (extract from the proposal document)
Clarification needed considering that the title of the IGF Code stated that it should apply to fuels that were gases or had a low-flash point, while, in SOLAS chapter II-1, Part G, the IGF Code applies to ships using low-flashpoint fuels regardless of whether they are in liquid or gaseous form.
4 Related output
"Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels"
5 History of the discussion (approval of work programmes, sessions of sub-committees, including CG/DG/WG arrangements)
MSC 109 in December 2024 note the discussions of the Sub-Committee concerning unified interpretations, and that concerning document CCC 10/10/3 (IACS), the Sub-Committee recommended that SOLAS chapter II-1 would require an amendment in line with paragraph 20 of that document; and that concerning document CCC 10/10/4 (Republic of Korea), the Sub-Committee recommended that the issues raised in that document could be further considered under the output on "Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels". MSC 109 also considered the proposal by the UK (MSC 1098/6) to amend SOLAS to clarify the application of the IGF Code to gas fuels. The WG noted that the current applicability of the IGF Code covered slow-flashpoint fuels, as defined in SOLAS regulation II-1/2.29, and ammonia did not present flammable vapour during the phase change from liquid to gas. Therefore, ammonia seemed to fall outside the scope of the IGF Code. The document stated that, consequently, this could create uncertainty within the industry looking to invest in ammonia fuelled ships, compliant with the Guidelines, as developed by CCC 10

MSC 109, approved the draft amendments to the SOLAS Convention as prepared by the WG in relation to the application of the IGF Code and agree to the recommendation of the Group that these amendments be approved at this session with a view to adoption at MSC 110 in June 2025 and that the four-year amendment cycle in MSC.1/Circ.1481, should be relaxed, with a view for the entry into force in 2027. The mentioned draft amendments to be circulated after the issuance of MSC 109 Report.
6 Impact on other instruments (codes, performance standards, guidance circulars, certificates/records format, etc.)
IGC Code
7 Technical background
7.1 Scope and objective (to cross-check with items 4 and 5 in part II of the checklist)
The WG noted that the current applicability of the IGF Code covered slow-flashpoint fuels, as defined in SOLAS regulation II-1/2.29, and ammonia did not present flammable vapour during the phase change from liquid to gas.
7.2 Technical/operational background and rationale (e.g. summary of FSA study, if available, or engineering challenge posed)
Not applicable
7.3 Source/derivation of requirement (non-mandatory instrument, industry standard, national/regional requirement)
Not applicable
7.4 Short summary of requirement (what is the new requirement – in short and lay terms)
Before these amendments, ammonia seemed to fall outside the scope of the IGF Code, consequently, this could create uncertainty within the industry looking to invest in ammonia fuelled ships, compliant with the Guidelines, as developed by CCC 10.
7.5 Points of discussions (controversial points and conclusion)
Not applicable

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ANNEX 5

DRAFT MSC-FAL CIRCULAR ON GUIDELINES ON THE RECOVERY OF DECEASED PERSONS AND ON DEATH AFTER RECOVERY

1 The Maritime Safety Committee, at its 109th session (2 to 6 December 2024), and the Facilitation Committee, at its [forty-ninth session (10 to 14 March 2025)] noted the urgent need to raise awareness of the proper transfer of deceased persons to supplement resolution MSC.528 (106) on *Recommended cooperation to ensure the safety of life at sea, the rescue of persons in distress at sea and the safe disembarkation of survivors,* which does not address deceased persons, either at the time of recovery or after recovery.

2 The Committees, being aware that the legal status of a deceased person may vary depending on the jurisdiction, and recognizing that this status may be unknown for salvors, approved *Guidelines on the recovery of deceased persons and on death after recovery*, and invited Member States and relevant international organizations:

.1 to pay due respect to the culture and practices of the rescued and the local public health policies in handling the deceased among survivors rescued; and

.2 to pay due consideration in transferring bodies between various organizations, in addition to volume III, section 21 of the IAMSAR Manual, as applicable.

3 Member Governments are invited to bring the attached guidelines to the attention of all stakeholders concerned.

ANNEX

DRAFT GUIDELINES ON THE RECOVERY OF DECEASED PERSONS AND ON DEATH AFTER RECOVERY

1 Introduction

1.1 Resolution MSC.528(106) on *Recommended cooperation to ensure the safety of life at sea, the rescue of persons in distress at sea and the safe disembarkation of survivors* provides guidance for handling survivors, but does not address deceased persons, either at the time of recovery or after recovery.

1.2 Volume III, section 21, of the IAMSAR Manual is dedicated to the handling of deceased persons but does not include guidance on the handing over of bodies between various organizations.

1.3 The Committees recognized that individuals handling deceased persons should respect the deceased's dignity. The rights of survivors under international law, including, as applicable, international human rights law and international refugee law, must be respected.

1.4 The Committees further recognized that some persons encountered at sea are fleeing dangerous circumstances in their home countries.

2 Recommended actions

2.1 Rescue Coordination Centre (RCC)

2.1.1 Upon hearing the presence of a deceased person among the rescued at sea, the Rescue Coordination Centre (RCC) coordinating the rescue operation should render further assistance to the rescuing ship, which may include, as applicable:

.1 initiating coordination between the ship, the company and relevant shore authorities for swift handover of the deceased persons;

.2 facilitating telemedical advice to the rescuing ship on the situation of survivors and deceased persons in order to ascertain the status; and

.3 assisting in arranging equipment/facilities that the rescuing ship may need, e.g. air transportation of body bags.

2.1.2 An RCC reserves its right not to recommend recovery of the deceased depending on the circumstances and information provided.

2.2 *Masters of ships/management company*

2.2.1 Upon finding a deceased person among those rescued at sea, the master of the rescuing ship should immediately inform the flag State, the ISM Company, the RCC coordinating the rescue operation and, as appropriate, the near-shore authority where the rescued and deceased are planned to be disembarked of the situation.

2.2.2 The master should ensure that the crew of the ship handle the deceased in a manner that respects the deceased person's dignity and, to the extent feasible, the will of the accompanying family member, if any.

2.2.3 The master should assess the situation if there is a risk of contagious disease and seek the advice of medical experts via the coordinating RCC.

2.2.4 If a specific facility or equipment is needed (e.g. body bag), the master of the rescuing ship should seek advice or assistance if the ship is not furnished with the appropriate equipment from the coordinating RCC, including assistance with respect to the possible air transfer of such equipment to the rescuing ship.

2.2.5 Any recovery of deceased persons at sea must take into consideration the circumstances at the scene and the risk to the rescuing ship and crew.

2.3 Flag States, coastal States and port States

2.3.1 Flag States, coastal States and port States involved should ensure effective cooperation to facilitate that the ship receives necessary support from the ISM Company, the RCC involved and the appropriate authorities of the intended port of disembarkation of the deceased and rescued persons.

2.4 Port authorities

2.4.1 Port authorities of the port where the survivors are disembarked should also endeavour to take any accompanying deceased person in the port.

2.4.2 Deceased persons should be treated with dignity and respect, with due consideration for the cultural and religious practices of the deceased.

2.4.3 Port authorities should ensure that due attention is paid to the wishes of any accompanying family member.

2.4.4 Where appropriate and necessary, port authorities should liaise with the local law enforcement agency.

2.4.5 Where appropriate, port authorities should liaise with humanitarian aid agencies (e.g. International Red Cross).

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ANNEX 6[*]

DRAFT REVISED GUIDELINES FOR FORMAL SAFETY ASSESSMENT (FSA) FOR USE IN THE IMO RULE-MAKING PROCESS

1 The Maritime Safety Committee, at its seventy-fourth session (30 May to 8 June 2001), and the Marine Environment Protection Committee, at its forty-seventh session (4 to 8 March 2002), approved the *Guidelines for Formal Safety Assessment (FSA) for use in the IMO rule-making process* (MSC/Circ.1023-MEPC/Circ.392, as amended by MSC/Circ.1180-MEPC/Circ.474 and MSC-MEPC.2/Circ.5).

2 The Maritime Safety Committee, at its ninety-first session (26 to 30 November 2012), and the Marine Environment Protection Committee, at its sixty-fifth session (13 to 17 May 2013), reviewed the above Guidelines and approved the *Revised guidelines for Formal Safety Assessment (FSA) for use in the IMO rule-making process* (MSC-MEPC.2/Circ.12).

3 The Maritime Safety Committee, at its ninety-fourth session (17 to 21 November 2014) and the Marine Environment Protection Committee, at its sixty-eighth session (11 to 15 May 2015), approved draft amendments to paragraph 9.3.3 of the aforementioned Revised FSA Guidelines, for circulation of the amended Revised Guidelines as MSC-MEPC.2/Circ.12/Rev.1.

4 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017) and the Marine Environment Protection Committee, at its seventy-second session (9 to 13 April 2018), approved the amendment to the flow chart shown in figure 2 referred to in paragraph 27 of appendix 10 of the Revised FSA Guidelines, for circulation of the amended Revised Guidelines, as set out in the annex, as MSC-MEPC.2/Circ.12/Rev.2.

5 The Maritime Safety Committee, at its 109th session (2 to 6 December 2024) and the Marine Environment Protection Committee, at its [eighty-third] session [(7 to 11 April 2025)], approved amendments to the Revised FSA Guidelines emanating from the recommendations made by the FSA Experts Groups and the SSE Sub-Committee that had considered various FSA studies, for circulation of the amended Revised FSA Guidelines, as set out in the annex, as MSC-MEPC.2/Circ.12/Rev.3.

~~5~~6 Member States and non-governmental organizations are invited to apply the revised guidelines contained in the annex.

~~6~~7 This circular supersedes MSC-MEPC.2/Circ.12/Rev.2.

[*] Grey shading indicates the modifications introduced.

DRAFT REVISED GUIDELINES FOR FORMAL SAFETY ASSESSMENT (FSA) FOR USE IN THE IMO RULE-MAKING PROCESS

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1 INTRODUCTION

1.1 Purpose of FSA

1.1.1 Formal Safety Assessment (FSA) is a structured and systematic methodology, aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and cost-benefit assessment.

1.1.2 FSA can be used as a tool to help in the evaluation of new regulations for maritime safety and protection of the marine environment or in making a comparison between existing and possibly improved regulations, with a view to achieving a balance between the various technical and operational issues, including the human element, and between maritime safety or protection of the marine environment and costs.

1.1.3 FSA is consistent with the current IMO decision-making process and provides a basis for making decisions in accordance with resolutions A.500(XII) on *Objectives of the Organization in the 1980s*, A.777(18) on *Work methods and organization of work in committees and their subsidiary bodies* and A.900(21) on *Objectives of the Organization in the 2000s*.

1.1.4 The decision makers at IMO, through FSA, will be able to appreciate the effect of proposed regulatory changes in terms of benefits (e.g. expected reduction of lives lost or of pollution) and related costs incurred for the industry as a whole and for individual parties affected by the decision. FSA should facilitate the development of regulatory changes equitable to the various parties thus aiding the achievement of consensus.

1.1.5 It may be noted that the FSA is a methodology that utilizes risk assessment for the development of regulations by IMO; however, it should also be kept in view that the FSA by itself is not a risk assessment technique.

1.2 Scope of the Revised FSA Guidelines

These Revised FSA Guidelines (hereinafter Guidelines) are intended to outline the FSA methodology as a tool, which may be used in the IMO rule-making process. In order that FSA can be consistently applied by different parties, it is important that the process is clearly documented and formally recorded in a uniform and systematic manner. This will ensure that the FSA process is transparent and can be understood by all parties irrespective of their experience in the application of risk analysis and cost-benefit assessment and related techniques.

1.3 Application

1.3.1 The FSA methodology can be applied by:

.1 a Member State or an organization in consultative status with IMO, when proposing amendments to maritime safety, pollution prevention and response-related IMO instruments in order to analyse the implications of such proposals; or

.2 a Committee, or an instructed subsidiary body, to provide a balanced view of a framework of regulations, so as to identify priorities and areas of concern and to analyse the benefits and implications of proposed changes.

1.3.2 It is not intended that FSA should be applied in all circumstances, but its application would be particularly relevant to proposals which may have far-reaching implications in terms of either costs (to society or the maritime industry), or the legislative and administrative burdens which may result. FSA may also be useful in those situations where there is a need for risk reduction but the required decisions regarding what to do are unclear, regardless of the scope of the project. In these circumstances, FSA will enable the benefits of proposed changes to be properly established, so as to give Member States a clearer perception of the scope of the proposals and an improved basis on which they take decisions.

2 BASIC TERMINOLOGY

The following definitions apply in the context of these ~~guidelines~~Guidelines:

Accident:	An unintended event involving fatality, injury, ship loss or damage, other property loss or damage, or environmental damage.
Accident category:	A designation of accidents reported in statistical tables according to their nature, e.g. fire, collision, grounding, etc.
Accident scenario:	A sequence of events from the initiating event to one of the final stages.
Consequence:	The outcome of an accident.
Frequency:	The number of occurrences per unit time (e.g. per year).
Generic model:	A set of functions common to all ships or areas under consideration.
Hazard:	A potential to threaten human life, health, property or the environment.
Initiating event:	The first of a sequence of events leading to a hazardous situation or accident.
Probability (Objective/frequentistic):	The relative frequency that an event will occur, as expressed by the ratio of the number of occurrences to the total number of possible occurrences.
Probability (Subjective/Bayesian):	The degree of confidence in the occurrence of an event, measured on a scale from 0 to 1. An event with a probability of 0 means that it is believed to be impossible; an event with the probability of 1 means that it is believed it will certainly occur.
Risk:	The combination of the frequency and the severity of the consequence.
Risk contribution tree:	The combination of all fault trees and event trees that constitute *(RCT)* the risk model.
Risk control measure: *(RCM)*	A means of controlling a single element of risk.
Risk control option: *(RCO)*	A combination of risk control measures.

Risk evaluation criteria:	Criteria used to evaluate the acceptability/tolerability of risk.
Sensitivity analysis:	Study of how the uncertainty in the output of a model (numerical or otherwise) can be apportioned to different sources of uncertainty in the model input. This analysis aims to identify the variables whose uncertainty significantly influences the uncertainty of the result.
Uncertainty analysis:	Investigation of the uncertainty(ies) of variables that are used in decision-making problems in which observations and models represent the knowledge base. In other words, uncertainty analysis aims to make a technical contribution to decision-making through the quantification of uncertainties in the relevant variables and results.

3 METHODOLOGY

3.1 Process

3.1.1 *Steps*

3.1.1.1 FSA should comprise the following steps:

.1 identification of hazards;

.2 risk analysis;

.3 risk control options;

.4 cost-benefit assessment; and

.5 recommendations for decision-making.

3.1.1.2 Figure 1 is a flow chart of the FSA methodology. The process begins with the decision makers defining the problem to be assessed along with any relevant boundary conditions or constraints. These are presented to the group who will carry out the FSA and provide results to the decision makers for use in their resolutions. In cases where decision makers require additional work to be conducted, they would revise the problem statement or boundary conditions or constraints, and resubmit this to the group and repeat the process as necessary. Within the FSA methodology, step 5 interacts with each of the other steps in arriving at decision-making recommendations. The group carrying out the FSA process should comprise suitably qualified and experienced ~~people~~ persons to reflect the range of influences and the nature of the "event" being addressed.

3.1.2 *Screening approach*

3.1.2.1 The depth or extent of application of the methodology should be commensurate with the nature and significance of the problem; however, experience indicates that very broad FSA studies can be harder to manage. To enable the FSA to focus on those areas that deserve more detailed analysis, a preliminary coarse qualitative analysis is suggested for the relevant ship type or hazard category, in order to include all aspects of the problem under consideration. Whenever there are uncertainties, e.g. in respect of data or expert judgement, the significance of these uncertainties should be assessed.

3.1.2.2 Characterization of hazards and risks should be both qualitative and quantitative, and both descriptive and mathematical, consistent with the available data, and should be broad enough to include a comprehensive range of options to reduce risks.

3.1.2.3 A hierarchical screening approach may be utilized. This would ensure that excessive analysis is not performed by utilizing relatively simple tools to perform initial analyses, the results of which can be used to either support decision-making (if the degree of support is adequate) or to scope/frame more detailed analyses (if not). The initial analyses would therefore be primarily qualitative in nature, with a recognition that increasing degrees of detail and quantification will come in subsequent analyses as necessary.

3.1.2.4 A review of historical data may also be useful as a preparation for a detailed study. For this purpose a loss matrix may be useful. An example can be found in figure 2.

3.2 Information and data

3.2.1 The availability of suitable data necessary for each step of the FSA process is very important. When data are not available, expert judgement, physical models, simulations and analytical models may be used to achieve valuable results. Consideration should be given to those data which are already available at IMO (e.g. casualty and deficiency statistics) and to potential improvements in those data in anticipation of an FSA implementation (e.g. a better specification for recording relevant data including the primary causes, underlying factors and latent factors associated with a casualty).

3.2.2 Data concerning incident reports, near misses and operational failures may be very important for the purpose of making more balanced, proactive and cost-effective legislation, as required in paragraph 4.2 of appendix 8. Such data must be reviewed objectively and their reliability, uncertainty and validity assessed and reported. The assumptions and limitations of these data must also be reported.

3.2.3 However, one of the most beneficial qualities of FSA is the proactive nature. The proactive approach is reached through the probabilistic modelling of failures and development of accident scenarios. Analytical modelling has to be used to evaluate rare events where there is inadequate historical data. A rare event is decomposed into more frequent events for which there is more experience available (e.g. evaluate system failure based on component failure data).

3.2.4 Equally, consideration should also be given to cases where the introduction of recent changes (e.g. regulatory, design, operation, construction/manufacturing) may have affected the validity of historic data for assessing current risk.

3.3 Expert judgement

3.3.1 The use of expert judgement is considered to be an important element within the FSA methodology. It not only contributes to the proactive nature of the methodology but is also essential in cases where there is a lack of historical data. ~~Further historical data may be evaluated by the use of expert judgement by which the quality of the historical data may be improved.~~ In such cases, data can be enhanced or completed by further consideration of information/data and the use of expert judgement by which the quality of the original historical data may be improved. The subsequent improvements support quantitatively the whole FSA process. The assumptions and rationale used for arriving at the expert judgement should be documented.

3.3.2 In applying expert judgement, different experts may be involved in a particular FSA study. It is unlikely that the experts' opinions will always be in agreement. It might even be the case that the experts have strong disagreements on specific issues. Preferably, a good level of agreement should be reached. It is highly recommended to report the level of agreement between the experts in the results of an FSA study. It is important to know the level of agreement, and this may be established by the use of a concordance matrix or by any other methodology. For example, appendix 9 describes the use of a concordance matrix.

3.4 Incorporation of the human element

3.4.1 The human element is one of the most important contributory aspects to the causation and avoidance of accidents. Human element issues throughout the integrated system shown in figure 3 should be systematically treated within the FSA framework, associating them directly with the occurrence of accidents, underlying causes or influences. Appropriate techniques for incorporating human factors should be used.

3.4.2 The human element can be incorporated into the FSA process by using human reliability analysis (HRA). Guidance for the use of HRA within FSA is given in appendix 1 and diagrammatically in figure 4. To allow easy referencing, the numbering system in appendix 1 is consistent with that of the rest of these ~~FSA~~ Guidelines.

3.5 Evaluating regulatory influence

It is important to identify the network of influences linking the regulatory regime to the occurrence of the event. Construction of Influence Diagrams may assist (see appendix 3).

4 PROBLEM DEFINITION

4.1 Preparation for the study

An FSA may address risks posed by all accident categories or focus only on a specific accident category. The purpose of problem definition is to carefully define the problem under analysis in relation to the regulations under review or to be developed. The definition of the problem should be consistent with operational experience and current requirements by taking into account all relevant aspects. Those which may be considered relevant when addressing ships (not necessarily in order of importance) are:

.1 ship category (e.g. type, length or gross tonnage range, new or existing, type of cargo);

.2 ship systems or functions (e.g. layout, subdivision, type of propulsion);

.3 ship operation (e.g. operations in port and/or during navigation, routeing);

.4 external influences on the ship (e.g. Vessel Traffic System, weather forecasts, reporting, ~~, routeing~~);

.5 accident category (e.g. collision, explosion, fire); and

.6 risks associated with consequences such as injuries and/or fatalities to passengers and crew, environmental impact, damage to the ship or port facilities, or commercial impact.

4.2 Generic model

4.2.1 In general, the problem under consideration should be characterized by a number of functions. Where the problem relates for instance to a type of ship, these functions include carriage of payload, communication, emergency response, manoeuvrability, etc. Alternatively, where the problem relates to a type of hazard, for instance fire, the functions include prevention, detection, alarm, containment, escape, suppression, etc.

4.2.2 For application of FSA, a generic model should therefore be defined to describe the functions, features, characteristics and attributes which are common to all ships or areas relevant to the problem in question.

4.2.3 The generic model should not be viewed as an individual ship in isolation, but rather as a collection of systems, including organizational, management, operational, human, electronic and hardware aspects which fulfil the defined functions. The functions and systems should be broken down to an appropriate level of detail. Aspects of the interaction of functions and systems and the extent of their variability should be addressed in order to consider all influences characterizing the problem under consideration, for instance ship size and/or type or different system designs.

4.2.4 A comprehensive view, such as the one shown in figure 3, should be taken, recognizing that the ship's technical and engineering system, which is governed by physical laws, is in the centre of an integrated system. The technical and engineering system is integrally related to the passengers and crew which are a function of human behaviour. The passengers and crew interact with the organizational and management infrastructure and those personnel involved in ship and fleet operations, maintenance and management. These systems are related to the outer environmental context, which is governed by pressures and influences of all parties interested in shipping and the public. Each of these systems is dynamically affected by the others.

4.3 Results

The output of the problem definition comprises:

.1 problem definition and setting of boundaries; and

.2 development of a generic model.

5 FSA STEP 1 – IDENTIFICATION OF HAZARDS

5.1 Scope

The purpose of step 1 is to identify a list of hazards and associated scenarios prioritized by risk level specific to the problem under review. This purpose is achieved by the use of standard techniques to identify hazards which can contribute to accidents, and by screening these hazards using a combination of available data and judgement. The hazard identification exercise should be undertaken in the context of the functions and systems generic to the ship type or problem being considered, which were established in paragraph 4.2 by reviewing the generic model.

5.2 Methods

5.2.1 *Identification of possible hazards*

5.2.1.1 The approach used for hazard identification generally comprises a combination of both creative and analytical techniques, the aim being to identify all relevant hazards. The creative element is to ensure that the process is proactive and not confined only to hazards that have materialized in the past. It typically consists of structured group reviews aiming at identifying the causes and effects of accidents and relevant hazards. Consideration of functional failure may assist in this process. The group carrying out such structured reviews should include experts in the various appropriate aspects, such as ship design, operations and management and specialists to assist in the hazard identification process and incorporation of the human element. A structured group review session may last over a number of days. The analytical element ensures that previous experience is properly taken into account, and typically makes use of background information (for example applicable regulations and codes, available statistical data on accident categories and lists of hazards to personnel, hazardous substances, ignition sources, etc.). Examples of hazards relevant to shipboard operations are shown in appendix 2.

5.2.1.2 Special attention should be paid to severe or catastrophic events that are expected to occur with a very low frequency (extremely remote) and for which no historical data is available. The actual occurrence of an extremely remote event requires either larger samples or longer observation periods both of which are often not available. Such events should not be discarded due to their low frequency, especially when they are severe or catastrophic, but should be properly assessed in the ranking.

5.2.1.3 A coarse analysis of possible causes and initiating events and outcome of each accident scenario should be carried out. The analysis may be conducted by using established techniques (examples are described in appendix 3), to be chosen according to the problem in question, whenever possible and in line with the scope of the FSA.

5.2.1.4 The hazard identification sessions and correspondence can also take advantage of the availability of the experts and be used to elaborate a preliminary list of risk control measures that could be investigated further in step 3 based on the step 2 quantitative assessment.

5.2.2 *Ranking*

5.2.2.1 The identified hazards and their associated scenarios relevant to the problem under consideration should be ranked to prioritize them and to discard scenarios judged to be of minor significance. The frequency and consequence of the scenario outcome requires assessment. Ranking is undertaken using available data, supported by judgement, on the scenarios. A generic risk matrix is shown in figure 5. The frequency and consequence categories used in the risk matrix have to be clearly defined. The combination of a frequency and a consequence category represents a risk level. Appendix 4 provides an example of one way of defining frequency and consequence categories, as well as possible ways of establishing risk levels for ranking purposes.

5.2.2.2 Notwithstanding the above, ranking of hazards may not be necessary during FSA step 1, if all the identified hazards relevant to the problem definition are included in the risk analysis step 2.

5.3 Results

The output from step 1 comprises:

.1 a list of hazards and their associated scenarios (including initiating events); and

.2 an assessment of accident scenarios (prioritized by risk level).

6 FSA STEP 2 – RISK ANALYSIS

6.1 Scope

6.1.1 The purpose of the risk analysis in step 2 is a detailed investigation of the causes and initiating events and consequences of the more important accident scenarios identified in step 1. This can be achieved by the use of suitable techniques that model the risk. This allows attention to be focused upon high-risk areas and to identify and evaluate the factors which influence the level of risk.

6.1.2 Different types of risk (i.e. risks to people, the environment or property) should be addressed as appropriate to the problem under consideration. Measures of risk are discussed in appendix 5.

6.2 Methods

6.2.1 There are several methods/tools that can be used to perform a risk analysis. The scope of the FSA, types of hazards identified in step 1, and the level of failure data available will all influence which method/tool works best for each specific application. Examples of the different types of risk analysis methods/tools are outlined in appendix 3.

6.2.2 Quantification makes use of accident and failure data and other sources of information as appropriate to the level of analysis. Where data is unavailable, calculation, simulation or the use of established techniques for expert judgement may be used.

6.2.3 Notwithstanding the accurate selection of input data, it is recommended to verify the accuracy of the risk model output against other available information to avoid erroneous overestimation or underestimation of risk. To consider the issue of underreporting within historical data, typical risk models should overestimate the risk calculated by means of historical data.

6.2.4 Sensitivity analysis and uncertainty analysis should be considered in the quantified and/or qualified risk and risk models and the results should be reported together with the quantitative data and explanation of models used. Methodologies of sensitivity analysis and uncertainty analysis would depend on the method of risk analysis and/or risk models used.

6.3 Results

The output from step 2 comprises:

.1 the identification of the high-risk areas which need to be addressed; and

.2 the explanation of risk models.

7 FSA STEP 3 – RISK CONTROL OPTIONS

7.1 Scope

7.1.1 The purpose of step 3 is to first identify Risk Control Measures (RCMs) , i.e. measures that reduce current risk, and then to group them into a limited number of Risk Control Options (RCOs) for use as practical regulatory options. Step 3 comprises the following four stages:

.1 focusing on risk areas needing control;

.2 identifying potential RCMs;

.3 evaluating the effectiveness of the RCMs in reducing risk by re-evaluating step 2; and

.4 grouping RCMs into practical regulatory options.

7.1.2 Step 3 aims at creating risk control options that address both existing risks and risks introduced by new technology or new methods of operation and management. Both historical risks and newly identified risks (from steps 1 and 2) should be considered, producing a wide range of risk control measures. Techniques designed to address both specific risks and underlying causes should be used.

7.2 Methods

7.2.1 *Determination of areas needing control*

The purpose of focusing risks is to screen the output of step 2 so that the effort is focused on the areas most needing risk control. The main aspects to making this assessment are to review:

.1 risk levels, by considering frequency of occurrence together with the severity of outcomes. Accidents with an unacceptable risk level become the primary focus;

.2 probability, by identifying the areas of the risk model that have the highest probability of occurrence. These should be addressed irrespective of the severity of the outcome;

.3 severity, by identifying the areas of the risk model that contribute to highest severity outcomes. These should be addressed irrespective of their probability; and

.4 confidence, by identifying areas where the risk model has considerable uncertainty either in risk, severity or probability. These uncertain areas should be addressed.

7.2.2 *Identification of potential RCMs*

7.2.2.1 Structured review techniques are typically used to identify new RCMs for risks that are not sufficiently controlled by existing measures. These techniques may encourage the development of appropriate measures and include risk attributes and causal chains. Risk attributes relate to how a measure might control a risk, and causal chains relate to where, in the "initiating event to fatality" sequence, risk control can be introduced.

7.2.2.2 RCMs (and subsequently RCOs) have a range of attributes. These attributes may be categorized according to the examples given in appendix 6.

7.2.2.3 The prime purpose of assigning attributes is to facilitate a structured thought process to understand how an RCM works, how it is applied and how it would operate. Attributes can also be considered to provide guidance on the different types of risk control that could be applied. Many risks will be the result of complex chains of events and a diversity of causes. For such risks the identification of RCMs can be assisted by developing causal chains which might be expressed as follows:

causal factors → failure → circumstance → accident → consequences

7.2.2.4 RCMs should in general be aimed at one or more of the following:

.1 reducing the frequency of failures through better design, procedures, organizational polices, training, etc.;

.2 mitigating the effect of failures, in order to prevent accidents;

.3 alleviating the circumstances in which failures may occur; and

.4 mitigating the consequences of accidents.

7.2.2.5 RCMs should be evaluated regarding their risk reduction effectiveness by using step 2 methodology, including consideration of any potential side effects of the introduction of the RCM.

7.2.2.6 Identification of RCMs may also take into account anticipated advances or ongoing developments in technologies.

7.2.3 *Composition of RCOs*

7.2.3.1 The purpose of this stage is to group the RCMs into a limited number of well thought out Risk Control Options (RCOs). There is a range of possible approaches to grouping individual measures into options. The following two approaches, related to likelihood and escalation, can be considered:

.1 "general approach" which provides risk control by controlling the likelihood of initiation of accidents and may be effective in preventing several different accident sequences; and

.2 "distributed approach" which provides control of escalation of accidents, together with the possibility of influencing the later stages of escalation of other, perhaps unrelated, accidents.

7.2.3.2 In generating the RCOs, the interested entities, who may be affected by the combinations of measures proposed, should be identified.

7.2.3.3 Some RCMs/RCOs may introduce new or additional hazards, in which case steps 1, 2 and 3 should be reviewed and revised as appropriate.

7.2.3.4 Before adopting a combination of RCOs for which a quantitative assessment of the combined effects was not performed, a qualitative evaluation of RCO interdependencies should be performed. Such an evaluation could take the form of a matrix as illustrated in the following table:

Table: Interdependencies of RCOs

RCO	**1**	**2**	**3**	**4**
1		Strong	No	Weak
2	Weak		Weak	No
3	No	Weak		No
4	Weak	No	No	

The above matrix table lists the RCOs both vertically and horizontally. Reading horizontally, the table indicates in the first row any dependencies between RCO 1 and each of the other proposed RCOs (2 to 4). For example, in this case the table states that if RCO 1 is implemented, RCO 2, being strongly dependent on RCO 1, needs to be re-evaluated before adopting it in conjunction with RCO 1. On the other hand, RCO 3 is not dependent on RCO 1, and therefore its cost-effectiveness is not altered by the adoption of RCO 1. RCO 4 is weakly dependent on RCO 1, so re-evaluation may not be necessary. In principle, one dependency table could be given for cost, benefits and risk reduction. The interdependencies in the above matrix may or may not be symmetric.

7.2.3.5 Where more than one RCOs are proposed to be implemented at the same time, the effectiveness of such combination in reducing the risk should be assessed.

7.2.3.6 Sensitivity analysis and uncertainty analysis should be considered in the analysis of effectiveness of RCMs and RCOs, and the results of sensitivity analysis and uncertainty analysis should be reported.

7.3 Results

The output from step 3 comprises:

.1 a list of RCOs with their effectiveness in reducing risk, including the method of analysis;

.2 a list of interested entities affected by the identified RCOs;

.3 a table stating the interdependencies between the identified RCOs; and

.4 results of analysis of side effects of RCOs.

8 FSA STEP 4 – COST-BENEFIT ASSESSMENT

8.1 Scope

8.1.1 The purpose of step 4 is to identify and compare benefits and costs associated with the implementation of each RCO identified and defined in step 3. A cost-benefit assessment may consist of the following stages:

.1 consider the risks assessed in step 2, both in terms of frequency and consequence, in order to define the base case in terms of risk levels of the situation under consideration;

.2 arrange the RCOs, defined in step 3, in a way to facilitate understanding of the costs and benefits resulting from the adoption of an RCO;

.3 estimate the pertinent costs and benefits for all RCOs;

.4 estimate and compare the cost-effectiveness of each option, in terms of the cost per unit risk reduction by dividing the net cost by the risk reduction achieved as a result of implementing the option; and

.5 rank the RCOs from a cost-benefit perspective in order to facilitate the decision-making recommendations in step 5 (e.g. to screen those which are not cost-effective or impractical).

8.1.2 ~~Costs should be expressed in terms of life cycle costs and may include initial, operating, training, inspection, certification, decommission, etc. Benefits may include reductions in fatalities, injuries, casualties, environmental damage and clean-up, indemnity of third party liabilities, etc. and an increase in the average life of ships.~~ Costs of the RCOs should be expressed in terms of life cycle costs and may include initial, operating, training, inspection, certification, decommission, etc. as far as practicable.

8.1.3 Benefits of the RCOs may include reductions in fatalities, injuries, environmental damage and clean-up, third-party economic impact (e.g. tourism, fishery), loss/damage of cargo, loss of ship or ship repair.

8.1.4 It should be noted that due consideration should be given to the estimation of costs and benefits, and related uncertainty because of the importance of both parameters for demonstrating cost-effectiveness.

8.2 Methods

8.2.1 *Definition of interested entities*

8.2.1.1 The evaluation of the above costs and benefits can be carried out by using various methods and techniques. Such a process should be conducted for the overall situation and then for those interested entities which are the most influenced by the problem in question.

8.2.1.2 In general, an interested entity can be defined as the person, organization, company, coastal State, flag State, etc., who is directly or indirectly affected by an accident or by the cost-effectiveness of the proposed new regulation. Different interested entities with similar interests can be grouped together for the purpose of applying the FSA methodology and identifying decision-making recommendations.

8.2.2 *Calculation indices for cost-effectiveness*

There are several indices which express cost-effectiveness in relation to safety of life such as Gross Cost of Averting a Fatality (Gross CAF) and Net Cost of Averting a Fatality (Net CAF) as described in appendix 7. Other indices based on damage to and effect on property and environment may be used for a cost-benefit assessment relating to such matters. Comparisons of cost-effectiveness for RCOs may be made by calculating such indices.

8.2.3 For evaluation of RCOs focusing on prevention of oil spill from ships, environmental risk evaluation criteria as described in appendix 7 can be used.

8.2.4 Sensitivity analysis and uncertainty analysis should be considered in the cost-benefit analysis and cost-effectiveness, and the results should be reported.

8.3 Results

The output from step 4 comprises:

.1 costs and benefits for each RCO identified in step 3 from an overview perspective;

.2 costs and benefits for those interested entities which are the most influenced by the problem in question; and

.3 cost-effectiveness expressed in terms of suitable indices.

9 FSA STEP 5 – RECOMMENDATIONS FOR DECISION-MAKING

9.1 Scope

9.1.1 The purpose of step 5 is to define recommendations which should be presented to the relevant decision makers in an auditable and traceable manner. The recommendations would be based upon the comparison and ranking of all hazards and their underlying causes; the comparison and ranking of risk control options as a function of associated costs and benefits; and the identification of those risk control options which keep risks as low as reasonably practicable.

9.1.2 The basis on which these comparisons are made should take into account that, in ideal terms, all those entities that are significantly influenced in the area of concern should be equitably affected by the introduction of the proposed new regulation. However, taking into consideration the difficulties of this type of assessment, the approach should be, at least in the earliest stages, as simple and practical as possible.

9.2 Methods

9.2.1 *Scrutiny of results*

Recommendations should be presented in a form that can be understood by all parties irrespective of their experience in the application of risk and cost-benefit assessment and related techniques. Those submitting the results of an FSA process should provide timely and open access to relevant supporting documents and a reasonable opportunity for and a mechanism to incorporate comments.

9.2.2 *Risk evaluation criteria*

There are several standards for risk acceptance criteria, none as yet universally accepted. While it is desirable for the Organization and Member States which propose new regulations or modifications to existing regulations to determine agreed risk evaluation criteria after wide and deep consideration, those used within an FSA should be explicit.

9.3 Results

The output from step 5 comprises:

.1 an objective comparison of alternative options, based on the potential reduction of risks and cost-effectiveness, in areas where legislation or rules should be reviewed or developed;

.2 feedback information to review the results generated in the previous steps; and

.3 recommended RCO(s) submitted in SMART (specific, measurable, achievable, realistic, time-bound) terms and accompanied with the application of the RCO(s), e.g. application of ship type(s) and construction date and/or systems to be fitted on board.

10 PRESENTATION OF FSA RESULTS

10.1 To facilitate the common understanding and use of FSA at IMO in the rule-making process, each report of an FSA process should:

.1 provide a clear statement of the final recommendations, ranked and justified in an auditable and traceable manner;

.2 list the principal hazards, risks, costs and benefits identified during the assessment;

.3 explain and reference the basis for significant assumptions, limitations, uncertainties, data models, methodologies and inferences used or relied upon in the assessment or recommendations, results of hazard identifications and risk analysis, risk control options and results of cost-benefit analysis to be considered in the decision-making process;

.4 describe the sources, extent and magnitude of significant uncertainties associated with the assessment or recommendations;

.5 describe the composition and expertise of groups that performed each step of the FSA process by providing a short curriculum vitae of each expert and describing the basis of selection of the experts; and

.6 describe the method of decision-making in the group(s) that performed the FSA process (see paragraph 3.3).

10.2 The standard format for reporting the FSA process is shown in appendix 8.

11 APPLICATION AND REVIEW PROCESS OF FSA

The Guidance for practical application and review process of FSA is contained in appendix 10.

~~**FIGURE 1**~~

~~**FLOW CHART OF THE FSA METHODOLOGY**~~

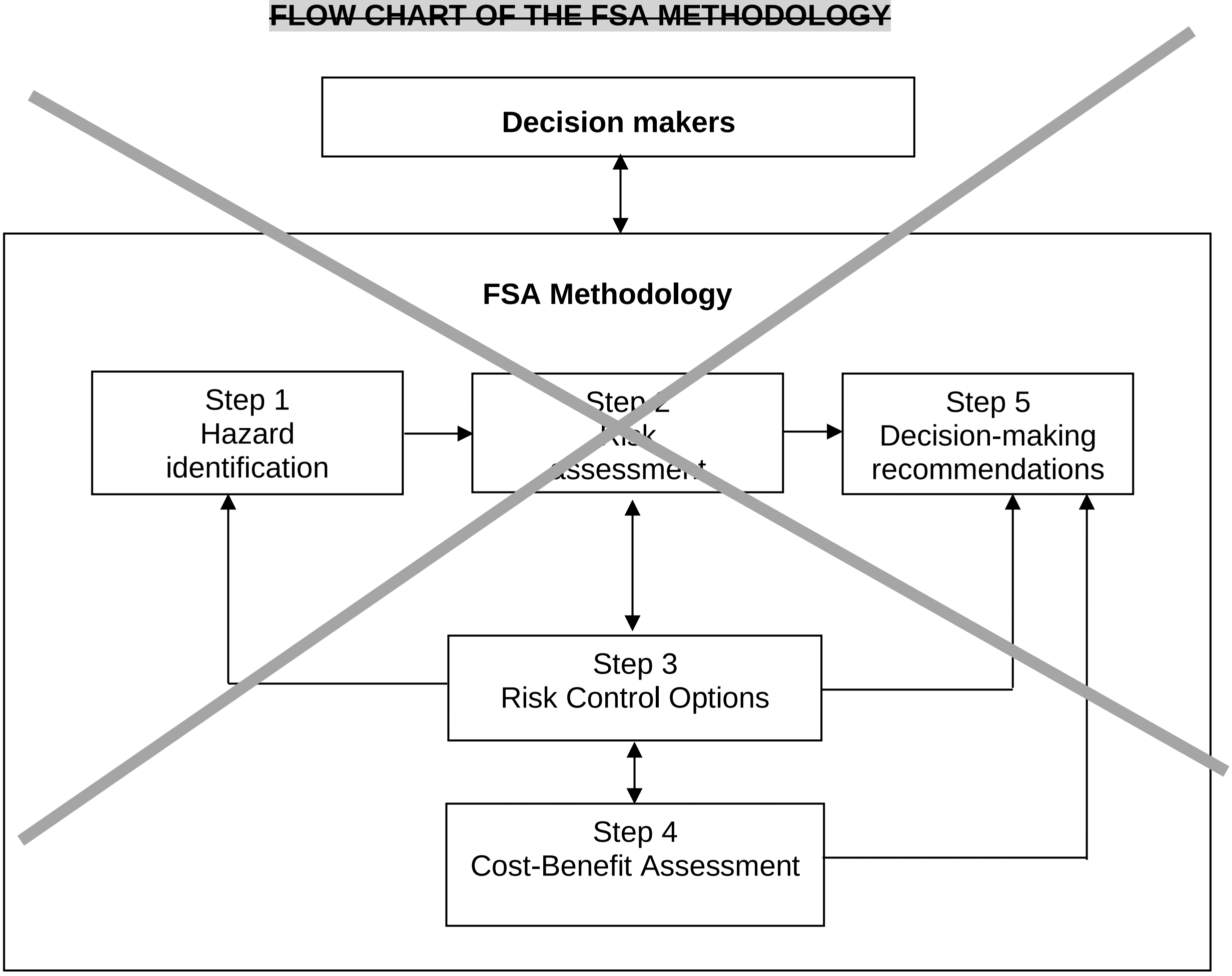


FIGURE 1

FLOW CHART OF THE FSA METHODOLOGY

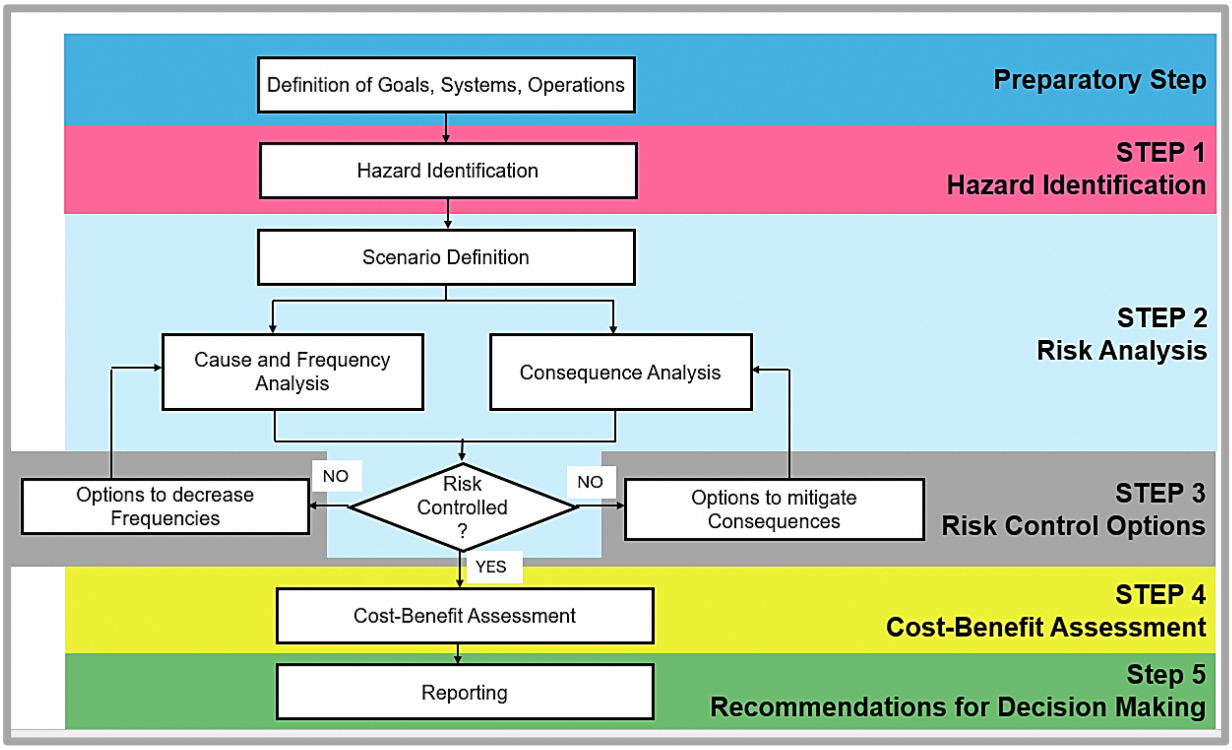


FIGURE 2

EXAMPLE OF LOSS MATRIX

Ship accident loss (£ or $ or € per ship year)					
Accident type	Ship accident cost	Environmental damage and clean-up	Risk to life	Risk of injuries and ill health	Total cost
	£ or $ or €	£ or $ or € /tonne x number of tonnes	Fatalities x £ or $ or € X m	DALY* x £ or $ or € Y	£ or $ or €
Collision Contact Foundered Fire/explosion Hull damage Machinery damage War loss Grounding Other ship accidents Other oil spills Personal accidents					
TOTAL					

* DALY = Disabled Adjourned Life Years (World Health Organization (WHO) Statistics; https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys) ~~(The World Health Report 2000; www.who.int~~)

FIGURE 3

COMPONENTS OF THE INTEGRATED SYSTEM

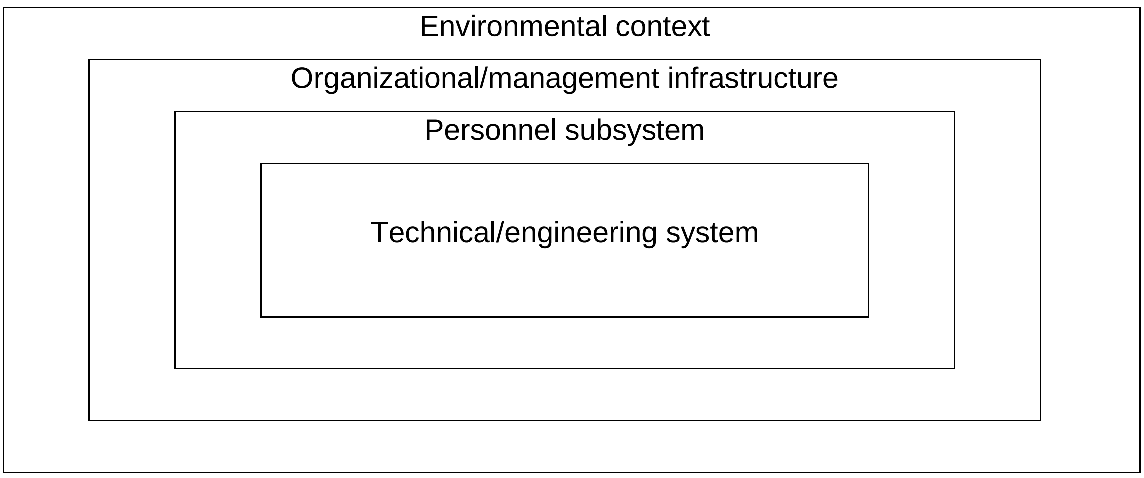


FIGURE 4

INCORPORATION OF HUMAN RELIABILITY ANALYSIS (HRA) INTO THE FSA PROCESS

FSA PROCESS	TASKS REQUIRED TO INCORPORATE HRA
Step 1 Hazard Identification	Human-related hazards (appendix 1-5.2) High-level task analysis (appendix 1-5.2) Preliminary description of outcome (appendix 1-5.3)
↓	
Step 2 Risk Analysis	Detailed task analysis for critical tasks (appendix 1-6.2) Human error analysis (appendix 1-6.3) Human error quantification (appendix 1-6.4)
↓	
Step 3 Risk Control Options	Risk control options for human element (appendix 1-7.2)
↓	
Step 4 Cost-Benefit Assessment	
↓	
Step 5 Recommendations for Decision-Making	

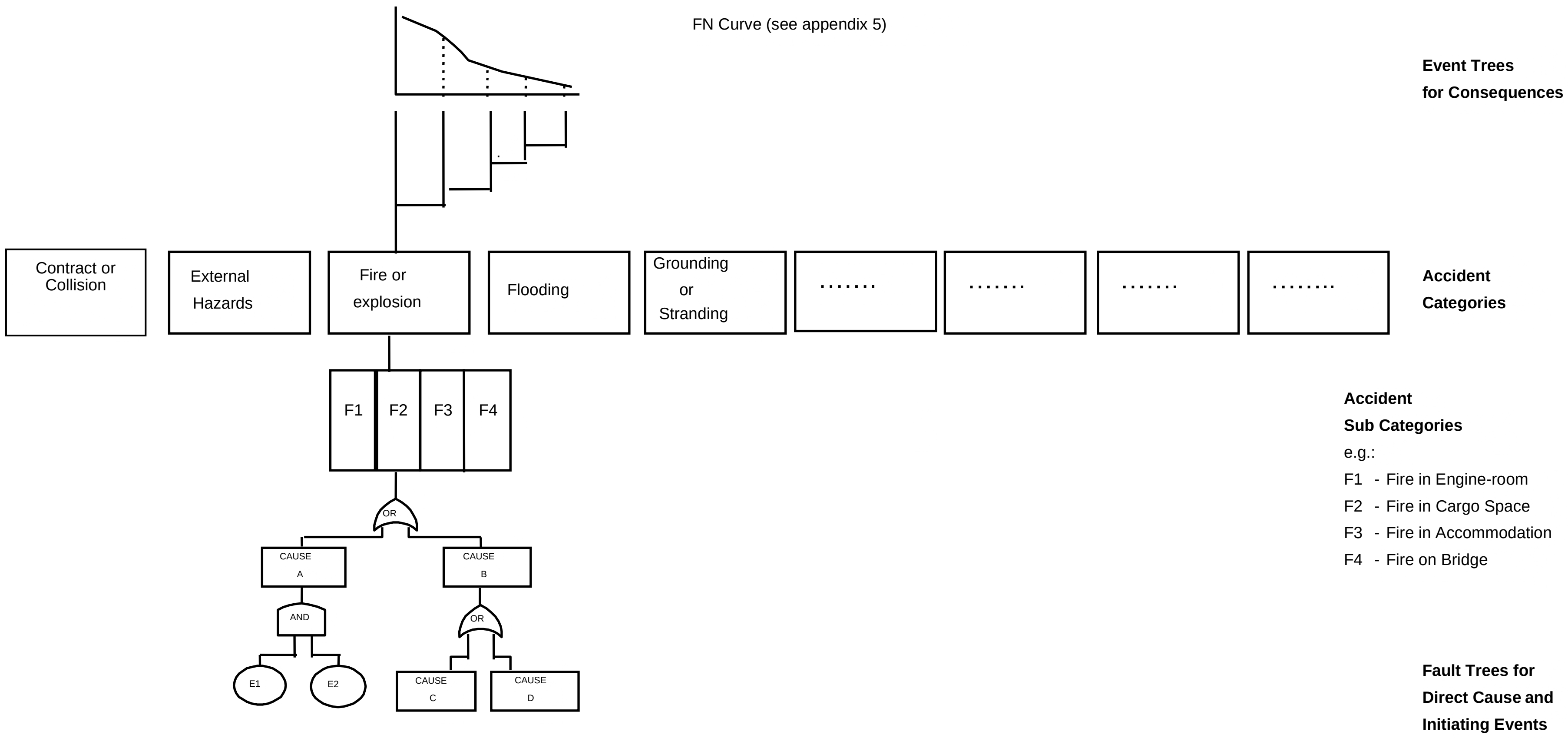
FIGURE 5

RISK MATRIX

FREQUENCY				
Frequent				HIGH RISK
Reasonably probable				
Remote				
Extremely remote	LOW RISK			
	Minor	Significant	Severe	Catastrophic
				CONSEQUENCE

FIGURE 6

EXAMPLE OF A RISK CONTRIBUTION TREE*



* As defined in the context of these Guidelines.

APPENDIX 1

GUIDANCE ON HUMAN RELIABILITY ANALYSIS (HRA)

1 INTRODUCTION

1.1 Purpose of Human Reliability Analysis (HRA)

1.1.1 Those industries which routinely use quantitative risk assessment (QRA) to assess the frequency of system failures as part of the design process or ongoing operations management, have recognized that in order to produce valid results it is necessary to assess the contribution of the human element to system failure. The accepted way of incorporating the human element into QRA and FSA studies is through the use of human reliability analysis (HRA).

1.1.2 HRA was developed primarily for the nuclear industry. Using HRA in other industries requires that the techniques be appropriately adapted. For example, because the nuclear industry has many built-in automatic protection systems, consideration of the human element can be legitimately delayed until after consideration of the overall system performance. On board ships, the human has a greater degree of freedom to disrupt system performance. Therefore, a high-level task analysis needs to be considered at the outset of an FSA.

1.1.3 HRA is a process which comprises a set of activities and the potential use of a number of techniques depending on the overall objective of the analysis. HRA may be performed on a qualitative or quantitative basis depending on the level of FSA being undertaken. If a full quantitative analysis is required then Human Error Probabilities (HEPs) can be derived in order to fit into quantified system models such as fault and event trees. However, in many instances a qualitative analysis may be sufficient. The HRA process usually consists of the following stages:

.1 identification of key tasks;

.2 task analysis of key tasks;

.3 human error identification;

.4 human error analysis; and

.5 human reliability quantification.

1.1.4 Where a fully-quantified FSA approach is required, HRA can be used to develop a set of HEPs for incorporation into probabilistic risk assessment. However, this aspect of HRA can be over-emphasized. Experienced practitioners admit that greater benefit is derived from the early, qualitative stages of task analysis and human error identification. Effort expended in these areas pays dividends because an HRA exercise (like an FSA study) is successful only if the correct areas of concern have been chosen for investigation.

1.1.5 It is also necessary to bear in mind that the data available for the last stage of HRA, human reliability quantification, are currently limited. Although several human error databases have been built up, the data contained in them are only marginally relevant to the maritime industry. In some cases where an FSA requires quantitative results from the HRA, expert judgement may be the most appropriate method for deriving suitable data. Where expert judgement is used, it is important that the judgement can be properly justified as required by appendix 8 of these ~~FSA~~ Guidelines.

1.2 Scope of the HRA Guidance

1.2.1 Figure 4 of these ~~FSA~~ Guidelines shows how the HRA Guidance fits into the FSA process.

1.2.2 The amount of detail provided in this guidance is at a level similar to that given in these ~~FSA~~ Guidelines, i.e. it states what should be done and what considerations should be taken into account. Details of some techniques used to carry out the process are provided in the appendices of this guidance.

1.2.3 The sheer volume of information about this topic prohibits the provision of in-depth information: there are numerous HRA techniques, and task analysis is a framework encompassing dozens of techniques. ~~Table 1~~ The list of references in appendix 11 lists the main references which could be pursued.

1.2.4 As with FSA, HRA can be applied to the design, construction, maintenance and operations of a ship.

1.3 Application

It is intended that this guidance should be used wherever an FSA is conducted on a system which involves human action or intervention which affects system performance.

2 BASIC TERMINOLOGY

Error producing condition: Factors that can have a negative effect on human performance.

Human error: A departure from acceptable or desirable practice on the part an individual or a group of individuals that can result in unacceptable or undesirable results.

Human error recovery: The potential for the error to be recovered, either by the individual or by another person, before the undesired consequences are realized.

Human error consequence: The undesired consequences of human error.

Human error probability: Defined as follows:

$$HEP = \frac{Number\ of\ human\ errors\ that\ have\ occurred}{Number\ of\ opportunities\ for\ human\ error}$$

Human reliability: The probability that a person: (1) correctly performs some system-required activity in a required time period (if time is a limiting factor) and (2) performs no extraneous activity that can degrade the system. *Human unreliability* is the opposite of this definition.

Performance shaping factors: Factors that can have a positive or negative effect on human performance.

Task analysis: A collection of techniques used to compare the demands of a system with the capabilities of the operator, usually with a view to improving performance, e.g. by reducing errors.

3 METHODOLOGY

HRA can be considered to fit into the overall FSA process in the following way:

.1 identification of key human tasks consistent with step 1;

.2 risk assessment, including a detailed task analysis, human error analysis and human reliability quantification consistent with step 2; and

.3 risk control options consistent with step 3.

4 PROBLEM DEFINITION

Additional human element issues which may be considered in the problem definition include:

.1 personal factors, e.g. stress, fatigue;

.2 organizational and leadership factors, e.g. manning level;

.3 task features, e.g. task complexity; and

.4 onboard working conditions, e.g. human-machine interface.

5 HRA STEP 1 – IDENTIFICATION OF HAZARDS

5.1 Scope

5.1.1 The purpose of this step is to identify key potential human interactions which, if not performed correctly, could lead to system failure. This is a broad scoping exercise where the aim is to identify areas of concern (e.g. whole tasks or large sub-tasks) requiring further investigation. The techniques used here are the same as those used in step 2, but in step 2 they are used much more rigorously.

5.1.2 Human hazard identification is the process of systematically identifying the ways in which human error can contribute to accidents during normal and emergency operations. As detailed in paragraph 5.2.2 below, standard techniques such as Hazard and Operability (HazOp) study and Failure Mode and Effects Analysis (FMEA) can be, and are, used for this purpose. Additionally, it is strongly advised that a high-level functional task analysis is carried out. This section discusses those techniques which were developed solely to address human hazards.

5.2 Methods for hazard identification

5.2.1 In order to carry out a human hazard analysis, it is first necessary to model the system in order to identify the normal and emergency operating tasks that are carried out by the crew. This is achieved by the use of a high-level task analysis (as described in table 1~~2~~) which identifies the main human tasks in terms of operational goals. Developing a task analysis can utilize a range of data-collection techniques, e.g. interviews, observation, critical incident, many of which can be used to directly identify key tasks. Additionally, there are many other sources of information which may be consulted, including design information, past experience, normal and emergency operating procedures, etc.

5.2.2 At this stage it is not necessary to generate a lot of detail. The aim is to identify those key human interactions and/or human-machine interactions which require further attention. Therefore, once the main tasks, sub-tasks and their associated goals have been listed, the potential contributors to human error of each task need to be identified together with the potential hazard arising. There are a number of techniques which may be utilized for this purpose, including human error HazOp, Hazard Checklists, etc. An example of human-related hazards identifying a number of different potential contributors to sub-standard performance is included in table 2~~3~~.

5.2.3 For each task and sub-task identified, the associated hazards and their associated scenarios should be ranked in order of their criticality in the same manner as discussed in section 5.2.2 of these ~~FSA~~ Guidelines.

5.3 Results

The output from step 1 is a set of activities (tasks and sub-tasks) with a ranked list of hazards associated with each activity. This list needs to be coupled with the other lists generated by the FSA process, and should therefore be produced in a common format. Only the top few hazards for critical tasks are subjected to risk assessment; less critical tasks are not examined further.

6 HRA STEP 2 – RISK ANALYSIS

6.1 Scope

The purpose of step 2 is to identify those areas where the human element poses a high risk to system safety and to evaluate the factors influencing the level of risk.

6.2 Detailed task analysis

6.2.1 At this stage, the key tasks are subjected to a detailed task analysis. Where the tasks involve more decision-making than action, it may be more appropriate to carry out a cognitive task analysis. Table ~~2~~ 1 outlines the extended task analysis which was developed for analysing decision-making tasks.

6.2.2 The task analysis should be developed until all critical sub-tasks have been identified. The level of detail required is that which is appropriate for the criticality of the operation under investigation. A good general rule is that the amount of detail required should be sufficient to give the same degree of understanding as that provided by the rest of the FSA exercise.

6.3 Human error analysis

6.3.1 The purpose of human error analysis is to produce a list of potential human errors that can lead to the undesired consequence that is of concern. To help with this exercise, some examples of typical human errors are included in figure 1.

6.3.2 Once all potential errors have been identified, they are typically classified along the following lines. This classification allows the identification of a critical subset of human errors that must be addressed:

.1 the supposed cause of the human error;

.2 the potential for error recovery, either by the operator or by another person (this includes consideration of whether a single human error can result in undesired consequences); and

.3 the potential consequences of the error.

6.3.3 Often, a qualitative analysis should be sufficient. A simple qualitative assessment can be made using a recovery/consequence matrix such as that illustrated in figure 2. Where necessary, a more detailed matrix can be developed using a scale for the likely consequences and levels of recovery.

6.4 Human error quantification

6.4.1 This activity is undertaken where a probability of human error (HEP) is required for input into a quantitative FSA. Human error quantification can be conducted in a number of ways.

6.4.2 In some cases, because of the difficulties of acquiring reliable human error data for the maritime industry, expert judgement techniques may need to be used for deriving a probability for human error. Expert judgement techniques can be grouped into four categories:

.1 paired comparisons;

.2 ranking and rating procedures;

.3 direct numerical estimation; and

.4 indirect numerical estimation.

It is particularly important that experts are provided with a thorough task definition. A poor definition invariably produces poor estimates.

6.4.3 Absolute Probability Judgement (APJ) is a good direct method. It can be used in various forms, from the single expert assessor to large groups of individuals whose estimates are mathematically aggregated (see table 34). Other techniques which focus on judgements from multiple experts include: brainstorming; consensus decision-making; Delphi; and the Nominal Group technique.

6.4.4 Alternatives to expert opinion are historic data (where available) and generic error probabilities. Two main methods for HRA which have databases of human error probabilities (mainly for the nuclear industry) are the Technique for Human Error Rate Prediction (THERP) and Human Error Assessment and Reduction Technique (HEART) (see table 34).

6.4.5 *Technique for Human Error Rate Prediction (THERP)*

THERP was developed by Swain and Guttmann (1983) of Sandia National Laboratories for the US Nuclear Regulatory Commission, and has become the most widely used human error quantitative prediction technique. THERP is both a human reliability technique and a human error databank. It models human errors using probability trees and models of dependence, but also considers performance shaping factors (PSFs) affecting action. It is critically dependent on its database of human error probabilities. It is considered to be particularly effective in quantifying errors in highly procedural activities.

6.4.6 *Human Error Assessment and Reduction Technique (HEART)*

HEART is a technique developed by Williams (1985) that considers particular ergonomics, tasks and environmental factors that adversely affect performance. The extent to which each factor independently affects performance is quantified and the human error probability is calculated as a function of the product of those factors identified for a particular task.

6.4.7 HEART provides specific information on remedial risk control options to combat human error. It focuses on five particular causes and contributions to human error: impaired system knowledge; response time shortage; poor or ambiguous system feedback; significant judgement required of operator; and the level of alertness resulting from duties, ill health or the environment.

6.4.8 When applying human error quantification techniques, it is important to consider the following:

.1 Magnitudes of human error are sufficient for most applications. A "gross" approximation of the human error magnitude is sufficient. The derivation of HEPs may be influenced by modelling and quantitative uncertainties. A final sensitivity analysis should be presented to show the effect of uncertainties on the estimated risks.

.2 Human error quantification can be very effective when used to produce a comparative analysis rather than an exact quantification. Then human error quantification can be used to support the evaluation of various risk control options.

.3 The detail of quantitative analysis should be consistent with the level of detail of the FSA model. The HRA should not be more detailed than the technical elements of the FSA. The level of detail should be selected based upon the contribution of the activity to the risk, system or operation being analysed.

.4 The human error quantification tool selected should fit the needs of the analysis. There are a significant number of human error quantification techniques available. The selection of a technique should be assessed for consistency, usability, validity of results, usefulness, effective use of resources for the HRA and the maturity of the technique.

6.5 Results

6.5.1 The output from this step comprises:

.1 an analysis of key tasks;

.2 an identification of human errors associated with these tasks; and

.3 an assessment of human error probabilities (optional).

6.5.2 These results should then be considered in conjunction with the high-risk areas identified elsewhere in step 2.

7 HRA STEP 3 – RISK CONTROL OPTIONS

7.1 Scope

The purpose of step 3 is to consider how the human element is considered within the evaluation of technical, human, work environment, personnel and management-related risk control options.

7.2 Application

7.2.1 The control of risks associated with the human interaction with a system can be approached in the same way as for the development of other risk control measures. Measures can be specified in order to:

.1 reduce the frequency of failure;

.2 mitigate the effects of failure;

.3 alleviate the circumstances in which failures occur; and

.4 mitigate the consequences of accidents.

7.2.2 Proper application of HRA can reveal that technological innovations can also create problems which may be overlooked by FSA evaluation of technical factors only. A typical example of this is the creation of long periods of low workload when a high degree of automation is used. This in turn can lead to an inability to respond correctly when required or even to the introduction of "risk-taking behaviour" in order to make the job more interesting.

7.2.3 When dealing with risk control concerning human activity, it is important to realize that more than one level of risk control measure may be necessary. This is because human involvement spans a wide range of activities from day-to-day operations through to senior management levels. Secondly, it must also be stressed that a basic focus on good system design utilizing ergonomics and human factor principles is needed in order to achieve enhanced operational safety and performance levels.

7.2.4 In line with figure 3 of these ~~FSA~~ Guidelines, risk control measures for human interactions can be categorized into four areas as follows: (1) technical/engineering subsystem, (2) working environment, (3) personnel subsystem and (4) organizational/management subsystem. A description of the issues that may be considered within each of these areas is given in figure 3.

7.2.5 Once the risk control measures have been initially specified, it is important to reassess human intervention in the system in order to assess whether any new hazards have been introduced. For example, if a decision had been taken to automate a particular task, then the new task would need to be re-evaluated.

7.3 Results

The output from this step comprises a range of risk control options categorized into 4 areas as presented in figure 3, easing the integration of human-related risk into step 3.

8 HRA STEP 4 – COST-BENEFIT ASSESSMENT

No specific HRA guidance for this section is required.

9 HRA STEP 5 – RECOMMENDATIONS FOR DECISION-MAKING

Judicious use of the results of the HRA study should contribute to a set of balanced decisions and recommendations of the whole FSA study.

FIGURE 1

TYPICAL HUMAN ERRORS

Physical Errors	***Mental Errors***
Action omitted Action too much/little Action in wrong direction Action mistimed Action on wrong object	Lack of knowledge of system/situation Lack of attention Failure to remember procedures Communication breakdowns Miscalculation

FIGURE 2

RECOVERY/CONSEQUENCE MATRIX

	High	May need to consider	MUST CONSIDER
Consequence	Low	No need to consider	May need to consider
		High	Low
		Recovery	

FIGURE 3

EXAMPLES OF RISK CONTROL OPTIONS

Technical/engineering subsystem

- ergonomic design of equipment and workspaces
- good layout of bridge, machinery spaces
- ergonomic design of the man-machine interface/human computer interface
- specification of information requirements for the crew to perform their tasks
- clear labelling and instructions on the operation of ship systems and control/ communications equipment

Working environment

- ship stability, effect on crew of working under conditions of pitch/roll
- weather effects, including fog, particularly on watch-keeping or external tasks
- ship location, open sea, approach to port, etc.
- appropriate levels of lighting for operations and maintenance tasks and for day and night-time operations
- consideration of noise levels (particularly for effect on communications)

- consideration of the effects of temperature and humidity on task performance

- consideration of the effects of vibration on task performance

Personnel subsystem

- development of appropriate training for crew members
- crew levels and make up
- language and cultural issues
- workload assessment (both too much and too little workload can be problematic)
- motivational and leadership issues

Organizational/management subsystem

- development of organization policies on recruitment, selection, training, crew levels and make up, competency assessment, etc.

- development of operational and emergency procedures (including provisions for tug and salvage services)

- use of safety management systems

- provision of weather forecasting/routeing services

~~TABLE 1~~

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TABLE 1

SUMMARY OF TASK ANALYSIS TYPES

1 High-level task analysis

1.1 High-level task analysis here refers to the type of task analysis which allows an analyst to gain a broad but shallow overview of the main functions which need to be performed to accomplish a particular task.

1.2 High-level task analysis is undertaken in the following way:

.1 describe all operations within the system in terms of the tasks required to achieve a specific operational goal; and

.2 consider goals associated with normal operations, emergency procedures, maintenance and recovery measures.

1.3 The analysis is recorded either in a hierarchical format or in tabular form.

2 Detailed task analysis

2.1 Detailed task analysis is undertaken to identify:

.1 the overall task (or job) that is done;

.2 sub-tasks;

.3 all of the people who contribute to the task and their interactions;

.4 how the work is done, i.e. the working practices in normal and emergency situations;

.5 any controls, displays, tools, etc. which are used; and

.6 factors which influence performance.

2.2 There are many task analysis techniques - Kirwan and Ainsworth (1992) list more than twenty. They note that the most widely used, hierarchical task analysis (HTA), can be used as a framework for applying other techniques:

.1 data-collection techniques, e.g. activity sampling, critical incident, questionnaires;

.2 task description techniques, e.g. charting and network techniques, tabular task analysis;

.3 tasks simulation methods, e.g. computer modelling and simulation;

.4 task behaviour assessment methods, e.g. management and oversight risk trees; and

.5 task requirement evaluation methods, e.g. ergonomics checklists.

3 Extended task analysis (XTA)

3.1 Traditional task analysis was designed for investigating manual tasks, and is not so useful for analysing intellectual tasks, e.g. navigation decisions. Extended task analysis or other cognitive task analyses (see Annett and Stanton, 1998) can be used where the focus is less on what actions are performed and more on understanding the rationale for the decisions that are taken.

3.2 XTA is used to map out the logical bases of the decision-making process which underpin the task under examination. The activities which comprise XTA techniques are described in Johnson and Johnson (1987). In summary, they are:

.1 Interview. The interviewer asks about the conditions which enable or disable certain actions to be performed, and how a change in the conditions affects those choices. The interviewer examines the individual's intentions to make sure that all relevant aspects of the situation have been taken into account. This enables the analyst to build up a good understanding of what the individual is doing and why, and how it would change under varying conditions.

.2 Qualitative analysis of data. The interview is tape-recorded, transcribed and subsequently analysed. Methods for analysing qualitative data are well-established in social science and more recently utilized in safety engineering. The technique (called Grounded Theory) is described in detail by Pidgeon et al*.* (1991).

.3 Representation of the analysis in an appropriate format. The representation scheme used in XTA is called systemic grammar networks – a form of associative network – see Johnson and Johnson (1987).

.4 Validation activities, e.g. observation, hypothesis.

TABLE 2

EXAMPLES OF HUMAN-RELATED HAZARDS

1 Human error occurs on board ships when a crew member's ability falls below what is needed to successfully complete a task. Whilst this may be due to a lack of ability, more commonly it is because the existing ability is hampered by adverse conditions. Below are some examples (not complete) of personal factors and unfavourable conditions which constitute hazards to optimum performance. A comprehensive examination of all human-related hazards should be performed. During the "design stage" it is typical to focus mainly on task features and on board working conditions as potential human-related hazards.

2 Personal factors

.1 Reduced ability, e.g. reduced vision or hearing;

.2 Lack of motivation, e.g. because of a lack of incentives to perform well;

.3 Lack of ability, e.g. lack of seamanship, unfamiliarity with vessel, lack of fluency of the language used on board;

.4 Fatigue, e.g. because of lack of sleep or rest, irregular meals; and

.5 Stress.

3 Organizational and leadership factors

.1 Inadequate vessel management, e.g. inadequate supervision of work, lack of coordination of work, lack of leadership;

.2 Inadequate shipowner management, e.g. inadequate routines and procedures, lack of resources for maintenance, lack of resources for safe operation, inadequate follow-up of vessel organization;

.3 Inadequate manning, e.g. too few crew, untrained crew; and

.4 Inadequate routines, e.g. for navigation, engine-room operations, cargo handling, maintenance, emergency preparedness.

4 Task features

.1 Task complexity and task load, i.e. too high to be done comfortably or too low causing boredom;

.2 Unfamiliarity of the task;

.3 Ambiguity of the task goal; and

.4 Different tasks competing for attention.

5 Onboard working conditions

.1 Physical stress from, e.g. noise, vibration, sea motion, climate, temperature, toxic substances, extreme environmental loads, night-watch;

.2 Ergonomic conditions, e.g. inadequate tools, inadequate illumination, inadequate or ambiguous information, badly-designed human-machine interface;

.3 Social climate, e.g. inadequate communication, lack of cooperation; and

.4 Environmental conditions, e.g. restricted visibility, high traffic density, restricted fairway.

TABLE 3

SUMMARY OF HUMAN ERROR ANALYSIS TECHNIQUES

The two main HRA quantitative techniques (HEART and THERP) are outlined below. CORE-DATA provides data on generic probabilities. As the data from all of these sources are based on non-marine industries, they need to be used with caution. A good alternative is to use expert judgement and one technique for doing this is Absolute Probability Judgement.

1 Absolute Probability Judgement (APJ)

1.1 APJ refers to a group of techniques that utilize expert judgement to develop human error probabilities (HEPs) detailed in Kirwan (1994) and Lees (1996). These techniques are used when no relevant data exist for the situation in question, making some form of direct numerical estimation the only way of developing values for HEPs.

1.2 There are a variety of techniques available. This gives the analyst some flexibility in accommodating different types of analysis. Most of the techniques avoid potentially detrimental group influences such as group bias; typically the techniques used are: the Delphi technique, the Nominal Group Technique and Paired Comparisons. The number and type of experts that are required to participate in the process are similar to that required for Hazard Identification techniques such as HazOp.

1.3 Paired Comparisons is a significant expert judgement technique. Using this technique, an individual makes a series of judgements about pairs of tasks. The results for each individual are analysed and the relative values for HEPs for the tasks derived. Use of the technique rests upon the ability to include at least two tasks with known HEPs. CORE-DATA and data from other industries may be useful.

1.4 The popularity of these techniques has reduced in recent times, probably due to the requirement to get the relevant groups of experts together. However, these techniques may be very appropriate for the maritime industry.

2 Technique for Human Error Rate Prediction (THERP)

2.1 THERP is one of the best known and most often utilized human reliability analysis techniques. At first sight the technique can be rather daunting due to the volume of information provided. This is because it is a comprehensive methodology covering task analysis, human error identification, human error modelling and human error quantification. However, it is best known for its human error quantification aspects, which includes a series of human error probability (HEP) data tables and data quantifying the effects of various performance shaping factors (PSFs). The data presented is generally of a detailed nature and so not readily transferable to the marine environment.

2.2 THERP contains a dependence model which is used to model the dependence relationship between errors. For example, the model could be used to assess the dependence between the helmsman making an error and the bridge officer noticing it. Operational experience does show that there are dependence effects between people and between tasks. Whilst this is the only human error model of its type, it has not been comprehensively validated.

2.3 A full THERP analysis can be resource-intensive due to the level of detail required to utilize the technique properly. However, the use of this technique forces the analyst to gain a detailed appreciation of the system and of the human error potential. THERP models humans as any other subsystem in the FSA modelling process. The steps are as follows:

.1 identify all the systems in the operation that are influenced and affected by human operations;

.2 compile a list and analyse all human operations that affect the operations of the system by performing a detailed task analysis;

.3 determine the probabilities of human errors through error frequency data and expert judgements and experiences; and

.4 determine the effects of human errors by integrating the human error into the PRA modelling procedure.

2.4 THERP includes a set of performance shaping factors (PSFs) that influence the human errors at the operator level. These performance factors include experience, situational stress factors, work environment, individual motivation, and the human-machine interface. The PSFs are used as a basis for estimating nominal values and value ranges for human error.

2.5 There are advantages to using THERP. First, it is a good tool for relative risk comparisons. It can be used to measure the role of human error in an FSA and to evaluate risk control options not necessarily in terms of a probability or frequency, but in terms of risk magnitude. Also, THERP can be used with the standard event-tree/fault-tree modelling approaches that are sometimes preferred by FSA practitioners. THERP is a transparent technique that provides a systematic, well-documented approach to evaluating the role of human errors in a technical system. The THERP database can be used through systematic analysis or, where available, external human error data can be inserted.

3 Human Error Assessment and Reduction Technique (HEART)

3.1 HEART is best known as a relatively simple way of arriving at human error probabilities (HEPs). The basis of the technique is a database of nine generic task descriptions and an associated human error probability. The analyst matches the generic task description to the task being assessed and then modifies the generic human error probability according to the presence and strength of the identified error producing conditions (EPCs). EPCs are conditions that increase the order of magnitude of the error frequency or probability measurements, similar in concept to PSFs in THERP. A list of EPCs is supplied as part of the technique, but it is up to the analyst to decide on the strength of effect for the task in question.

3.2 Whilst the generic data is mainly derived from the nuclear industry, HEART does appear amenable to application within other industries. It may be possible to tailor the technique to the marine environment by including new EPCs such as weather. However, it needs careful application to avoid ending up with very conservative estimates of HEPs.

4 CORE-DATA

4.1 CORE-DATA is a database of human error probabilities. Access to the database is available through the University of Birmingham in the United Kingdom. The database has been developed as a result of sponsorship by the UK Health and Safety Executive with support from the nuclear, rail, chemical, aviation and offshore industries and contains up to 300 records as of January 1999.

4.2 Each record is a comprehensive presentation of information including, e.g. a task summary, industry origin, country of origin, type of data collection used, a database quality rating, description of the operation, performance shaping factors, sample size and HEP.

4.3 As with all data from other industries, care needs to be taken when transferring the data to the maritime industry. Some of the offshore data may be the most useful.

APPENDIX 2

EXAMPLES OF HAZARDS

1 SHIPBOARD HAZARDS TO PERSONNEL

.1 asbestos inhalation;
.2 burns from caustic liquids and acids;
.3 electric shock and electrocution;
.4 falling overboard; and
.5 pilot ladder/pilot hoist operation.

2 HAZARDOUS SUBSTANCES ON BOARD SHIP

Accommodation areas:

.1 combustible furnishings;
.2 cleaning materials in stores; and
.3 oil/fat in galley equipment;

Deck areas:

.4 cargo; and
.5 paint, oils, greases, etc. in deck stores;

Machinery spaces:

.6 cabling;
.7 fuel and diesel oil for engines, boilers and incinerators;
.8 fuel, lubricating and hydraulic oil in bilges, save-alls, etc.;
.9 refrigerants; and
.10 thermal heating fluid systems.

3 POTENTIAL SOURCES OF IGNITION

General:

.1 electrical arc;
.2 friction;
.3 hot surface;
.4 incendiary spark;
.5 naked flame; and
.6 radio waves;

Accommodation areas (including bridge):

.7 electronic navigation equipment; and
.8 laundry facilities – irons, washing machines, tumble driers, etc.;

Deck areas:

.9 deck lighting;
.10 funnel exhaust emissions; and
.11 hot work sparking;

Machinery spaces:

.12 air compressor units; and
.13 generator engine exhaust manifold.

4 HAZARDS EXTERNAL TO THE SHIP

.1 storms;
.2 lightning;
.3 uncharted submerged objects; and
.4 other ships.

APPENDIX 3

HAZARD IDENTIFICATION AND RISK ANALYSIS TECHNIQUES

1 FAULT TREE ANALYSIS

1.1 A Fault Tree is a logic diagram showing the causal relationship between events which singly or in combination occur to cause the occurrence of a higher level event. It is used in Fault Tree Analysis to determine the probability of a top event, which may be a type of accident or unintended hazardous outcome. Fault Tree Analysis can take account of common cause failures in systems with redundant or standby elements. Fault Trees can include failure events or causes related to human factors.

1.2 The development of a Fault Tree is by a top-down approach, systematically considering the causes or events at levels below the top level. If two or more lower events need to occur to cause the next higher event, this is shown by a logic "and" gate. If any one of two or more lower events can cause the next higher event, this is shown by a logic "or" gate. The logic gates determine the addition or multiplication of probabilities (assuming independence) to obtain the values for the top event.

2 EVENT TREE ANALYSIS

2.1 An Event Tree is a logic diagram used to analyse the effects of an accident, a failure or an unintended event. The diagram shows the probability or frequency of the accident linked to those safeguard actions required to be taken after occurrence of the event to mitigate or prevent escalation.

2.2 The probabilities of success or failure of these actions are analysed. The success and failure paths lead to various consequences of differing severity or magnitude. Multiplying the likelihood of the accident by the probabilities of failure or success in each path gives the likelihood of each consequence.

3 FAILURE MODE AND EFFECT ANALYSIS (FMEA)

FMEA is a technique in which the system to be analysed is defined in terms of functions or hardware. Each item in the system is identified at a required level of analysis. This may be at a replaceable item level. The effects of item failure at that level and at higher levels are analysed to determine their severity on the system as a whole. Any compensating or mitigating provisions in the system are taken account of and recommendations for the reduction of the severity are determined. The analysis indicates single failure modes which may cause system failure.

4 HAZARD AND OPERABILITY STUDIES (HAZOP)

4.1 These studies are carried out to analyse the hazards in a system at progressive phases of its development from concept to operation. The aim is to eliminate or minimize potential hazards.

4.2 Teams of safety analysts and specialists in the subject system, such as designers, constructors and operators are formally constituted. The team members may change at successive phases depending on the expertise required. In examining designs they systematically consider deviations from the intended functions, looking at causes and effects. They record the findings and recommendations and follow-up actions required.

5 WHAT IF ANALYSIS TECHNIQUE

5.1 What If Analysis Technique is a hazard identification technique suited for use in a hazard identification meeting. The typical participants in the meeting may be: a facilitator leader, a recorder and a group of carefully selected experienced persons covering the topics under consideration. Usually a group of 7 to 10 persons is required.

5.2 The group first discusses in detail the system, function or operation under consideration. Drawings, technical descriptions etc. are used, and the experts may have to clarify to each other how the details of the system, function or operation work and may fail.

5.3 The next phase of the meeting is brainstorming, where the facilitator leader guides by asking questions starting with "what if?". The questions span topics like operation errors, measurement errors, equipment malfunction, maintenance, utility failure, loss of containment, emergency operation and external influences. When the ideas are exhausted, previous accident experience may be used to check for completeness.

5.4 The hazards are considered in sequence and structured into a logical sequence, in particular to allow cross-referencing between hazards.

5.5 The hazard identification report is usually developed and agreed in the meeting, and the job is done and reported when the meeting is adjourned.

5.6 The technique requires that the participants are senior personnel with detailed knowledge within their field of experience. A meeting typically takes three days. If the task requires long meetings it should be broken down into smaller sub-tasks.

5.7 SWIFT (Structured What If Technique) is one example of a What If Analysis Technique ~~(http://www.dnv.nl/Syscert/training&consultancy.htm)~~.

6 RISK CONTRIBUTION TREE (RCT)

6.1 RCT may be used as a mechanism for displaying diagrammatically the distribution of risk amongst different accident categories and sub-categories, as shown in figure 6 of these ~~FSA~~ Guidelines. Structuring the tree starts with the accident categories, which may be divided into sub-categories to the extent that available data allow and logic dictates. The preliminary fault and event trees can be developed based on the hazards identified in step 1 to demonstrate how direct causes initiate and combine to cause accidents (using fault trees), and also how accidents may progress further to result in different magnitudes of loss (using event trees). Whilst the example makes use of fault and event tree techniques, other established methods could be used if appropriate.

6.2 Quantifying the RCT is typically undertaken in three stages using available accident statistics:

.1 categories and sub-categories of accidents are quantified in terms of the frequency of accidents;

.2 the severity of accident outcomes is quantified in terms of magnitude and consequence; and

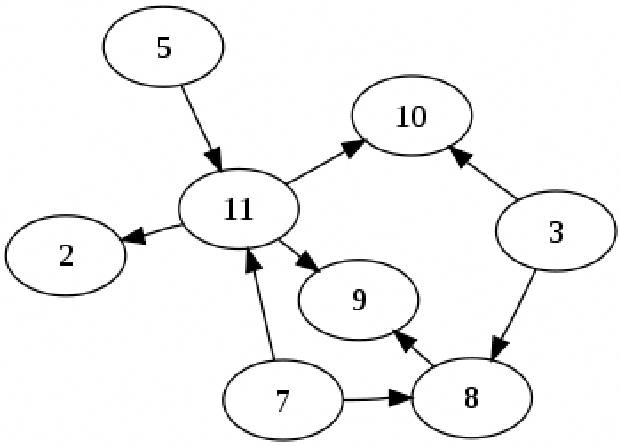
.3 the risk of the categories and sub-categories of accidents can be expressed as F-N curves (see appendix 5) or potential loss of lives (PLL) based on the frequency of accidents and the severity of the outcome of the accidents. Thus, the distribution of risks across all the sub-categories of accidents is determined in risk terms, so as to display which categories contribute how much risk.

7 INFLUENCE DIAGRAMS

The purpose of the Influence Diagram approach is to model the network of influences on an event. These influences link failures at the operational level with their direct causes, and with the underlying organizational and regulatory influences. The Influence Diagram approach is derived from decision analysis and, being based on expert judgements, is particularly useful in situations for which there may be little or no empirical data available. The approach is therefore capable of identifying all the influences (and therefore underlying causal information) that help explain why a marine risk profile may show high risk levels in one aspect (or even vessel type) and low risk level in another aspect. As the Influence Diagram recognizes that the risk profile is influenced, for example by human, organizational and regulatory aspects, it allows a holistic understanding of the problem area to be displayed in a hierarchical way.

8 BAYESIAN NETWORK

Bayesian network is a probabilistic graphical model (a type of statistical model) that represents a set of random variables and their conditional dependencies via a directed acyclic graph (DAG; see diagram below). For example, a Bayesian network could represent the probabilistic relationships between diseases and symptoms. Given symptoms, the network can be used to compute the probabilities of the presence of various diseases.



9 SENSITIVITY ANALYSIS AND UNCERTAINTY ANALYSIS

"Sensitivity analysis" and "**Uncertainty analysis"** have already been defined in section 2 (Basic Terminology).

Sensitivity analysis and uncertainty analysis investigate the robustness of a study when the study includes some form of statistical modelling and, ideally, should be run in tandem.

Sensitivity analysis and uncertainty analysis are related practices; however, uncertainty analysis focuses rather on quantifying uncertainty in model output and aims to make a technical contribution to decision-making through the quantification of uncertainties in the relevant variables.

~~**Sensitivity analysis** is the study of how the uncertainty in the output of a model (numerical or otherwise) can be apportioned to different sources of uncertainty in the model input. A related practice is **uncertainty analysis** which focuses rather on quantifying uncertainty in model output. Ideally, uncertainty and sensitivity analysis should be run in tandem.~~

~~**Uncertainty analysis** investigates the uncertainty of variables that are used in decision-making problems in which observations and models represent the knowledge base. In other words, uncertainty analysis aims to make a technical contribution to decision-making through the quantification of uncertainties in the relevant variables.~~

~~Uncertainty and sensitivity analysis investigate the robustness of a study when the study includes some form of **statistical modelling**.~~

APPENDIX 4

INITIAL RANKING OF ACCIDENT SCENARIOS

1 At the end of step 1, hazards are to be prioritized and scenarios ranked. Scenarios are typically the sequence of events from the initiating event up to the consequence, through the intermediate stages of the scenario development.

2 To facilitate the ranking and validation of ranking, it is generally recommended to define consequence and probability indices on a logarithmic scale. A risk index may therefore be established by adding the probability/frequency and consequence indices. By deciding to use a logarithmic scale, the Risk Index for ranking purposes of an event rated "remote" (FI=3) with severity "Significant" (SI=2) would be RI=5.

Risk = Probability x Consequence
Log (Risk) = log (Probability) + log (Consequence)

3 The following table gives an **example** of a logarithmic severity index, scaled for a maritime safety issue. Consideration of environmental issues or of passenger vessels may require additional or different categories.

Alternatively, the severity index (SI) for fatalities can be directly calculated from the equivalent number of fatalities (S) using the below formula

$$SI = 3 + \log(S)$$

Severity index				
SI	SEVERITY	EFFECTS ON HUMAN SAFETY	EFFECTS ON SHIP	S (Equivalent fatalities)
1	Minor	Single or minor injuries	Local equipment damage	0.01
2	Significant	Multiple or severe injuries	Non-severe ship damage	0.1
3	Severe	Single fatality or multiple severe injuries	Severe damage	1
4	Catastrophic	Multiple fatalities	Total loss	10
Severity indices > 4 are suggested to be used for accidents with a higher number of fatalities				

4 The following table gives an **example** of a logarithmic probability/frequency index.

Alternatively, the frequency index (FI) can be directly calculated from the frequency of occurrence using the below formula:

$$FI = 6 + \log(F)$$

Frequency index			
FI	FREQUENCY	DEFINITION	F (per ship year)
7	Frequent	Likely to occur once per month on one ship	10
6	Highly probable	Likely to occur once per year on one ship	1
5	Reasonably probable	Likely to occur once per year in a fleet of 10 ships, i.e. likely to occur a few times during the ship's life	0.1
4	Probable	Likely to occur once per year in a fleet of 100 ships, i.e. likely to occur during the ship's life	10^{-2}
3	Rare	Likely to occur once per year in a fleet of 1,000 ships, i.e. likely to occur in the total life of several similar ships	10^{-3}
2	Remote	Likely to occur once per year in a fleet of 10,000 ships	10^{-4}
1	Extremely remote	Likely to occur once in the lifetime (20 years) of a world fleet of 5,000 ships	10^{-5}

5 The following table gives an **example** of a risk matrix based on the tables above.

Risk Index (RI)					
		SEVERITY (SI)			
		1	2	3	4
FI	FREQUENCY	Minor	Significant	Severe	Catastrophic
7	Frequent	**8**	**9**	**10**	**11**
6	Highly probable	**7**	**8**	**9**	**10**
5	Reasonably probable	**6**	**7**	**8**	**9**
4	Probable	**5**	**6**	**7**	**8**
3	Rare ~~Remote~~	**4**	**5**	**6**	**7**
2	Remote	**3**	**4**	**5**	**6**
1	Extremely remote	**2**	**3**	**4**	**5**

6 In case of FSA on prevention of oil spill from ships, the following severity index can be used.

Severity Index		
SI	SEVERITY	DEFINITION
1	Category 1	Oil spill size < 1 tonne
2	Category 2	Oil spill size between 1-10 tonnes
3	Category 3	Oil spill size between 10-100 tonnes
4	Category 4	Oil spill size between 100-1,000 tonnes
5	Category 5	Oil spill size between 1,000-10,000 tonnes
6	Category 6	Oil spill size >10,000 tonnes

APPENDIX 5

MEASURES AND TOLERABILITY OF RISKS

1 INTRODUCTION

The following information on measures and tolerability of risks is provided for conceptual understanding and is not intended to provide prescriptive thresholds for acceptability of risks.

2 TERMINOLOGY

Individual Risk (IR): The risk of death, injury and ill health as experienced by an individual at a given location, e.g. a crew member or passenger on board the ship, or belonging to third parties that could be affected by a ship accident. Usually IR is taken to be the risk of death and is determined for the maximally exposed individual. Individual Risk is person and location specific.

$$IR_{for\ Person\ Y} = F_{of\ undesired\ event} \cdot P_{for\ Person\ Y} \cdot E_{of\ Person\ Y}$$

F = frequency
P = resulting casualty probability
E = fractional exposure to that risk

Societal Risk: Average risk, in terms of fatalities, experienced by a whole group of people (e.g. crew, port employees or society at large) exposed to an accident scenario. Usually Societal Risk is taken to be the risk of death and is typically expressed as FN-diagrams or Potential Loss of Life (PLL) (refer to section 2). Societal Risk is determined for the all exposed, even if only once a year. Societal Risk is not person and location specific.

FN-Curve: A continuous graph with the ordinate representing the cumulative frequency distribution of N or more fatalities and the abscissa representing the consequence (N fatalities). The FN-curve represents the cumulative distribution of multiple fatality events and therefore useful in representing societal risk. The FN-curve is constructed by taking each hazard or accident scenario in turn and estimating the number of fatalities. With the estimated frequency of occurrence of each accident scenario the overall frequency with which a given number of fatalities may be equalled or exceeded can be calculated and plotted in the form of an FN-curve.

ALARP (As Low As Reasonably Practicable): Refers to a level of risk that is neither negligibly low nor intolerable high. ALARP is actually the attribute of a risk, for which further investment of resources for risk reduction is not justifiable. The principle of ALARP is employed for the risk assessment procedure. Risks should be As Low As Reasonably Practicable. It means that accidental events whose risks fall within this region have to be reduced unless there is a disproportionate cost to the benefits obtained.

3 PRINCIPLES OF RISK EVALUATION

Risk can be expressed in several complementary fashions. Concerning life safety, the most commonly used expressions are Individual Risk and Societal Risk. This is risk of death, injuries and ill health experienced by an individual and/or a group of people. The notion of risk combines frequency and an identified level of harm. Commonly, the level of harm is narrowed down to the loss of life and risk is an expression of frequency and number of fatalities. In other words, life safety is usually taken to refer to the risk of loss of life, and usually expressed as fatalities per year. In order to address not only fatalities, but also disabilities and injuries, the Equivalent Fatality Concept as specified below is advocated. Risk should at least be judged from two viewpoints. The first point of view is that of the individual, which is dealt with by the Individual Risk. The second point of view is that of society, considering whether a risk is acceptable for (large) group of people. This is dealt with by the Societal Risk.

3.1 The use of Individual Risk

3.1.1 This risk expression is used when the risk from an accident is to be estimated for a particular individual at a given location. Individual Risk considers not only the frequency of the accident and the consequence (here: fatality or injury), but also the individual's fractional exposure to that risk, i.e. the probability of the individual of being in the given location at the time of the accident.

3.1.2 Example: The risk for a person to be killed or injured in a harbour area, due to a tanker explosion, is the higher the closer the person is located to the explosion location, and the more likely the person will be in that location at the time of the explosion. Therefore, the Individual Risk for a worker in the vicinity of the explosion will be higher than for an occupant in the neighbourhood of the harbour terminal.

3.1.3 The purpose of estimating the Individual Risk is to ensure that individuals, who may be affected by a ship accident, are not exposed to excessive risks.

3.2 The use of Societal Risk

3.2.1 Societal Risk is used to estimate risks of accidents affecting many persons, e.g. catastrophes, and acknowledging risk averse or neutral attitudes. Societal Risk includes the risk to every person, even if a person is only exposed on one brief occasion to that risk. For assessing the risk to a large number of affected people, Societal Risk is desirable because Individual Risk is insufficient in evaluating risks imposed on large numbers of people. Societal Risk expressions can be generated for each type of accident (e.g. collision), or a single overall Societal Risk expression can be obtained, e.g. for a ship type, by combining all accidents together (e.g. collision, grounding, fire). Societal Risk may be expressed as:

.1 FN-diagrams showing explicitly the relationship between the cumulative frequency of an accident and the number of fatalities in a multidimensional diagram.

.2 Annual fatality rate: frequency and fatality are combined into a convenient one-dimensional measure of societal risk. This is also known as Potential Loss of Life (PLL).

FN-diagrams

3.2.2 Society in general has a strong aversion to multiple casualty accidents. There is a clear perception that a single accident that kills 1,000 people is worse than 1,000 accidents that kill a single person. Societal Risk expressed by an FN-diagram show the relationship between the frequency of an accident and the number of fatalities (see figure 1 below).

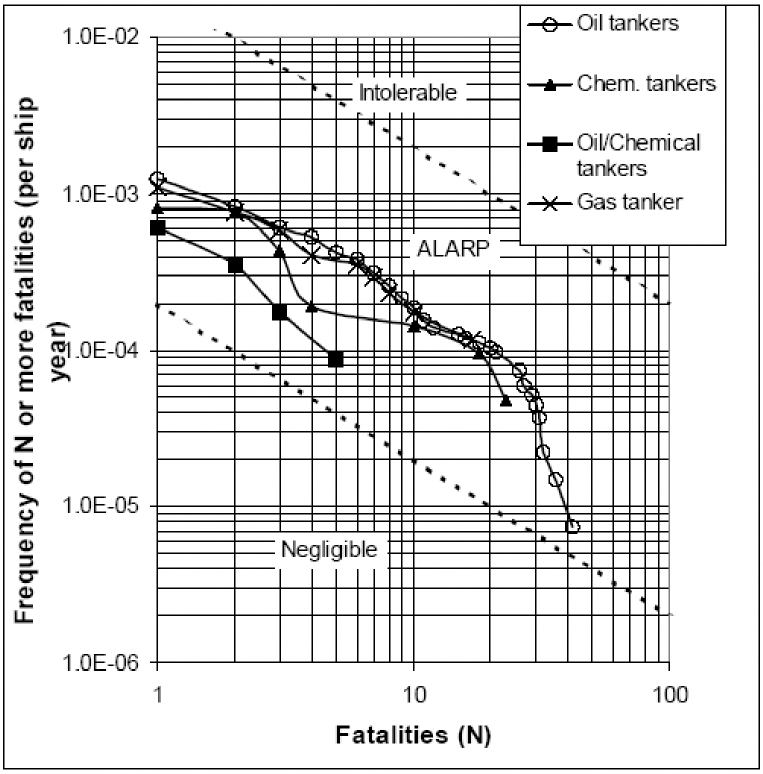


Figure 1: FN-diagram *(from MSC 72/16)*

Potential Loss of Life (PLL)

3.2.3 A simple measure of Societal Risk is the PLL which is defined as the expected value of the number of fatalities per year. PLL is a type of risk integral, being a summation of risk as expressed by the product of consequence and frequency. The integral is summed up over all potential undesired events that can occur.

3.2.4 Compared to the FN-diagram, the distinction between high frequency/low consequence accidents and low frequency/high consequence accidents is lost: all fatalities are treated as equally important, irrespective of whether they occur in high fatality or low fatality accidents. PLL is a simpler format of Societal Risk than the FN-diagram. PLL is typically measured as fatality per ship-year.

3.3 Comparing Societal Risk and Individual Risk

3.3.1 Societal Risk expressed in an FN-diagram allows a more comprehensive picture of risk than Individual Risk measures. The FN-diagram allows the assessment not only of the average number of fatalities but also of the risk of catastrophic accidents killing many people at once.

3.3.2 However, unlike Individual Risk, both FN-diagrams and PLL values give no indication of the geographical distribution of a particular risk. Societal Risk represents the risk to a (large) group of people. In this group, the risk to individuals may be quite different, depending, e.g. on the different locations of the individuals when the accident occurs. The Societal Risk value therefore represents an average risk. There is a general agreement in society that it is not sufficient to just achieve a minimal average risk. It is also necessary to reduce the risk to the most exposed individual. It is therefore adequate to look at both Societal Risk and Individual Risk to achieve a full risk picture.

3.3.3 Societal Risk is difficult to apply to the task of risk reduction, specifically because it is multidimensional.

3.4 Risk equivalence concept

3.4.1 Normally, from a given activity in industry, there tends to be a relationship between fatalities and injuries of different severities resulting from an accident. Furthermore, measures that will reduce the occurrence of fatalities also tend to reduce injuries in proportion. In the literature there exist some studies on the ratio between accidental outcomes, e.g. from Bird and German (1966). In document MSC 68/INF.6, a straightforward approach was introduced, suggesting an equivalence ratio between fatalities, major injuries and minor injuries:

.1 one (1) fatality equals ten (10) severe injuries; and

.2 one (1) severe injury equals ten (10) minor injuries.

3.4.2 The QALY and DALY concepts (refer to appendix 7) would represent more general approaches for measuring injuries and health effects, and are used by e.g. the World Health Organization (WHO).

4 ALARP PRINCIPLE

By using different forms of risk expressions, risk criteria can be created that meet the requirement of different principles. The commonly accepted principle is known as the ALARP principle. Risk criteria are used to translate a risk level into value judgement.

4.1 General

4.1.1 The purpose of FSA is to reduce the risk to a level that is tolerable. IMO has a moral responsibility to limit the risks to people life and health, to the marine environment and to property. In addition, IMO should also account for maintaining a healthy industry. Spending resources on regulations whose benefits are grossly disproportionate to their costs will put the industry in a less than competitive position.

4.1.2 This is realized in the ALARP principle, which is shown in figure 2.

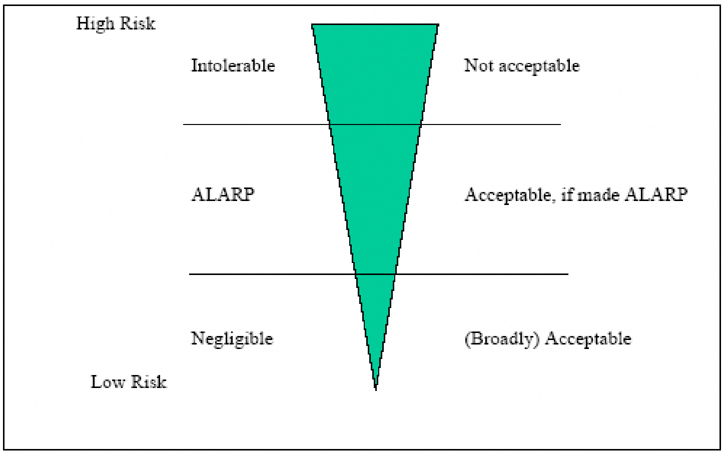


Figure 2: The ALARP principle

4.1.3 It states that there is a risk level that is intolerable above an upper bound. In this region, risk cannot be justified and must be reduced, irrespectively of costs. The principle also states that there is a risk level that is "broadly acceptable" below a lower bound. In this region risk is negligible and no risk reduction required. If the risk level is in between the two bounds, the ALARP region, risk should be reduced to meet economic responsibility: Risk is to be reduced to a level as low as is reasonably practicable. The term reasonable is interpreted to mean cost-effective. Risk reduction measures should be technically practicable and the associated costs should not be disproportionate to the benefits gained. This is examined in a cost-effectiveness analysis.

4.2 Cost-effectiveness Analysis (CEA)

With this approach the amount of risk reduction that can be justified in the ALARP region is determined. Several researchers have proven that most risks in shipping fall into this region. However, it should be noted that this has not yet been verified for all ship types. As such, most of the risk-based decisions will require a CEA. ~~However, it should be noted that this has not yet been verified for all ship types~~. It should be noted that an assessment and related risk rating is valid for a specific point in time and is therefore subject to change with time. There are several indices which express cost-effectiveness in relation to safety of life such as GCAF and NCAF, as described in appendix 7.

5 RECOMMENDED RISK EVALUATION CRITERIA

5.1 Individual Risk

5.1.1 Individual Risk criteria for hazardous activities are often set using risk levels that have already been accepted from other industrial activities.

5.1.2 The level of risk that will be accepted for an individual depends upon two aspects:

.1 if the risk is taken involuntarily or voluntarily; and

.2 if the individual has control over the risk or no control.

5.1.3 If a person is voluntarily exposing himself to a risk and/or has some control over it, then the risk level that is accepted is higher as if this person was exposed involuntarily to that risk or had no control over it.

5.1.4 For example: A passenger on a cruise ship or an occupant living in the vicinity of a port have little or no control over the risks they are exposed to from the ship and/or the port activity. They are involuntarily exposed to risks. A crew member on a ship, instead, has chosen his or her workplace on a voluntary basis, and due to skills and training has some control over the risks he or she is exposed to at the workplace.

5.1.5 An appropriate level for the risk acceptance criteria would be substantially below the total accident risks experienced in daily life, but might be similar to risks that are accepted from other involuntary sources.

5.1.6 The lower and upper bound risk acceptance criteria as listed in table 1 are provided for illustrative purposes only. The specific values selected as appropriate should be explicitly defined in FSA studies.

5.2 Societal Risk/FN-Diagram

5.2.1 When setting upper and lower bounds for societal risk acceptance, both an anchor point and a slope should be defined. The slope reveals the risk inherent attitude: risk prone, neutral or averse. It is recommended to use a slope equal of -1 on a log/log scale to reflect the risk aversion.

5.2.2 In document MSC 72/16 it was pointed out that Societal Risk acceptance criteria cannot be simply transferred from one industrial activity to another. This could lead to illogical and unpredictable results. A method was introduced where the Societal Risk acceptance criteria reflect the importance of the activity to the society (for more detail, refer to document MSC 72/16, Skjong and Eknes (2001, 2002)).

5.2.3 For a given activity, an average acceptable Potential Loss of Life (PLL) is developed by considering the economic value of the activity and its relation to the gross national product. This can be done for crew/workers, passengers and other third parties. The risk is defined to be intolerable if it exceeds the average acceptable risk by more than one order of magnitude, and it is negligible (broadly acceptable), if it is one order of magnitude below the average acceptable risk. These upper and lower bounds represent the ALARP region, which thus ranges over two orders of magnitude, which is in agreement with other published Societal Risk acceptance criteria.

5.2.4 It is recommended to apply this method to define Societal Risk acceptance criteria on different ship types and/or marine activities, as the method can contribute to transparency in using risk acceptance criteria for Societal Risk. In document MSC 72/16, Societal Risk criteria developed with this method and expressed in FN-diagrams are provided for different ship types.

5.3 Examples of risk acceptance criteria

5.3.1 The following criteria are broadly used in other industries and have been also published in HSE (2001).

Decision Parameter		Acceptance Criteria	
		Lower bound for ALARP region	Upper bound for ALARP region
		Negligible (broadly acceptable) fatality risk per year	Maximum tolerable fatality risk per year
Individual Risk	to crew member	10^{-6}	10^{-3}
	to passenger	10^{-6}	10^{-4}
	to third parties, member of public ashore	10^{-6}	10^{-4}
	target values for new ships *)	10^{-6}	Above values to be reduced by one order of magnitude
Societal Risk	to groups of above persons	To be derived by using economic parameters as per MSC 72/16	

Table 1: Quantitative risk evaluation upper and lower bounds

*) While it is recommended that the maximum tolerable criteria for Individual Risk as listed should apply to all ships, it is proposed, in accordance with MSC 72/16, that for comprehensive FSA studies for new ships a more demanding target is appropriate.

5.3.2 It is important to understand, that the above risk acceptance criteria always refer to the total risk to the individual and/or group of persons. Total risk means the sum of all risks that, e.g. a person on board a ship is exposed to. The total risk therefore would contain risks from hazards such as fire, collision, etc. There is no criterion available to determine the acceptability of specific hazards. Therefore, the above criteria can be used to assess the acceptability of the total risk on being, e.g. on a passenger ship, but not for assessing the specific risk of dying on a passenger ship due to a fire.

5.3.3 In case no global assessment due to an FN-diagram is possible (e.g. only a single accident category is considered in the FSA), analysts may simply apply the ALARP principle to look for cost-efficient control measures.

APPENDIX 6

ATTRIBUTES OF RISK CONTROL MEASURES

1 CATEGORY A ATTRIBUTES

1.1 *Preventive risk control* is where the risk control measure reduces the probability of the event.

1.2 *Mitigating risk control* is where the risk control measure reduces the severity of the outcome of the event or subsequent events, should they occur.

2 CATEGORY B ATTRIBUTES

2.1 *Engineering risk control* involves including safety features (either built in or added on) within a design. Such safety features are safety critical when the absence of the safety feature would result in an unacceptable level of risk.

2.2 *Inherent risk control* is where at the highest conceptual level in the design process, choices are made that restrict the level of potential risk.

2.3 *Procedural risk control* is where the operators are relied upon to control the risk by behaving in accordance with defined procedures.

3 CATEGORY C ATTRIBUTES

3.1 *Diverse risk control* is where the control is distributed in different ways across aspects of the system, whereas concentrated risk control is where the risk control is similar across aspects of the system.

3.2 *Redundant risk control* is where the risk control is robust to failure of risk control, whereas **single risk control** is where the risk control is vulnerable to failure of risk control.

3.3 *Passive risk control* is where there is no action required to deliver the risk control measure, whereas *active risk control* is where the risk control is provided by the action of safety equipment or operators.

3.4 *Independent risk control* is where the risk control measure has no influence on other elements.

3.5 *Dependent risk control* is where one risk control measure can influence another element of the risk contribution tree.

3.6 *Involved human factors* is where human action is required to control the risk but where failure of the human action will not in itself cause an accident or allow an accident sequence to progress.

3.7 *Critical human factors* is where human action is vital to control the risk either where failure of the human action will directly cause an accident or will allow an accident sequence to progress. Where a *critical human factor* attribute is assigned, the human action (or critical task) should be clearly defined in the risk control measure.

3.8 *Auditable* or *Not Auditable* reflects whether the risk control measure can be audited or not.

3.9 *Quantitative* or *Qualitative* reflects whether the risk control measure has been based on a quantitative or qualitative assessment of risk.

3.10 *Established* or *Novel* reflects whether the risk control measure is an extension to existing marine technology or operations, whereas novel is where the measure is new. Different grades are possible, for example the measure may be novel to shipping but established in other industries or it is novel to both shipping and other industries.

3.11 *Developed* or *Non-developed* reflects whether the technology underlying the risk control measure is developed both in its technical effectiveness and its basic cost. Non-developed is either where the technology is not developed but it can be reasonably expected to develop, or its basic cost can be expected to reduce in a given timescale. The purpose of considering this attribute is to attempt to anticipate development and produce forward looking measures and options.

APPENDIX 7

EXAMPLES OF CALCULATION OF INDICES FOR COST-EFFECTIVENESS

1 Indices for cost-effectiveness on safety

1.1 Introduction

The purpose of this appendix is to suggest a set of cost-effectiveness criteria, which may be used in FSA studies. The use of these cost-effectiveness criteria would enable the FSA studies to be conducted in a more consistent manner, making results and the way they were achieved better comparable and understandable. This appendix provides clarification on available criteria to assess the cost-effectiveness of risk control options so-called cost-effectiveness criteria. It is also recommended how these criteria should be applied.

1.2 *Terminology*

1.2.1 *DALY (Disability Adjusted Life Years)/QALY (Quality Adjusted Life Years)*: The basic idea of a QALY is one year of perfect health-life expectancy to be worth 1, but regards one year of less than perfect health-life expectancy as less than 1. Unlike QALY, the DALY assigns that one year of perfect health-life to be 0 and one year of less than perfect as more than 0.

1.2.2 *LQI (Life Quality Index)*: The index for expressing the social, health, environment and economic dimensions of the quality of life at working conditions. The LQI can be used to comment on key issues that affect people and contribute to the public debate about how to improve the quality of life in our communities.

1.2.3 *GCAF (Gross Cost of Averting a Fatality)*: A cost-effectiveness measure in terms of ratio of marginal (additional) cost of the risk control option to the reduction in risk to personnel in terms of the fatalities averted; i.e.

$$GCAF = \frac{\Delta Cost}{\Delta Risk}$$

1.2.4 *NCAF (Net Cost of Averting a Fatality)*: A cost-effectiveness measure in terms of ratio of marginal (additional) cost, accounting for the economic benefits of the risk control option to the reduction in risk to personnel in terms of the fatalities averted, i.e.

$$NCAF = \frac{\Delta Cost - \Delta EconomicBenefit}{\Delta Risk} = GCAF - \frac{\Delta EconomicBenefit}{\Delta Risk}$$

1.3 *NCAF and GCAF*

1.3.1 The common criteria used for estimating the cost-effectiveness of risk reduction measures are NCAF and GCAF. In principle there are several approaches to derive NCAF and GCAF criteria:

.1 Observation of the Willingness-To-Pay to avert a fatality;

.2 Observation of past decisions and the costs involved with them; and

.3 Consideration of societal indicators such as the Life Quality Index (LQI).

For further detail, reference is made to Nathwani et al. (1997), Rackwitz (2002).

1.3.2 The proposed values for NCAF and GCAF ~~in table 2~~ were derived by considering societal indicators (refer to document MSC 72/16, UNDP 1990, Lind 1996). The values provided in table 1 were updated in 2024 based on the recent studies [1] [2] and ~~They~~ are provided for illustrative purposes only. The specific values selected as appropriate and used in an FSA study should be explicitly defined. These criteria given in table 1~~2~~ are not static, but should be updated every year according to the average risk free rate of return (approximately 5%) or by use of the formula based on LQI (Nathwani et al. (1997~~6~~), Skjong and Ronold (1998, 2002), Rackwitz (2002 ~~a,b~~). The values shown in table 1 were determined using the 2019 data (Hamann and Cichowicz, 2023).

Table 1: Cost-Effectiveness Criteria

	NCAF (US $)	GCAF (US $)
Criterion covering risk of fatality, injuries and ill health	8.7 million	8.7 million
Criterion covering only risk of fatality [3]	4.35 million	4.35 million
Criterion covering only risk of injuries and ill health [3] [4]	4.35 million	4.35 million

	NCAF [US $]	GCAF [US $]
criterion covering risk of fatality, injuries and ill health	3 million	3 million
criterion covering only risk of fatality *)	1.5 million	1.5 million
criterion covering only risk of injuries and ill health *) **)	1.5 million	1.5 million

Table 2: Cost Effectiveness Criteria

*) NCAF and GCAF criteria are normally used covering not only fatalities from accidents, but implicitly also injuries and/or ill health from them. This is an adequate approach, because, as was mentioned above, many accidents involve both consequence categories: fatalities and injuries/ill health.

However, if accidents are analysed that involve only one of the two categories, the criteria should be adjusted to cover explicitly only the category relevant to the accident under consideration. In MSC 72/16 a proposal was made, that the NCAF and GCAF criteria are split equally for the two consequence categories.

**) refer also to QALY approach

1 R. Hamann, J. Cichowicz.(2023): Updating Threshold for IMO Cost Benefit Assessment. Ship Technology Research, https://doi.org/10.1080/09377255.2023.2184049.

2 European Maritime Safety Agency (2023), Study investigating cost-efficient measures for reducing the risk of cargo fires on container vessels (CARGOSAFE) EMSA, Lisbon.

3 NCAF and GCAF criteria are normally used covering not only fatalities from accidents, but implicitly also injuries and/or ill health from them. This is an adequate approach, because, as was mentioned above, many accidents involve both consequence categories: fatalities and injuries/ill health.

However, if accidents are analysed that involve only one of the two categories, the criteria should be adjusted to cover explicitly only the category relevant to the accident under consideration. In document MSC 72/16 a proposal was made, that the NCAF and GCAF criteria are split equally for the two consequence categories.

4 Refer also to QALY approach.

1.3.3 It is recommended that the following approach is applied in using GCAF and NCAF criteria:

.1 GCAF or NCAF:

In principle, either of the two criteria can be used. However, it is recommended to firstly consider GCAF instead of NCAF. NCAF also takes into account economic benefits from the RCOs under consideration. This may be misused in some cases for pushing certain RCOs, by considering more economic benefits on preferred RCOs than on other RCOs. NCAF adds another source of uncertainty into the evaluation which can be avoided when an RCO is already cost-efficient according to GCAF.

If the cost-effectiveness of an RCO is in the range of criterion, then NCAF may be also considered.

.2 Negative NCAF:

Recent FSA studies have come up with some risk control options (RCO) where the associated NCAF was negative. Assuming that the RCO has a positive risk reduction potential ΔR (i.e. reduces the risk), a negative NCAF means that the benefits in monetary units are higher than the costs associated with the RCO. It should be noted that a high negative NCAF with positive ΔR may result from either of the following two facts:

.1 the benefits are much higher than the costs associated with the RCO; or

.2 the RCO has a low risk reduction potential ΔR (the lower ΔR, the higher is the NCAF, refer to formula (2)).

~~1.3.4 Therefore, RCOs with high negative NCAFs should always be considered in connection with the associated risk reduction capability.~~

1.3.4 RCOs passing the criteria with GCAF, or NCAF, or with negative NCAFs should always be considered in connection with the associated risk reduction capability ΔR and, when prioritized, this should be done according to ΔR. When clear conclusions cannot be drawn from the initial ranking, other criteria may be used, e.g. benefit-cost-ratio (BCR = ΔBenefit / ΔCost).

QALY and/or DALY

1.3.5 The QALY or DALY criterion can be used for risks that only involve injuries and/or ill health, but no fatalities. It can be derived from the GCAF criterion, by assuming that one prevented fatality implies 35 Quality Adjusted Life Years gained (refer to document MSC 72/16):

QALY = GCAF (covering injuries/ill health) / 35 ~~= US$42,000~~.

2 Environmental risk evaluation criteria on prevention of oil spill from ships

2.1 Noting that the most appropriate conversion formula to use will depend on the specific scope of each FSA to be performed, a general approach to be followed is outlined in the following suggested examples.~~s.~~ Possible sources of data for oil spill could include ITOPF data (https://www.itopf.org/), IOPC Funds data (https://iopcfunds.org/), US data and Norwegian data.

Cost for compensating oil spills

2.2 Consolidated oil spill database based on IOPC Funds data; US Data; and Norwegian data.

2.3 Figure 1 shows the data of the consolidated oil spill database in terms of specific costs per tonne spilled (figure 5 of document MEPC 62/INF.24). Further information with respect to the basis of the database can be found in document MEPC 62/INF.24. It should be acknowledged that the consolidated oil spill database has limitations and possible deficiencies. These are described in document MEPC 62/INF.24 and may also involve incomplete or missing data on costs or other information.

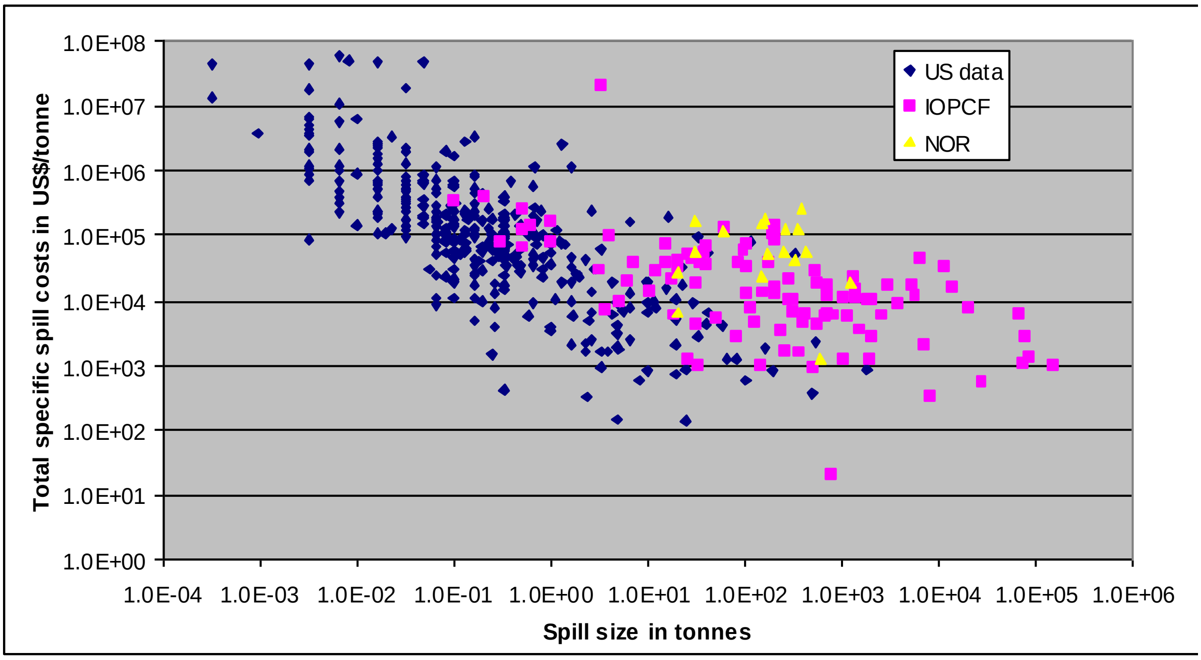


Figure 1: All specific oil spill cost data in 2009 US$ (spill cost per tonne)
Source: document MEPC 62/INF.24

2.4 The submitter of the FSA can amend this database with new oil spill data, however, this amendment should be properly documented.

2.5 Some regression formulae derived from the consolidated oil spill database are summarized in table ~~1~~2 in which V is spill size in tonnes.

Table ~~1~~2: Regression formulae derived from the consolidated database

Data set	f(V)=Total Spill Cost (TSC) (2009 US dollars)	Reference
All spills	$67{,}275\ V^{0.5893}$	MEPC 62/INF.24
V>0.1 tonnes	$42{,}301\ V^{0.7233}$	MEPC 62/18*

2.6 FSA analysts are free to use other conversion formulae, so long as these are well documented by the data. For example, if an FSA is considering only small spills, the submitter may filter the data and perform his or her own regression analysis.

* Updated regression made on the final consolidated data set.

2.7 It is recommended that the FSA analyst use the following formula to estimate the societal oil spill costs (SC) used in the analysis:

$$SC(V) = F_{Assurance} \cdot F_{Unccertainty} \cdot f(V)$$

This equation considers:

.1 Assurance factor ($F_{Assurance}$): allowing for society's willingness to pay to avert accidents;

.2 Uncertainty factor ($F_{Uncertainty}$): allowing for uncertainties in the cost information from occurred spill accidents; and

.3 Volume-dependent total cost function ($f(V)$): representing the fact that the cost per unit oil spilled decreases with the spill size in US$ per tonne oil spilled.

2.8 The values of both assurance and uncertainty factors should be well documented. In addition, if value of $F_{Assurance}$ and $F_{Uncertainty}$ other than 1.0 are used, a cost-effective analysis using $F_{Assurance}$= 1.0 and $F_{Uncertainty}$= 1.0 should be included in the FSA results, for reference.

2.9 In order to consider the large scatter, the FSA analyst may perform a regression to determine a function $f(V)$ that covers a percentile different than 50% and document it in the report.

Application in RCO evaluation

2.10 The FSA analyst should perform a cost-benefit and cost-effectiveness evaluation of the RCOs identified and provide all relevant details in the report, as outlined below.

RCOs affecting oil spills only

2.11 In case an RCO affects oil spills only:

RCO is cost-effective if ΔC < ΔSC

ΔC = Expected cost of the RCO

ΔSC = (Expected SC **without** the RCO) – (Expected SC **with** the RCO) = Expected benefit of the RCO

RCOs affecting both safety and environment

2.12 In case of RCOs addressing both safety and environment the following formula is recommended:

NCAF = (ΔC – ΔSC) / ΔPLL

In the above,

ΔC = Expected cost of the RCO

ΔSC = (Expected SC **without** the RCO) – (Expected SC **with** the RCO) = Expected benefit of the RCO

ΔPLL = Expected reduction of fatalities due to the RCO

2.13 The criteria for NCAF are as per table 1 of this appendix ~~2 of appendix 7 of document MSC 83/INF.2~~.

2.14 In case there is an economic benefit (ΔB), ΔC should be replaced by ΔC-ΔB.

2.15 It is also emphasized that all cost and benefit components of the cost-benefit or cost-effectiveness inequality should be shown in an FSA study for better transparency.

Other indices

2.16 The FSA ~~user~~ submitter/analyst is free to develop new approaches, taking into account the objectives of the FSA.

APPENDIX 8

STANDARD FORMAT FOR REPORTING AN APPLICATION OF FSA TO IMO

1 This standard format is intended to facilitate the compilation of the results of applications according to these ~~guidelines~~ Guidelines and the consistent presentation of those results to IMO.

2 Interested parties having carried out an FSA application should provide the most significant results in a clear and concise manner, which can also be understood by other parties not having the same experience in the application of risk assessment techniques.

3 The report of an FSA application should contain an executive summary and the following sections: definition of the problem, background information, method of work, description of the results achieved in each step and final recommendations arising from the FSA study.

4 The level of detail of the report depends on the problem under consideration. In order for users and reviewers to understand the results of FSA, the results of the FSA should be reported by:

.1 a summary report of limited length (~~i.e.~~ e.g. ~~maximum~~ generally20 pages);

.2 a full report that includes a detailed presentation and an explanation; and

.3 if necessary, background data on an Internet site which is accessible by reviewers of the Organization.

5 Those submitting the results of the FSA application should provide the other interested parties with timely and open access to relevant supporting documentation and sources of information or data which are referred to in the above-mentioned report, as reflected in paragraph 9.2.1 of these ~~FSA~~ Guidelines.

6 The following section presents the standard format of FSA application reports. The subjects expected to be presented in each section of the report are listed in italic characters and reference is made, in brackets, to the relevant paragraph(s) of these ~~FSA~~ Guidelines.

STANDARD REPORTING FORMAT

1 TITLE OF THE APPLICATION OF FSA

2 SUMMARY (~~maximum~~ generally half a page)

2.1 Executive summary: scope of the application and reference to the paragraph defining the problem assessed and its boundaries.

2.2 Actions to be taken: type of action requested (e.g. for information or review) and summary of the final recommendations listed in section 7.

2.3 Related documents: reference to any supporting documentation.

3 DEFINITION OF THE PROBLEM (~~maximum~~ generally one page)
(refer to paragraphs 4.1 and 4.2 of these ~~guidelines~~Guidelines)

3.1 Definition of the problem to be assessed in relation to the proposal under consideration by the decision-makers.

3.2 Reference to the regulation(s) affected by the proposal to be reviewed or developed (in an annex).

3.3 Definition of the generic model (e.g. functions, features, characteristics or attributes which are relevant to the problem under consideration, common to all ships of the type affected by the proposal).

4 BACKGROUND INFORMATION (~~maximum~~ generally up to three pages)
(refer to paragraph 3.2 of these ~~guidelines~~Guidelines)

4.1 Lessons learned from recently introduced measures to address similar problems.

4.2 Casualty statistics concerning the problem under consideration (e.g. ship types or accident category) including data analysis (i.e. time dependence, ship size influence, variability assessment, hypothesis testing, etc.).

4.3 Any other sources of data and relevant limitations.

5 METHOD OF WORK (~~maximum~~ generally up to three pages)
(refer to paragraph 3.1.1.2 of these ~~guidelines~~Guidelines)

5.1 Composition and expertise of those having performed each step of the FSA process by providing e.g. name and expertise of the experts involved in the application and name and contact point (email address, telephone number and mailing address) of the coordinator of the FSA.

5.2 Description of how the assessment has been conducted in terms of organization of working groups and, method of decision-making in the group(s) that performed each step of the FSA process.

5.3 Start and finish date of the assessment.

6 DESCRIPTION OF THE RESULTS ACHIEVED IN EACH STEP (generally up to 10 pages)

For each step, describe:

.1 method and techniques used to carry out the assessment;

.2 assumptions, limitations or uncertainties and the basis for them; and

.3 outcomes of each step of the FSA methodology, including:

STEP 1 – HAZARD IDENTIFICATION:
(refer to paragraph 5.3 of these ~~guidelines~~Guidelines)

- prioritized list of hazards and description of their associated scenarios
- identified significant accident scenarios including causes and initiating events in line with the scope of the FSA

STEP 2 – RISK ANALYSIS:
(refer to paragraph 6.3 of these ~~guidelines~~Guidelines)

- types of risk (e.g. individual, societal, environmental, business)
- presentation of the distribution of risks depending on the problem under consideration
- identified significant risks
- principal influences that affect the risks
- sources of accident and reliability statistics
- the results should also include details of expert judgement where utilized

STEP 3 – RISK CONTROL OPTIONS:
(refer to paragraph 7.3 of these ~~guidelines~~Guidelines)

- what hazards are covered by current regulations
- identified risk control options
- assessment of the control options as a function of their effectiveness against risk reduction
- the results should include details of the risk control measures identified

STEP 4 – COST-BENEFIT ASSESSMENT:
(refer to paragraph 8.3 of these ~~guidelines~~Guidelines)

- identified types of cost and benefits involved for each risk control option
- cost-benefit assessment for the entities which are influenced by each option
- identification of the cost-effectiveness expressed in terms of cost per unit risk reduction

STEP 5 – RECOMMENDATIONS FOR DECISION-MAKING:
(refer to paragraph 9.3 of these ~~guidelines~~Guidelines)

- objective comparison of alternative options
- discussion on how recommendations could be implemented by decision-makers

7 FINAL RECOMMENDATIONS FOR DECISION-MAKING (~~maximum~~ generally two ~~1/2~~ pages)

List of final recommendations, ranked and justified in an auditable and traceable manner
(refer to paragraph 9.3 of these ~~guidelines~~Guidelines)

ANNEXES (as necessary)

.1 explanation of the background of each expert (e.g. a short curriculum vitae) and the basis of selection of the experts;

.2 list of references;

.3 sources of data;

.4 accident statistics;

.5 technical support material; and

.6 any further information.

APPENDIX 9

DEGREE OF AGREEMENT BETWEEN EXPERTS CONCORDANCE MATRIX

1 Experts are sometimes used to rank risks associated with accident scenarios, or to rank the frequency or severity of hazards. One example is the ranking that takes place at the end of FSA Step 1 – Hazard Identification. This is a subjective ranking, where each expert may develop a ranked list of accident scenarios, starting with the most severe. To enhance the transparency in the result, the resulting ranking should be accompanied by a concordance coefficient, indicating the level of agreement between the experts.

Calculation of concordance coefficient

2 Assume that a number of experts (J experts in total) have been tasked to rank a number of accident scenarios (I scenarios), using the natural numbers (1, 2, 3, .. , I). Expert "j" has thereby assigned rank x_{ij} to scenario "I". The concordance coefficient "W" may then be calculated by the following formula:

$$W = \frac{12 \sum_{i=1}^{i=I} \left[\sum_{j=1}^{j=J} x_{ij} - \frac{1}{2} J(I+1) \right]^2}{J^2 \left(I^3 - I \right)}$$

3 The coefficient W varies from 0 to 1. W=0 indicates that there is no agreement between the experts as to how the scenarios are ranked. W=1 means that all experts rank scenarios equally by the given attribute.

Examples

4 The following three tables are examples. In each example there are 6 experts (J=6) that are ranking 10 scenarios (I=10). In order to show the role of the concordance coefficient, the final combination by $\sum x_{ij}$ constructed by the importance of hazards 1- 10 for all three groups. From tables 1 to 3 it is quite evident how various degrees of concordance have been formed.

5 Assessment of significance of the concordance coefficient is determined by parameter Z:

$$Z = \frac{1}{2} \ln \frac{(J-1)W}{1-W}$$

which has the Fischer distribution with degrees of freedom $\nu_1 = I - 1 - \frac{2}{J}$ and $\nu_2 = (J-1)\nu_1$. If I > 7 Pearson's criteria χ^2 may be used. The value of $J(I-1)W$ has a χ^2-distribution with $\nu = I - 1$ degrees of freedom.

Table 1: Group of experts with high degree of agreement

Experts \ Hazards	1*	2	3	4	5	6	7	8	9	10
1	1	3	4	2	5	6	8	10	7	9
2	2	3	1	5	4	6	7	8	9	10
3	1	2	3	4	5	6	7	8	9	10
4	2	1	4	3	6	5	7	8	10	9
5	2	3	1	4	5	6	8	10	9	7
6	1	2	4	3	5	7	6	8	9	10
$\sum x_{ij}$	9	14	17	21	30	36	43	52	53	55

* Numbers correspond to the initial list of hazards.

Calculations based on Table 1 result in W = 0,909; $\chi^2 = J(I-1)W = 47{,}5$; confidence level of probability $\alpha = 0{,}999$.

Table 2 Group of experts with medium degree of agreement

Experts \ Hazards	1	2	3	4	5	6	7	8	9	10
1	1	6	8	4	2	3	5	7	9	10
2	2	3	1	5	6	4	7	8	10	9
3	3	4	1	2	5	8	9	10	6	7
4	4	5	6	1	8	2	3	10	7	9
5	4	3	1	9	2	5	7	10	6	8
6	5	1	7	4	3	9	8	2	10	6
$\sum x_{ij}$	19	23	24	25	26	31	39	47	48	49

Calculations based on the ranking in Table 2 result in W = 0,413; $\chi^2 = 25{,}4$; $\alpha = 0{,}995$, where α is the confidence level of probability.

Table 3 Group of experts with low degree of agreement

Experts \ Hazards	1	2	3	4	5	6	7	8	9	10
1	5	9	3	8	2	1	7	10	6	4
2	1	5	7	4	8	9	3	6	2	10
3	6	2	8	3	9	10	4	1	5	7
4	1	4	3	2	7	5	9	6	10	8
5	6	1	3	5	2	8	4	9	7	10
6	3	7	5	8	4	2	10	6	9	1
$\sum x_{ij}$	22	28	29	30	32	35	37	38	39	40

Calculations based on the ranking in Table 3 result in W = 0,102; $\chi^2 = 5{,}4$; $\alpha = 0{,}20$.

6 The level of agreement is characterized in table 4:

Table 4: Concordance coefficients		
W	> 0.7	Good agreement
W	0.5 – 0.7	Medium agreement
W	< 0.5	Poor agreement

Other use

7 The method described can be used in all cases where a group of experts are asked to rank object according to one attribute using the natural numbers [1,I].

8 Generalizations of the method may be used when experts assign values to parameters, when pair comparison methods are used, etc. David (1969), Kendall (1970). An FSA application is published by Paliy et al. (2000).

~~**References for further reading**~~

~~1 David, H.A. *The method of Paired Comparisons*. Griffin and Co, London, 1969.~~

~~2 Kendall, M. *Rank Correlation Methods*. Griffin and Co, London, 1970.~~

~~3 Paliy, O., E. Litonov, V.I. Evenko. *Formal Safety Assessment for Marine Drilling Platforms*. Proceedings Ice Tech' 2000, Saint Petersburg, 2000.~~

APPENDIX 10

GUIDANCE FOR PRACTICAL APPLICATION AND REVIEW PROCESS OF FSA

Introduction

1 The guidance provides information on the following subjects:

.1 project management issues to be considered for an FSA study;

.2 application of FSA by a Member State or an organization having consultative status with IMO (hereinafter called Member), when proposing amendments to maritime safety and pollution prevention instruments, to support or analyse the implications of such proposals;

.3 application of FSA by a Committee or instructed subsidiary body, to provide a balanced view of a framework of regulations, so as to identify priorities and areas of concern, and to analyse the benefits and implications of proposed changes;

.4 consideration of the expertise for the team carrying out an FSA study and qualifications for those experts; and

.5 review of an FSA study.

2 Recommendations resulting from an FSA study should aim to be used by decision makers at all levels and in a variety of contexts at IMO, without a requirement of specialist expertise. For this purpose, an FSA study should be open and transparent for review by all interested Member States and non-governmental organizations which have not participated in the conduct of the FSA study.

3 FSA studies submitted to the Organization in accordance with the *Guidelines for formal safety assessment (FSA), for use in IMO rule-making process* for consideration, when introducing or amending IMO instruments should be considered as one source but not the only source of valuable information to support IMO decision-making.

Practice/Conduct of FSA Study

Project management

4 Any activity that uses resources to transform inputs to outputs can be considered a process, and this definition also fits FSA. Quality management in FSA can be applied by identifying each FSA step as a sub-process involving a number of interrelated activities, and by establishing means to facilitate, monitor and control these activities to achieve the desired objectives.

5 In principle, critical issues, controls and controlling measurements to monitor the quality of the process should be defined for each FSA step. Moreover, several issues should be identified up front, before the study initiation and periodically reviewed during the study:

.1 basic reasons to undertake the study;

.2 responsibilities and skills of the team in the various stages of the study;

.3 clear authority chart;

.4 extent of the coverage of the study (in particular, how many of the FSA steps are required, which tools are expected to be used);

.5 a project plan including the timescale of the study;

.6 potentially critical areas and key measures of quality assurance; and

.7 risk evaluation criteria.

Application of FSA by a Member

6 A Member State or an organization having a consultative status with IMO, or a pool of Members, may decide to carry out an FSA and submit its results for consideration by a Committee or instructed subsidiary body. The scope of the FSA definition of the problem and its boundaries should be decided by the Member(s) conducting the study, in the context of the submitted proposal. The costs involved in carrying out the study should be covered by the Member(s) conducting the study, who will also coordinate and keep responsibility for the work of subcontractors, if any.

7 The Member(s) carrying out the FSA study should make its/their best efforts to ensure that the report is presented in accordance with the Standard Format for Reporting FSA Applications, given in appendix 8 of these ~~FSA~~ Guidelines. It is important that the FSA report includes the names and credentials of the experts who have carried out or have been involved in the FSA.

Application of FSA by a Committee or an instructed sub-committee

8 The Committee may decide to carry out an FSA study following:

.1 a proposal by a Member;

.2 a proposal from a subsidiary body; or

.3 discussion in the Committee of an agenda item.

9 There are different options which may be followed by the Committee for undertaking the FSA study. In some circumstances, for instance when a proposal has far-reaching implications and requires a balanced view between all relevant issues, the Committee may decide that the FSA study should be carried out by an instructed sub-committee, as described in paragraphs 15 to 24 below.

10 Further options for undertaking an FSA study may also be appropriate, one of which could be to invite a Member, or a pool of Members, to carry out the FSA study and report its results for consideration by the Committee. The Member(s) accepting this proposal could proceed according to the steps given in paragraphs 4 to 9 above.

11 In cases where the Committee decides that the study should be carried out by instructed sub-committee(s), the FSA study may be conducted in accordance with the flow chart shown in figure 1, as described below.

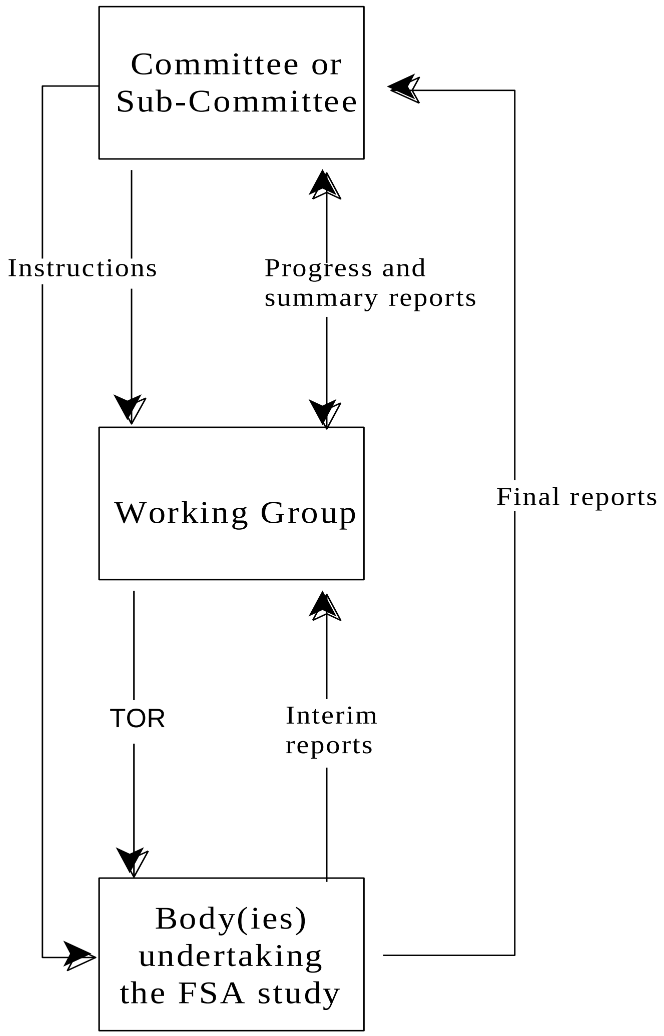


Figure 1

12 The Committee may decide to establish a working group, instructed to:

.1 develop the terms of reference for undertaking FSA;

.2 propose a list of required competencies;

.3 develop and execute a project management plan;

.4 coordinate the conduct of FSA;

.5 validate FSA, when necessary; and

.6 report the results of FSA to the Committee, for information and approval.

13 The terms of reference of FSA may include, inter alia:

.1 the definition of the problem under consideration and its boundaries (chapter 4 of these ~~guidelines~~Guidelines);

.2 characterization of the problem under consideration, for example in terms or features, characteristics and attributes which are relevant to the problem concerned (section 4.2 of these ~~guidelines~~Guidelines);

.3 the organization and tasks proposed for carrying out the five steps of the FSA process, including instructions to the relevant subsidiary bodies; and

.4 the list of competencies required for carrying out each step of FSA.

14 The Committee should examine the draft terms of reference developed by the working group, including in particular the necessary competencies, for approval. On the basis of the approved terms of reference, the Committee will:

.1 instruct the sub-committee(s) to undertake FSA (for instance a sub-committee or several sub-committees);

.2 endorse the list of competencies for carrying out each step of FSA; and

.3 invite Members willing to participate in the conduct of the FSA study to provide persons with the required competencies.

15 Members interested in participating in FSA should provide the Committee with a list of persons proposed to participate in the sub-committees instructed to carry out the FSA study, together with details of their relevant competencies. The working group should determine that such a list, when completed, covers the competencies deemed necessary for carrying out each step of the FSA study, and report to the Committee to decide as appropriate.

16 Each instructed subsidiary body should carry out the parts of the FSA study assigned to them. Any progress reports that the Committee may require, and, on completion of the FSA study, the final report should be submitted to the Committee. This final report should be in accordance with the Standard Reporting Format, given in appendix 8~~annex 2~~ of these ~~FSA~~ Guidelines.

17 Interim reports may be submitted to the working group for the purposes of providing inputs to other parts of the process and enabling the working group to facilitate and monitor progress according to the project plan. The working group should review these reports and inform the Committee whether the FSA study proceeds in accordance with the approved project management plan. The working group should also propose necessary corrective actions, if any.

18 In addition to the final report submitted to the Committee by the sub-committees undertaking the FSA study, the working group should, at the completion of the FSA study, present to the Committee a summary report, which may include, inter alia:

.1 an evaluation that the methodology applied is in accordance with these ~~interim guidelines FSA~~ Guidelines;

.2 any proposals for improvement of these ~~interim guidelines~~ Guidelines;

.3 deviations, if any, from the terms of reference approved by the Committee, and reasons therefor; and

.4 a list of recommendations resulting from the FSA study for a decision by the Committee.

19 The Committee should receive the recommendations made by the working group and decide as appropriate.

Participation of experts in an FSA study

20 The participation of experts in the various fields is an essential part for the success of an FSA application. The team carrying out the FSA study should be selected in accordance with the area of interest of the study and related problems. A number of other experts should be involved to gather expert views and judgements throughout the five steps of the FSA process.

21 The team carrying out an FSA study should cover the fields of expertise necessary to progress within the five steps of the FSA process. The composition of the team depends on the type of problem and level of detail of the assessment. For instance, the team might include:

.1 experts in risk assessment techniques;

.2 experts in statistical data gathering and analysing;

.3 experts involved in casualty investigations;

.4 experts in the human element;

.5 experts in the applicable rules and regulations;

.6 experts from the technical, operational and organizational field, (e.g. designers, builders and operators);

.7 experts in consequence assessment (e.g. SAR, salvage and environment protection); and

.8 experts in cost-benefit assessment.

22 The team carrying out an FSA study may involve other experts in order to provide additional expert views, technical evaluations and/or judgements. All the experts involved in FSA study should have, as far as possible, a basic knowledge and understanding of the FSA methodology, as set out in these ~~FSA~~ Guidelines.

23 The experts to be involved should cover the widest possible range of knowledge, qualifications and competence relevant to the problem under consideration, including, for instance:

.1 organizational and managerial aspects, e.g. pertinent to shipping companies;

.2 technical aspects, e.g. design, construction, operation and maintenance;

.3 legal, finance and insurance matters; and

.4 matters of concern to flag Administrations and port State controls.

24 The names and expertise of the members of the team carrying out an FSA study and other experts involved should be included in an annex to the report containing the results of the study.

25 Other experts in various fields may be involved when reviewing and discussing the results of the FSA study.

Review of FSA study

Review process

26 The Committee or an instructed subsidiary body should consider the submission of an FSA study and decide, on a case-by-case basis, the most appropriate course of action. When the subject is sufficiently clear, the Committee can form an opinion about the FSA study and its relevant proposals, and decide accordingly. In other circumstances, the Committee may decide that a review is necessary to validate the FSA study and its findings.

27 The review process should be carried out within the Organization, by a group of experts established by the Committee for that purpose following the flow chart shown in figure 2 below.

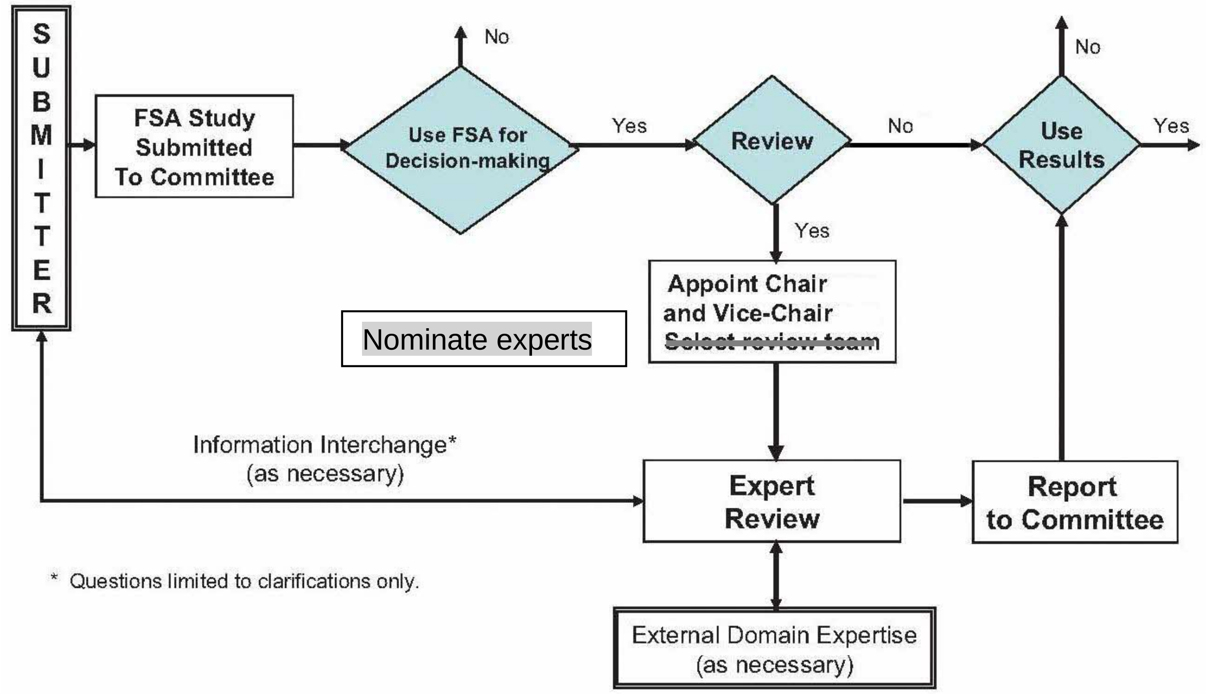


Figure 2

Flow chart for FSA review process

Terms of reference of the Experts Group

28 The terms of reference of such a review should be established by the Committee, based on the matter under consideration. The terms of reference should be to review the FSA studies submitted, in particular to:

.1 check:

.1 the adequacy of scope of the FSA; and definition of the problem;

.2 the validity of the input data (transparency, comprehensiveness, availability, etc.);

.3 the adequacy of expertise of participants in the FSA; identified hazards and their ranking; and the reasonableness of assumptions; and

.4 the adequacy of accident scenarios, risk models and calculated risks; identified RCMs and RCOs; selection of RCOs for Cost-Benefit Analysis (CBA); and CBA results;

.2 check methodologies used and relevance of methods and tools for:

.1 decision in the group(s) in the FSA;

.2 HAZID;

.3 Calculation of risk;

.4 Cost-Benefit Analysis (CBA); and

.5 Sensitivity and uncertainty analysis;

.3 if any deficiency was identified in the items above, consider whether they affect the results;

.4 consider whether the FSA was conducted in accordance with these ~~guidelines~~Guidelines;

.5 check whether the recommendations in the FSA ask to take any immediate action or propose any changes to IMO instruments;

.6 consider whether the results and the recommendations in the FSA are credible and advise the decision makers (e.g. Committees of the Organization) accordingly; and

.7 consider whether it is necessary to improve the Revised FSA Guidelines, and, if so, the proposal for the improvement.

Establishment of, and report from, the Experts Group

29 When the Committee decides to establish a group of experts for a specific project, it should determine the number of meetings necessary to meet the target completion date.

30 The Members, having carried out the FSA study, should provide timely and open access to relevant supporting documents, and any reasonable opportunity to take into consideration the comments received.

31 The results of the review by the group of experts should be presented to the Committee or instructed subsidiary body, as appropriate. The group of experts should, as a goal, try to reach consensus on its conclusions for the review of the FSA study, but where there are strong conflicting views, these should be indicated in the report.

Structure of the Experts Group

32 Participation in a group of experts will be voluntary and is open to all Member States and international organizations.

33 A Chair and a Vice-Chair should be selected by the Committee when it decides an FSA study should be reviewed by a group of experts.

34 When nominating experts, Member States and international organizations should nominate experts who have suitable qualifications in the field of formal safety assessment, as described in paragraph 37, and inform the Organization of particulars of the expert (e.g. name, expertise and contact details) with a short CV.

35 Participants in the group of experts should:

.1 have not been involved in the FSA study to be reviewed; and

.2 be capable of acting scientifically independent (i.e. acting in an individual capacity).

36 The review work should be conducted concisely in order to give timely conclusion(s) to the Committee(s) and, in order to do so, the review work can be conducted by holding meetings of the group (without interpretation) as well as by correspondence.

Qualifications of the experts

37 Members participating in a group of experts should, as a minimum, have knowledge/training in the application of the~~ FSA~~se Guidelines, and should have, at least, one of the following qualifications:

.1 risk assessment experience;

.2 a maritime background; or

.3 relevant knowledge or any unique concerns related to the FSA (e.g. human element).

Report of the Experts Group

38 Experts Groups' reports should only include the names of the experts but not of the nominating Member States or organizations.

APPENDIX 11

LIST OF REFERENCES

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ANNEX 7

DRAFT AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 1994 (1994 HSC CODE)

CHAPTER 8
LIFE-SAVING APPLIANCES AND ARRANGEMENTS

8.3 Personal life-saving appliances

1 Paragraph 8.3.5 is replaced by the following:

"8.3.5 A lifejacket complying with the requirements of regulation III/32.1 or regulation III/32.2 of the Convention should be provided for every person on board the craft and, in addition:

.1 a number of lifejackets suitable for children equal to at least 10% of the number of passengers on board should be provided or such greater number as may be required to provide a lifejacket for each child;

.2 every passenger craft should carry lifejackets for not less than 5% of the total number of persons on board. These lifejackets should be stowed in conspicuous places on deck or at muster stations;

.3 a sufficient number of lifejackets should be carried for persons on watch and for use at remotely located survival craft and rescue boat stations;

.4 all lifejackets should be fitted with a light, which complies with the requirements of regulation III/32.3 of the Convention; and

.5 in addition, on all craft, the following should be provided no later than the date of the first renewal survey on or after 1 January 2028:

.1 for passenger craft on voyages less than 24 h, a number of infant lifejackets equal to at least 2.5% of the number of passengers on board should be provided;

.2 for passenger craft on voyages 24 h or greater, infant lifejackets should be provided for each infant on board; and

.3 if the adult lifejackets provided are not designed to fit persons weighing up to 140 kg and with a chest girth of up to 1,750 mm, a sufficient number of suitable accessories should be available on board to allow them to be secured to such persons."

ANNEX 1

FORM OF SAFETY CERTIFICATE FOR HIGH-SPEED CRAFT

Record of Equipment for High-Speed Craft Safety Certificate

2 Details of life-saving appliances

1 In the table for "Details of life-saving appliances, a new entry 8.3 is inserted under entry 8.2, as follows:

"

8.3	Number suitable for infants	………………..

***

ANNEX 8

DRAFT AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 1994 (1994 HSC CODE)

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    .3 if the adult lifejackets provided are not designed to fit persons weighing up to 140 kg and with a chest girth of up to 1,750 mm, a sufficient number of suitable accessories should be available on board to allow them to be secured to such persons."

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ANNEX 9

RESOLUTION MSC.568(109)
(adopted on 6 December 2024)

AMENDMENTS TO THE REVISED RECOMMENDATION ON TESTING OF LIFE-SAVING APPLIANCES (RESOLUTION MSC.81(70))

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO that the Assembly, when adopting resolution A.689(17) on *Testing of life-saving appliances*, authorized the Committee to keep the annexed Recommendation on testing of life-saving appliances under review and to adopt, when appropriate, amendments thereto,

RECALLING FURTHER that, since the adoption of resolution A.689(17), the Committee has amended the Recommendation annexed thereto by resolutions MSC.54(66) and MSC.81(70), and by Circulars MSC/Circ.596, MSC/Circ.615 and MSC/Circ.809,

RECOGNIZING the need to ensure that the references in the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)) are kept up to date,

1 ADOPTS the Amendments to the Revised recommendation on testing of life-saving appliances (resolution MSC.81(70)), set out in the annex to the present resolution;

2 RECOMMENDS Governments to apply the amendments when testing life-saving appliances, as set out in the annex to the present resolution;

3 INVITES Contracting Governments to the SOLAS Convention to bring the above amendments to the attention of all parties concerned.

ANNEX

AMENDMENTS TO THE REVISED RECOMMENDATION ON TESTING OF LIFE-SAVING APPLIANCES (RESOLUTION MSC.81(70))

PART 1 – PROTOTYPE TEST FOR LIFE-SAVING APPLIANCES

6 Lifeboats

6.14 Additional tests for totally enclosed lifeboats

1 Paragraph 6.14.1.1 is replaced by the following:

Self-righting test

"6.14.1.1 when the lifeboat with its engine is loaded in the normal position with properly secured weights representing the fully equipped lifeboat with a full complement of persons on board. The weight used to represent each person, assumed to have an average mass of 75 kg for a lifeboat intended for a passenger ship or 82.5 kg for a lifeboat intended for a cargo ship, should be secured at each seat location and have its centre of gravity approximately 300 mm above the seat pan so as to have the same effect on stability as when the lifeboat is loaded with the number of persons for which it is to be approved; and".

***

ANNEX 10

DRAFT AMENDMENTS TO SOLAS CHAPTER II-2

CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part C
Suppression of fire

Regulation 11
Structural integrity

2 Material of hull, superstructures, structural bulkheads, decks and deckhouses

6 Section 2 is replaced by the following:

"**2 Material of hull, superstructures, structural bulkheads, decks and deckhouses**

The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material as given in regulation 3.43, the "applicable fire exposure" shall be according to the integrity and insulation standards given in tables 9.1 to 9.8. For example, where divisions such as decks or sides and ends of deckhouses are permitted to have "B-0" fire integrity, the "applicable fire exposure" shall be half an hour."

4 Machinery spaces of category A

4.1 Crowns and casings

7 Paragraph 4.1 is replaced by the following:

"4.1 Crowns and casings of machinery spaces of category A shall be of steel construction and shall be insulated as required by tables 9.1 and 9.3 for passenger ships or tables 9.5 and 9.7 for cargo ships, as appropriate".

***

ANNEX 11

DRAFT ASSEMBLY RESOLUTION

CHARGES FOR DISTRESS, URGENCY AND SAFETY COMMUNICATIONS THROUGH RECOGNIZED MOBILE SATELLITE SERVICES IN THE GMDSS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO resolution 2 adopted by the International Conference on Maritime Search and Rescue, 1979, which recommends that States should arrange that participation in ship reporting systems shall be free of message cost to the ships concerned,

RECALLING FURTHER that regulation IV/4-1 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), requires the Maritime Safety Committee to determine the criteria, procedures and arrangements for the evaluation, recognition, review and oversight of the provision of mobile satellite services in the GMDSS,[1]

NOTING that no charge is raised against ship stations for transmissions related to, inter alia, distress, urgency and safety communications in the maritime mobile service[2] in accordance with the special charging arrangements approved by the International Telecommunication Union (ITU) under Recommendation ITU-T D.90 on *Charging, billing, international accounting and settlement in the maritime mobile service*, as regulated by Article 58 of the ITU Radio Regulations,

RECOGNIZING the essential role and involvement of the recognized mobile satellite services in supporting and delivering the functional requirements specified in the GMDSS,

RECOGNIZING ALSO the need for establishing a harmonized and unified policy in respect of charges for distress, urgency or safety communications carried over the recognized mobile satellite services in the GMDSS,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its 109th session,

1 ADOPTS the revised *Charges for distress, urgency and safety communications through recognized mobile satellite services in the GMDSS*, which specifies charging policies towards shore authorities and ship stations, as set out in the annex to the present resolution;

2 REVOKES resolution A.707(17).

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1 Refer to *Criteria for the provision of mobile satellite communication systems in the Global Maritime Distress and Safety System (GMDSS)* (resolution A.[…]).

2 For the purposes of Recommendation ITU-T D.90, references to the term maritime mobile service are taken to cover the maritime mobile satellite service as well as the MF, HF and VHF radio media, unless specifically stated otherwise.

ANNEX

CHARGES FOR DISTRESS, URGENCY AND SAFETY COMMUNICATIONS THROUGH RECOGNIZED MOBILE SATELLITE SERVICES IN THE GMDSS

Services	Charge to shore authority	Charge to ship station (for information only)	Notes (for information only)
Distress traffic, including replies to initial distress alerts, calls or messages	NO	NO	Refer to SOLAS regulations IV/4 and V/7 for further information on the applicable services. See also *International Aeronautical and Maritime Search and Rescue Manual* (IAMSAR Manual), Volume III.
Search and rescue communications	NO	NO	
Maritime safety information (including navigational warnings, meteorological warnings and forecasts) and other urgent safety-related messages	YES	NO	Refer to SOLAS regulations IV/4 and V/4, and resolution A.706(17), as amended; regulation V/5 and resolution A.1051(27), as amended; and regulation V/6 for further information on applicable services. See also the *Joint IMO/IHO/WMO Manual on Maritime Safety Information* (MSC.1/Circ.1310, as revised).
Meteorological data	YES	NO	Meteorological reports can be made using special access code (SAC) 41 via the recognized mobile satellite service providers. See also SOLAS regulation V/5 and the *Joint IMO/IHO/WMO Manual on Maritime Safety Information* (MSC.1/Circ.1310, as revised).
Urgent navigational/meteorological danger messages	NO	NO	Refer to SOLAS regulations V/31 and V/32. Danger messages can be made using SAC 42 via the recognized mobile satellite service providers.

Services	Charge to shore authority	Charge to ship station (for information only)	Notes (for information only)
Ship reports	YES	NO	Refer to SOLAS regulation V/11 or, for search and rescue purposes, chapter 5 of the International Convention on Maritime Search and Rescue, 1979. Ship reports can be made using SAC 43 via the recognized mobile satellite service providers. See also IAMSAR Manual, Volume III.
Medical advice	YES	NO	Medical advice at sea can be obtained using SAC 32 via the recognized mobile satellite service providers. See also IAMSAR Manual, Volume III.
Medical assistance for grave and imminent danger	NO	NO	Medical assistance for grave and imminent danger at sea can be obtained from agencies recognized by Administrations using SAC 38 via the recognized mobile satellite service providers. See also IAMSAR Manual, Volume III.

Two-digit special access codes for safety services

Abbreviated dialling codes have been established for use by the recognized mobile satellite services to enable automatic routeing of specific types of calls from ships to the appropriate addresses. The following two-digit codes pertain to safety services:
32 - Request for medical advice
38 - Request for medical assistance
39 - Request for maritime assistance
41 - Shipment of meteorological data
42 - Shipment of meteorological data and navigational dangers
43 - Ship reports

***

ANNEX 12

RESOLUTION MSC.569(109)
(adopted on 6 December 2024)

PERFORMANCE STANDARDS FOR THE RECEPTION OF MARITIME SAFETY INFORMATION AND SEARCH AND RESCUE RELATED INFORMATION BY MF AND HF DIGITAL NAVIGATIONAL DATA (NAVDAT) SYSTEM

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21) on *Procedure for the adoption of, and amendments to, performance standards and technical specifications*, by which the Assembly resolved that the functions of adopting performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

TAKING INTO ACCOUNT the amendments to the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), adopted by resolution MSC.496(105),

NOTING, in particular, regulation IV/7.1.4 of the Convention, which requires every ship to be provided with a receiver or receivers capable of receiving maritime safety information and search and rescue related information throughout the entire voyage in which the ship is engaged,

NOTING ALSO the works carried out by the International Telecommunication Union on a digital navigational data (NAVDAT) system and the allocated frequencies on MF and HF for its use,

NOTING FURTHER the *Guidance for the reception of maritime safety information and search and rescue related information as required in the Global Maritime Distress and Safety System (GMDSS)* (MSC.1/Circ.1645), which identifies related information broadcast services and the equipment which should be installed on board ships to meet the requirements of chapter IV of the Convention,

RECOGNIZING that further growth in information promulgated to ships is constrained by the capacity of the International NAVTEX Service and HF NBDP broadcasts, and that MF and HF digital NAVDAT broadcasts may be used in the GMDSS,

HAVING CONSIDERED, at its 109th session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its eleventh session,

1 ADOPTS the *Performance standards for the reception of maritime safety information and search and rescue related information by MF and HF digital navigational data (NAVDAT) system,* set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that NAVDAT receiver equipment conforms to performance standards not inferior to those specified in the annex to the present resolution.

ANNEX

PERFORMANCE STANDARDS FOR THE RECEPTION OF MARITIME SAFETY INFORMATION AND SEARCH AND RESCUE RELATED INFORMATION BY MF AND HF DIGITAL NAVIGATIONAL DATA (NAVDAT) SYSTEM

1 INTRODUCTION

1.1 The NAVDAT receiver equipment should be capable of receiving maritime safety information (MSI) and search and rescue (SAR) related information transmitted by NAVDAT system on MF and HF frequencies, and may be used to meet the requirements of SOLAS regulation IV/7.1.4.

1.2 In addition to meeting the requirements of the Radio Regulations, the NAVDAT receiver equipment should comply with the most recent versions of Recommendations ITU-R M.2010 and ITU-R M.2058 for NAVDAT in the MF and HF bands, respectively.

1.3 The NAVDAT receiver equipment should comply also with the requirements set out in resolutions A.694(17), MSC.191(79), as amended by resolution MSC.466(101), and MSC.508(105), and the following performance standards.

2 GENERAL

2.1 The NAVDAT system allows the broadcast of messages in the form of digital files providing texts, pictures or any other data. This broadcast can be done on the two international frequencies: 500 kHz in the MF band and 4 226 kHz in the HF band, and also on all other maritime radio frequencies assigned by the ITU for NAVDAT usage (see paragraph 4.2.1).

2.2 The NAVDAT receiver equipment should comprise a radio receiver, an appropriate antenna, a signal processor with non-volatile memory, a human-machine interface, data interfaces (see paragraph 9) and:

.1 an integrated display; or

.2 a connection to external equipment with a display (e.g. an integrated navigation system).

2.3 The NAVDAT receiver could either be a stand-alone equipment or combined with another equipment.

2.4 The NAVDAT receiver equipment should be provided with an antenna capable of receiving the entire maritime radio frequencies from, at minimum, 400 kHz to 30 MHz.

2.5 The NAVDAT receiver equipment should provide facilities to automatically update the ship's position and the time at which the position was determined from a suitable electronic position-fixing aid which may be an integral part of the equipment. For equipment which does not have an integral position-fixing aid, such facilities should include a suitable interface conforming to the appropriate international standards.[1]

2.6 When the NAVDAT receiver equipment has a dedicated antenna, it is recommended that the antenna be equipped with two outputs for sharing with another MF/HF receiver.

[1] Refer to IEC 61162.

3 CONTROLS AND INDICATORS

3.1 Subject messages[2] excluded by the operator from display should be readily available.

3.2 When a message is received correctly or with errors, the equipment may be able to emit a corresponding short audio notification. In addition, a distinctive alert should be built into the receiver for messages with distress and urgency priority.

3.3 The NAVDAT receiver equipment should be capable of displaying communication parameters, including received signal strength indication (RSSI), signal noise ratio (SNR) and bit error rate (BER).

3.4 Each time a NAVDAT message is received, the NAVDAT receiver equipment should display, in plain text, the priority, subject message, coast station identity and number of the message.

3.5 The NAVDAT receiver equipment should be able to configure parameters of data interfaces for communication with other ship equipment.

3.6 The stored tables of the NAVDAT receiver equipment should be able to be updated by using either a data interface or reception of stored tables update messages.

3.7 Human-machine interface, including the presentation of alerts, for the NAVDAT receiver equipment should be in accordance with the guidelines developed by the Organization.[3]

4 RECEIVER

4.1 Frequency management

4.1.1 The NAVDAT receiver should be capable of receiving transmissions on MF (500 kHz) and HF (4 226 kHz) channels simultaneously.

4.1.2 The NAVDAT receiver should also be able to receive, via a scanning function, on at least one (or more) regional frequency allocated to NAVDAT in the MF and HF maritime bands.

4.1.3 The NAVDAT receiver should demodulate signal(s) received on the MF channel 500 kHz and the HF channel 4 226 kHz simultaneously.

4.1.4 The demodulated signal(s) received by scanning can be decoded simultaneously or non-simultaneously.

4.2 Scan function

4.2.1 To allow reception of transmissions on national or regional frequencies assigned to NAVDAT, the receiver should use a scan function on the following maritime frequency bands:

.1 the MF band from 415 kHz to 526.5 kHz (except 500 kHz);

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[2] See the list of subject message codes in the most recent version of Recommendation ITU-R M.2010 or ITU-R M.2058.

[3] Refer to *Guideline on software quality assurance and human-centred design for e-navigation* (MSC.1/Circ.1512).

.2 the channels assigned to NAVDAT in appendix 15 of the Radio Regulations: 6 337.5 kHz, 8 443 kHz, 12 663.5 kHz, 16 909.5 kHz and 22 450.5 kHz (except 4 226 kHz); and

.3 the frequency bands assigned to wideband digital transmissions in appendix 17 of the Radio Regulations in the bands 4, 6, 8, 12, 16 and 22 MHz.

4.2.2 The signals received on the frequencies selected for scanning can be decoded simultaneously or non-simultaneously according to the resources of the NAVDAT receiver at that moment.

4.2.3 The transmitted pre-signal[4] should allow the NAVDAT receiver to detect the transmission and tune in to the frequency, measure its SNR and identify the transmitting NAVDAT coast station, including, based on its location, the associated NAVAREA/METAREA.

4.3 The receiver sensitivity should be better than – 95dBm in a bandwidth of 10 kHz, with a BER better than 10^{-4} after error correction.

4.4 The NAVDAT receiver equipment should comply with the latest appropriate electromagnetic compatibility (EMC) standards (e.g. resolutions A.694(17) and A.813(19), and IEC 60945).

4.5 The NAVDAT receiver equipment should be able to receive any NAVDAT message and identify the priority level and the type of that message.

4.6 For identification purposes, the NAVDAT receiver equipment should use the Maritime Mobile Service Identity (MMSI) of the ship (see also paragraph 11).

4.7 The NAVDAT receiver equipment should be able to select automatically whether to receive subsequent messages according to the following broadcast modes:

.1 General broadcast: Broadcasting messages to all ships.

.2 Selective broadcast: Broadcasting messages to a group of ships or ships within a specific navigational area.

.3 Dedicated broadcast: Addressing messages to one ship, using MMSI.

4.8 The NAVDAT receiver equipment should be able to select automatically demodulation mode, error correction decoding and message decoding methods according to the received modulation information stream (MIS).

4.9 NAVDAT message transmission is based on the transmission of data packets. The equipment should be able to correct received messages using forward error correction and by using repeatedly sent data packets.

4.10 The NAVDAT receiver equipment should have a built-in real-time clock that is automatically calibrated by a suitable electronic position-fixing aid (or clock reference through an onboard data network).

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[4] To ensure proper operation of the receiver scan function, the transmitters of active national or regional NAVDAT coast stations will broadcast a pre-signal before the NAVDAT frames. This pre-signal is a known data repeated eight times for a total duration of 3.2 seconds.

5 DISPLAY DEVICE

5.1 The display device should be able to display different types of NAVDAT messages.

5.2 The design and size of the integrated display device should be such that displayed information is easily read under all conditions by observers at normal working distance and viewing angles. An interface to an external display device or appropriate navigational equipment should be provided.

5.3 On the display, the following requirements should be met:

.1 an indication of newly received and unsuppressed messages should be immediately displayed until acknowledged or for 24 hours after their receipt; and

.2 newly received unsuppressed messages should also be displayed.

5.4 When displaying received messages, a clear indication of the end of any message should be given.

5.5 The display resolution should be at least 640*480 pixels.

5.6 The list of messages received on 500 kHz and 4 226 kHz can be displayed in different areas of the display screen at the same time.

5.7 In the list of received messages, the latest message is displayed on the first line with its number, contents, date and time.

6 STORAGE

6.1 Non-volatile memory

6.1.1 The NAVDAT receiver equipment should keep all information concerning NAVDAT coast stations in a non-volatile memory. This information should include name of the stations, their geographical positions, their numbering allocated by the NAVDAT coordination procedure, the frequency(s) used as well as the different slots that can be used by the stations. This information will be regularly updated upon receipt of stored tables update messages.

6.1.2 For each frequency provided, it should be possible to record at least 100 messages in the non-volatile memory provided. It should not be possible for the user to erase messages from the memory. When the memory is full, the oldest message should be replaced by new messages.

6.1.3 The user should be able to mark the individual messages for permanent retention. These messages can occupy up to 25% of available memory and should not be overwritten by new messages. When no longer needed, the user should be able to delete the tag on these messages, which can be overwritten normally.

6.1.4 The NAVDAT receiver equipment should be able to detect duplicate messages and discard repeated messages.

6.1.5 A memory capacity of not less than 1 gigabyte should be provided to store, as a minimum, the time, transmitter identity, subject and content of received messages.

6.1.6 After between 60 and 72 hours, a message should automatically be erased from the memory storage. If the number of received messages exceeds the capacity of the storage, the oldest message should be erased.

6.1.7 Only messages satisfactorily received (i.e. BER is better than 10^{-4}) should be stored.

6.2 Programmable control memories

6.2.1 Information identifying the transmitter service area and the code of each subject message in programmable memory should not be erased by interruptions in the power supply of less than 24 hours.

6.2.2 The NAVDAT receiver equipment should be able to display, delete and query stored messages, and be able to output messages manually or automatically to appropriate ship equipment (e.g. ECDIS).

7 ALERT

7.1 Upon receipt of new search and rescue related information messages with distress or urgency priority, the NAVDAT receiver equipment should give an alert, including information for decision-making.

7.2 The position information contained in the messages with distress and urgency priorities should be automatically transmitted to other navigation equipment (e.g. ECDIS, ENC plotter).

7.3 The NAVDAT receiver equipment should comply with the *Performance standards for bridge alert management* (resolution MSC.302(87)).

8 TEST FACILITIES

The NAVDAT receiver equipment should be provided with a facility to test the radio receiver, the display and the non-volatile memory and to display the results of the test.

9 DATA INTERFACES

9.1 The NAVDAT receiver equipment should include at least one interface for the transfer of all messages to other navigation or communication equipment.

9.2 All interfaces provided for communication with other navigation or communication equipment should comply with the relevant international standards.[5]

9.3 The NAVDAT receiver equipment may include a standard printer interface.

10 POWER SUPPLY

10.1 The NAVDAT receiver equipment should normally be powered from the ship's main or emergency sources of electrical energy. In addition, it should be possible to operate the equipment and all equipment necessary for its normal functioning from the reserve source or sources of energy in accordance with SOLAS regulation IV/13.

[5] Refer to IEC 61162.

10.2 The NAVDAT receiver equipment should continue to operate without any loss of software parameters or received messages stored in the memory in the presence of power supply variations normally to be expected in a ship.

11 RECEIVER IDENTIFICATION

It should be possible to configure the NAVDAT receiver equipment with:

.1 the identity (MMSI) of the ship (according to Recommendation ITU-R M.585); or

.2 the group identity (MMSI) (according to Recommendation ITU-R M.585); or

.3 additional lists of identities (MMSIs).

12 STORED TABLES

The NAVDAT receiver equipment should have the possibility of memorizing some tables. For example:

.1 The list of coast stations with:

Area;
Country;
Longitude;
Latitude;
Name;
Slots; and
Frequency used.

This stored table is queried when the identities of a NAVDAT coast station are received and the complete parameters of this NAVDAT coast station should be displayed in plain text.

.2 The list of subject messages:

Table with subject message 01 to 63 (see the most recent versions of Recommendations ITU-R M.2010 and ITU-R M.2058).

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ANNEX 13

RESOLUTION MSC.509(105)/REV.1
(adopted on 6 December 2024)

PROVISION OF RADIO SERVICES FOR THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO that the Assembly, at its nineteenth session, adopted resolution A.801(19) on *Provision of radio services for the Global Maritime Distress and Safety System (GMDSS)*, authorizing the Maritime Safety Committee to keep the resolution under review and to adopt amendments thereto, as necessary,

RECALLING FURTHER resolution MSC.509(105), by which it adopted, at its 105th session, a revision of resolution A.801(19), as amended by resolution MSC.199(80), superseding the latter resolutions from 1 January 2024,

TAKING INTO ACCOUNT the amendments to chapter IV of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), adopted by resolutions MSC.436(99) and MSC.496(105),

NOTING, in particular, regulation IV/5 of the Convention concerning provision of radiocommunication services,

HAVING CONSIDERED, at its 109th session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its eleventh session,

1 ADOPTS the revised *Recommendation on provision of radio services for the GMDSS*, the *Criteria for use when providing shore-based digital selective calling (DSC) facilities for use in the GMDSS*, the *Criteria for establishing GMDSS sea areas,* the *Criteria for use when providing a NAVTEX service* and the *Criteria for use when providing a NAVDAT service*, set out in annexes 1 to 5, respectively, to the present resolution;

2 RECOMMENDS Governments to ensure that provision of radio services for the GMDSS established on or after the date of adoption of the present resolution conforms to criteria not inferior to that set out in the annexes to the present resolution;

3 INVITES Governments to:

  .1 provide, either individually or in cooperation with other Governments, the radio services deemed practicable and necessary for the proper operation of the GMDSS; and

  .2 inform the Secretary-General of the shore-based facilities to be provided in support of the GMDSS in response to this resolution through the Organization's Global Integrated Shipping Information System (GISIS);

4 REVOKES resolution MSC.509(105).

ANNEX 1

RECOMMENDATION ON PROVISION OF RADIO SERVICES FOR THE GMDSS

1 Governments should establish such coast stations, individually or in cooperation with other Governments, as are needed to designate a sea area or areas A1 or A2, or both, off their coasts. Each sea area should be established in accordance with the *Criteria for establishing GMDSS sea areas* recommended in annex 3.

2 Governments that do not define sea areas A1 or A2 should establish such coast stations, individually or in cooperation with other Governments, as are needed to designate a sea area (or areas) A3 or A4 in accordance with SOLAS regulations IV/2.1.17 and 2.1.18. Each sea area should be established in accordance with the *Criteria for establishing GMDSS sea areas* recommended in annex 3.

3 Each Government should submit to the Organization information on the sea area or sea areas (A1, A2, A3 and/or A4) designated, radiocommunication services it has established for the GMDSS, and when there are changes to the sea area or areas it has so defined.

4 Governments should make provision for radiocommunication services in each sea area they have defined, so that a ship, while at sea, can receive shore-to-ship radiocommunication and that coast stations can receive ship-to-shore radiocommunication in accordance with the functional requirements set out in SOLAS regulation IV/4.1.

ANNEX 2

CRITERIA FOR USE WHEN PROVIDING SHORE-BASED DIGITAL SELECTIVE CALLING (DSC) FACILITIES FOR USE IN THE GMDSS

1 Governments, individually or in cooperation with other Governments, desiring to provide a high frequency (HF) DSC coast station for use in the GMDSS should notify the Organization so it can maintain in the GMDSS Master Plan details of HF coast stations providing HF DSC distress watch. Governments should ensure that such HF DSC coast stations are provided in accordance with appendix 1.

2 Governments, individually or in cooperation with other Governments, desiring to provide a medium frequency (MF) DSC coast station serving, either wholly or in part, a particular sea area A2, should notify the Organization as to the extent of continuous coverage and the extent of coverage from shore. This information should be determined by Governments in accordance with the criteria recommended in annex 3. Governments should ensure that MF DSC coast stations are provided in accordance with appendix 2.

3 Governments, individually or in cooperation with other Governments desiring to provide a very high frequency (VHF) DSC coast station serving, either wholly or in part, a particular sea area A1, should notify the Organization as to the extent of continuous coverage and the extent of coverage from shore. This information should be determined by Governments in accordance with the criteria recommended in annex 3. Governments should ensure that VHF DSC coast stations are provided in accordance with appendix 3.

4 In addition, Report ITU-R M.2027 provides engineering guidance to upgrade shore-based facilities to operate the GMDSS in sea areas A1, A2, A3 and A4.

APPENDIX 1

1 BASIC PRINCIPLES FOR ESTABLISHING HF DSC COAST STATIONS FOR SEA AREAS A3 AND A4

The location of HF DSC coast stations for sea areas A3 and A4 should be based where practicable on the following principles:

.1 each area should have a minimum of two stations to provide the required coverage;

.2 stations should be selected to provide redundant coverage; and

.3 in areas of high traffic density, more than two stations should be provided.

Governments are encouraged to cooperate in order to achieve the above basic principles for establishing HF DSC coast stations and a complete global coverage.

2 CRITERIA FOR THE PROVISION OF HF DSC COAST STATIONS

Stations participating in HF DSC watchkeeping in the GMDSS should:

.1 be affiliated to an RCC and have reliable communications between them;

.2 monitor all HF DSC distress frequencies;

.3 provide as complete a coverage of their area as possible;

.4 be in continuous operation; and

.5 be able to relay distress alerts and communications under an international common procedure as agreed by the Organization.[1]

3 AVAILABILITY AND COVERAGE OF HF DSC COAST STATIONS

The minimum number of HF DSC coast stations indicated in paragraph 1 may need to be adjusted in future in order to:

.1 ensure coast stations can provide a mutual backup in the event of operational failure; and

.2 provide a methodology for predicting coverage to include in the GMDSS Master Plan.

[1] Refer to IAMSAR Manual, Volume II, section 3.6 "Designation of the RCC or RSC responsible for initiating SAR action".

APPENDIX 2

1 BASIC PRINCIPLES FOR ESTABLISHING MF DSC COAST STATIONS FOR SEA AREA A2

The selection of MF DSC coast stations for sea area A2 should be based on the following principles:

.1 each sea area designated as A2 requires a continuous MF guard on the distress frequencies and a sufficient number of coast stations to provide MF coverage in the coastal area of the Government concerned; and

.2 in certain areas, several Governments may collectively provide complete coverage (e.g. the North Sea).

2 CRITERIA FOR THE PROVISION OF MF DSC COAST STATIONS

Stations participating in MF DSC watchkeeping in the GMDSS should:

.1 be affiliated to an RCC and have reliable communications between them;

.2 provide as complete a coverage of their immediate sea area as possible; and

.3 be in continuous operation.

APPENDIX 3

1 BASIC PRINCIPLES FOR ESTABLISHING VHF DSC COAST STATIONS FOR SEA AREA A1

The selection of VHF DSC coast stations for sea area A1 should be based on the following principles:

.1 each sea area designated as A1 requires a continuous VHF guard and should have the minimum number of stations necessary to provide VHF coverage in the coastal area of the Government concerned; and

.2 in certain areas, several Governments may collectively provide complete coverage along their coasts (e.g. the North Sea).

2 CRITERIA FOR THE PROVISION OF VHF DSC COAST STATIONS

Stations participating in VHF DSC watchkeeping in the GMDSS should:

.1 be affiliated to an RCC and have reliable communications between them;

.2 provide as complete a coverage of their immediate sea area as possible; and

.3 be in continuous operation.

ANNEX 3

CRITERIA FOR ESTABLISHING GMDSS SEA AREAS

1 INTRODUCTION

Governments should use the following criteria when establishing sea areas as defined in SOLAS regulation IV/2.

2 SEA AREA A1

2.1 General

The communication range of stations operating in the maritime mobile VHF band is likely to be limited by propagation factors rather than lack of radiated power.

2.2 Guidance criteria

Sea area A1 is that sea area which is within a circle of radius A nautical miles over which the radio propagation path lies substantially over water. The radius A is equal to the transmission distance between a ship's VHF antenna at a height of 4 m above sea level and the antenna of the VHF coast station which lies at the centre of the circle.

2.3 Determination of radius A

2.3.1 The following formula should be used to calculate the range A in nautical miles:

$$A = 2.5\ (\sqrt{H(\text{in metres})} + \sqrt{h(\text{in metres})}\ )$$

H is the height above sea level of the VHF coast station receiving antenna and h is the height above sea level of the ship's transmitting antenna, which is assumed to be 4 m.

2.3.2 The formula given above applies to line-of-sight cases but is not considered adequate for cases where both antennae are at a low level. The VHF range in sea area A1 should be verified by field strength measurements.

3 SEA AREA A2

3.1 General

3.1.1 Consideration of the reception of radio signals in the 2 MHz band indicates that the range is likely to be limited by propagation conditions and atmospheric noise, which are affected by variations in geographical position and time of day, as well as radiated power.

3.1.2 The theoretical distance to be expected from ground-wave propagation can be determined by reference to the "Ground-wave propagation curves for frequencies between 10 kHz and 30 MHz" in the most recent version of Recommendation ITU-R P.368, to be used above seawater and adjusted as necessary to take account of the actual radiated field strength from the transmitting antenna and the minimum field strength necessary for the proper operation of a receiver conforming with the latest performance standard adopted by the Organization.

3.1.3 The determination of the minimum signal level required for satisfactory radio reception in the absence of other unwanted signals necessitates taking account of the noise with which the wanted signal must compete. The latest Recommendation ITU-R P.372 gives the world distribution of values of noise level and of other noise parameters and shows the method of using these in the evaluation of the probable performance of a radio circuit.

3.1.4 In addition, the most recent version of Recommendation ITU-R M.1467 provides guidance to Administrations for predicting sea area A2 by taking into account variations in the propagation conditions.

3.2 Guidance criteria

Sea area A2 is that sea area which is within a circle of radius B nautical miles over which the propagation path lies substantially over water and which is not part of any sea area A1, the centre of the circle being the position of the coast station receiving antenna.

3.3 Determination of radius B

The radius B may be determined for each coast station by reference to the most recent versions of Recommendations ITU-R P.368 and ITU-R P.372 for the performance of a single sideband (J3E) system under the following conditions:

Frequency	-	2 182 kHz
Bandwidth	-	3 kHz
Propagation	-	ground wave
Time of day	-	[2]
Season	-	[2]
Ship's transmitter power (PEP)	-	60 W[3]
Ship's antenna efficiency	-	25%
Radio frequency signal over noise (RF S/N)	-	9 dB (voice)
Mean transmitter power	-	8 dB below peak power
Fading margin	-	3 dB

The range of sea area A2 should be verified by field strength measurements.

4 SEA AREA A3

Guidance criteria

Sea area A3 means an area, excluding sea areas A1 and A2, within the coverage of a recognized mobile satellite service supported by the ship earth station carried on board in which continuous alerting is available.

5 SEA AREA A4

Guidance criteria

Sea area A4 means an area outside of sea areas A1, A2 and A3.

[2] Administrations should determine time periods and seasons appropriate to their geographic area based on prevailing noise level.

[3] In the absence of field strength measurements, it may be assumed that this range will be obtained by a radio frequency power of 60 watts PEP for full carrier emissions generated by a single sinusoidal oscillation in an antenna of 25% efficiency.

ANNEX 4

CRITERIA FOR USE WHEN PROVIDING A NAVTEX SERVICE

1 There are two basic areas which must be defined when establishing a NAVTEX service. They are:

Coverage area: An area defined by an arc of a circle having a radius from the transmitter calculated according to the method and criteria given in this annex.

Service area: A unique and precisely defined sea area, wholly contained within the coverage area, for which MSI is provided from a particular NAVTEX transmitter. It is normally defined by a line which takes full account of local propagation conditions and the character and volume of information and maritime traffic patterns in the region.

2 Governments desiring to provide a NAVTEX service should use the following criteria for calculating the coverage area of the NAVTEX transmitter they intend to install, in order to:

.1 determine the most appropriate location for NAVTEX stations having regard to existing or planned stations;

.2 avoid interference with existing or planned NAVTEX stations; and

.3 establish a service area for promulgation to seafarers.

3 The ground-wave coverage may be determined for each coast station by reference to the most recent versions of Recommendations ITU-R P.368 and ITU-R P.372 for the performance of a system under the following conditions:

Frequency - 518 kHz
Bandwidth - 300 Hz
Propagation - ground wave
Time of day - [4]
Season - [4]
Transmitter power - [5]
Antenna efficiency - [5]
Radio frequency signal over noise (RF S/N) in 500 Hz bandwidth - 8 dB[6]
Percentage of time - 90

4 Full coverage of a NAVTEX service area should be verified by field strength measurements.

5 In addition, the most recent version of Recommendation ITU-R M.1467 provides guidance to Administrations for predicting NAVTEX coverage areas by taking into account variations in the propagation conditions.

4 Administrations should determine time periods in accordance with NAVTEX time transmission table (see NAVTEX Manual) and seasons appropriate to their geographic area based on prevailing noise level.

5 The range of a NAVTEX transmitter depends on the transmitter power and local propagation conditions. The actual range achieved should be adjusted to the minimum required for adequate reception in the NAVTEX area served, taking into account the needs of ships approaching from other areas. Experience has indicated that the required range of 250 to 400 nautical miles (nm) can generally be attained by transmitter power in the range between 100 and 1,000 W during daylight with a 60% reduction at night. The receiver characteristics, particularly as regards the bandwidth response, must be compatible with that of the NAVTEX transmitter.

6 Bit error rate 1×10^{-2}.

ANNEX 5

CRITERIA FOR USE WHEN PROVIDING A NAVDAT SERVICE

1 There are two basic areas which must be defined when establishing a NAVDAT service. They are:

***Coverage area*: An area defined for ground-wave propagation by an arc of a circle having a radius from the coast station calculated according to the method and criteria given in this annex.

***Service area*: A unique and precisely defined sea area, wholly contained within the coverage area, for which MSI is provided from a particular NAVDAT coast station. It is normally defined by a line which takes full account of local propagation conditions and the character and volume of information and maritime traffic patterns in the region.

2 Governments desiring to provide a NAVDAT service should use the following criteria for calculating the coverage area of the NAVDAT coast station they intend to install, in order to:

.1 determine the most appropriate location for the NAVDAT coast station having regard to existing or planned coast stations;

.2 avoid interference with existing or planned GMDSS coast stations by determining the transmit power level; and

.3 establish a service area for promulgation to seafarers.

3 NAVDAT can be used in the MF and HF maritime frequency bands. In the MF frequency band, the main propagation is on ground wave with some sky wave at night-time. In HF, ground-wave and sky wave propagation modes are both possible.

4 The ground-wave coverage may be determined for each coast station by reference to the most recent version of Recommendations ITU-R P.368 and ITU-R P.372 or by appropriate software coverage calculation for the performance of a system under the following conditions:

Frequency:	500 kHz or 4 226 kHz
Modulation:	4 QAM, 16 QAM or 64 QAM
Bandwidth:	1, 3, 5 or 10 kHz
Propagation	ground wave
Transmitter power:	1 to 4 kW rms (10 to 40 kW pep)
Antenna polarization:	vertical
Antenna efficiency:	30 to 85% (depending on frequency and antenna model)
Minimum radio frequency signal over noise (RF S/N) for BER 10^{-4} relating to modulation:	4 QAM: 11.5 dB 16 QAM: 18.5 dB 64 QAM: 24.5 dB
Percentage of time:	90%

5 This S/N ratio is also affected by the bandwidth used by the receiver (i.e. narrow bandwidth requires less S/N).

6 When calculating the radio coverage, the transmit RF power should use the rms value.

7 During daylight hours, solar radiation penetrates the atmosphere far enough to ionize the lowest "D" layer roughly 60 km above ground. This "D" layer completely absorbs signals on MF frequencies so that they do not carry on upwards out into space. This is the case of a pure ground-wave propagation.

8 With the approach of sunset, the "D" layer absorption decreases rapidly and within a few hours, MF signals continue to move in the upward direction towards the atmosphere. However, MF signals then encounter higher regions of the ionosphere which, instead of absorbing the signal, tend to refract or bend the path of the signal travel. With enough refraction, the signal can be redirected back to the Earth's surface far away from the transmitter site. This is the case of a mixed propagation: ground wave and sky wave. According to this explanation, propagation at night could cause interference between NAVDAT stations.

9 The dominant means of communication in the HF band is skywave ("skip") propagation, in which radio waves directed at an angle into the sky refract back to Earth from layers of ionized atoms in the ionosphere. By this method HF radio waves can travel beyond the horizon, around the curvature of the Earth, and can be received at intercontinental distances. However, suitability of this band for medium or short distance communications is reduced and this characteristic should be considered in the coverage analysis.

10 Full coverage of a NAVDAT service area should be verified by field strength measurements.

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ANNEX 14

DRAFT ASSEMBLY RESOLUTION

CRITERIA FOR THE PROVISION OF MOBILE SATELLITE COMMUNICATION SYSTEMS IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO that regulation IV/5 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, requires each Contracting Government to undertake to make available, as it deems practicable and necessary, either individually or in cooperation with other Contracting Governments, appropriate shore-based facilities for the mobile satellite service and maritime mobile service, having due regard to the recommendations of the Organization,

TAKING INTO ACCOUNT resolution MSC.509(105)/Rev.1 on *Provision of radio services for the Global Maritime Distress and Safety System (GMDSS)*,

NOTING that mobile satellite communication systems have the capability to offer maritime distress and safety communications,

NOTING ALSO the decision of the Maritime Safety Committee, at its eighty-second session, that the oversight of future mobile satellite service providers in the GMDSS should be undertaken by the International Mobile Satellite Organization (IMSO),

RECOGNIZING that mobile satellite communication systems for use in the GMDSS should fulfil performance criteria adopted by the Organization,

RECOGNIZING ALSO the need for the Organization to have in place criteria against which the capabilities and performance of mobile satellite communication systems for use in the GMDSS may be verified and evaluated,

1 ADOPTS the revised *Criteria for the provision of mobile satellite communication systems in the Global Maritime Distress and Safety System (GMDSS)*, set out in the annex to the present resolution;

2 INVITES Governments, when permitting ships entitled to fly the flag of their State to carry maritime mobile satellite equipment for use in the GMDSS, to require those ships to carry equipment which can utilize only those satellite systems that have been recognized by the Organization and conform to the performance standards adopted by the Organization for use in the GMDSS, in accordance with the criteria set out in the annex;

3 INVITES international organizations, such as IEC, IHO, ITU and WMO, to notify the Organization regarding changes to relevant instruments and standards that may affect the provision of recognized mobile satellite services;

4 REQUESTS the Maritime Safety Committee to:

(a) apply the criteria set out in the annex to the present resolution, through the procedure set out in section 2 of the annex, to evaluate satellite systems notified by Governments for possible recognition for use in the GMDSS, within the context of the relevant regulations of SOLAS chapter IV; and

(b) ensure that mobile satellite communication systems recognized by the Organization for use in the GMDSS are compatible with all appropriate SOLAS requirements, and also that such recognition takes into account existing operational procedures and equipment performance standards;

5 ALSO REQUESTS the Maritime Safety Committee to keep this resolution under review and take appropriate action as necessary to secure the long-term integrity of the GMDSS;

6 REVOKES resolution A.1001(25) and MSC.1/Circ.1414.

ANNEX

CRITERIA FOR THE PROVISION OF MOBILE SATELLITE COMMUNICATION SYSTEMS IN THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)

1 DEFINITION

1.1 Mobile satellite communication system

1.1.1 The mobile satellite communication system (or satellite system), as defined in ITU Radio Regulations article No.1.111, means a space system using one or more artificial earth satellites.

1.1.2 A mobile satellite communication system includes the space segment, the arrangements for controlling the space segment, the network control facilities controlling the access to the space segment, the earth stations and maritime mobile terminals operating in the system. In the context of this resolution, the satellite system will include, or interface with, the following elements:

.1 **Earth station** – any fixed satellite communication station acting as a gateway between the space segment and the terrestrial networks.

.2 **Ship earth station (SES)** – any radiocommunication equipment on board a ship, working through a satellite communication system.

.3 **Space segment** – satellites and the radiocommunication facilities they carry both for control and to provide GMDSS services, including the forward and return communication links with the earth.

.4 **Terrestrial networks** – the communication networks providing land-based subscriber communication facilities such as telephone, facsimile or data communications.

.5 **Rescue coordination centre (RCC)** – A unit responsible for promoting the efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region. This includes maritime, aeronautical and other search and rescue authorities or entities that conduct or coordinate search and rescue operations.

1.2 Recognized mobile satellite service

Recognized mobile satellite service (RMSS) means any service which operates through a satellite system and is recognized by the Organization for use in the GMDSS.

1.3 GMDSS call formats

The information transmitted by an RMSS fall into the following categories:

.1 **Distress alerting / calling** – The transmission of a distress alert or a distress call indicates that a mobile unit or person is threatened by grave and imminent danger and requires immediate assistance;

.2 **Urgency –** Urgency transmissions indicate that the calling station has urgent communications such as meteorological warnings, navigational warnings, messages of a medical nature or other urgent communications; and

.3 **Safety –** The safety call format or the safety signal indicates that the calling station has important navigational or meteorological information to transmit.

1.4 System-critical component

A system-critical component is a component of the satellite system for which contingency is required to ensure continued provision of the RMSS(s).

1.5 Coverage area

1.5.1 The coverage area of the satellite system is the geographical area within which the satellite system provides availability in accordance with the criteria stated in section 3.5 in the ship-to-shore and shore-to-ship directions, and within which continuous alerting is available.

1.5.2 The coverage area is the entire footprint of the satellite system on the surface of the earth which provides the availability of recognized GMDSS services in accordance with section 3.5

1.6 Availability

1.6.1 The recognized satellite system should provide continuous availability for distress, urgency and safety communication services included in paragraph 3.1, calculated in accordance with the following formula:

$$A = \underline{\text{(scheduled operating time) - (downtime)}} \times 100\% \text{ (scheduled operating time)}$$

where:

Scheduled operating time = 100% of the time period being reported on; and

Downtime = the total time during the period for which the recognized GMDSS system was not operationally available.

1.6.2 Definitions and calculations of availabilities of communications circuits in the maritime mobile satellite service are given in the most recent version of Recommendation ITU-R M.828.

2 RECOGNITION OF MOBILE SATELLITE COMMUNICATION SYSTEMS FOR USE IN THE GMDSS

The evaluation and recognition of satellite systems participating, or wishing to participate in the GMDSS are undertaken by the Organization. Guidance on the information required for application of recognition is provided in appendix 1.

2.1 Application for recognition

2.1.1 Satellite system providers wishing to participate in the GMDSS should apply to the Organization, through a Member State, for recognition as a radio system providing maritime distress, urgency and safety satellite communication capabilities for use in the GMDSS. Such applications should be notified to the Organization by Governments, either individually or in cooperation with other Governments. The application will be reviewed by the Maritime Safety Committee (MSC) in relation to its policy for the expansion of satellite services in the GMDSS. If the MSC decides that there are no objections in principle to the application, it will forward the application to the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) for evaluation. Recognition of the satellite provider to operate in the GMDSS will be undertaken by the Committee on the basis of the evaluation report.

2.1.2 The Governments concerned should make available to the Organization all necessary information to enable it to evaluate the satellite system in relation to the criteria indicated below.

2.1.3 In particular, Governments proposing such satellite systems for possible recognition and use in the GMDSS should provide evidence to show that:

.1 the satellite system conforms with all the criteria specified in this annex;

.2 the charging policies of ITU and provisions of relevant instruments adopted by the Organization are complied with;

.3 there is a well-founded confidence that the company concerned will remain viable for the foreseeable future and will remain in a position to deliver the required services over an extended period, in keeping with the expectations of the Organization and the maritime industry as to the continuity, durability and reliability of the service; and

.4 the provider of the satellite system is ready to submit any recognized services to oversight by IMSO and sign the required public services agreement (PSA) with that organization.

2.2 Verification and evaluation

2.2.1 The NCSR Sub-Committee should verify and evaluate the information, seeking clarification as required directly from the service provider concerned, and decide whether the satellite system meets the criteria established by this resolution. In reaching its decision, the NCSR Sub-Committee should take into account the provisions of the relevant regulations of chapter IV of the 1974 SOLAS Convention and the criteria established by this resolution.

2.2.2 Recognition by the Organization should be recorded in an MSC resolution entitled *Statement of Recognition of Maritime Mobile Satellite Services provided by [Company Name]*, detailing the specific services provided by the company which have been recognized by the Organization. A copy of the statement of recognition should be provided to IMSO.

2.2.3 If, following evaluation, the Organization is unable to recognize the company or the service(s) offered for the GMDSS, the Organization should communicate this decision to the company and IMSO in writing, setting out the reasons for the decision and any actions the company may take to achieve recognition in the future.

2.3 Public services agreement

2.3.1 Recognized services are subject to oversight by IMSO according to the rules and arrangements set out in the PSA concluded between the service provider and IMSO. No maritime satellite system should be used in the GMDSS unless it has first been recognized by the Organization in accordance with the above procedure and the service provider has signed a PSA with IMSO.

2.3.2 IMSO should conduct its oversight of the recognized services on a continuing basis.

2.3.3 Responsibility for ensuring compliance with the standards established by this annex, other relevant mandatory international instruments and, to the extent necessary, those recommendations, resolutions and procedures of IMO and ITU which are of a recommendatory nature insofar as they relate to the provision of GMDSS services, rests with IMSO under the terms of the PSA.

2.4 Commencement of service

All outstanding implementation actions identified by the Organization during the recognition process, which include, but are not limited to, those provided in appendix 2, are required to be completed before the commencement of service.

2.5 Reports

At least once a year, IMSO should make available to the Organization a report on availability, performance and other relevant information in respect of each recognized service, for the period since the preceding report, in accordance with paragraph 3.5.3 of the criteria indicated below.

3 CRITERIA AND REQUIREMENTS FOR THE RECOGNIZED MOBILE SATELLITE COMMUNICATION SYSTEM

3.1 Functional requirements[1]

Satellite systems forming part of the GMDSS radio systems specified in regulation IV/5 of the 1974 SOLAS Convention, should provide capabilities for at least the following maritime distress, urgency and safety communications:

.1 ship-to-shore distress alerts/calls;

.2 shore-to-ship distress alert relays;

.3 ship-to-shore, and shore-to-ship search and rescue coordinating communications;

.4 ship-to-shore and shore-to-ship distress, urgency and safety communications; and

.5 shore-to-ship broadcasting of maritime safety information (MSI) and search and rescue (SAR) related information.

[1] – Resolution A.887(21) on *Establishment, updating and retrieval of the information contained in the registration databases for the Global Maritime Distress and Safety System (GMDSS)*;

– Resolution A.694(17) on *General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids*;

– System-specific EGC manuals;

– Resolution A.664(16) on *Performance standards for enhanced group call equipment*; and

– Appropriate IEC Standards and ITU Recommendations.

3.2 Capacity

The satellite system should be designed to provide sufficient channel and power capacity to process effectively, with the availability stated in section 3.5, the maritime distress, urgency and safety traffic estimated to be required by the ships using the system.

3.3 Priority access

3.3.1 Satellite systems in the GMDSS should be capable of processing maritime distress, urgency, safety and routine communications in accordance with the message priority as defined by the ITU Radio Regulations. The order of processing these communications should be:

.1 distress;

.2 urgency;

.3 safety; and

.4 routine (general communications).

3.3.2 In implementing these four levels of priority:

.1 Distress alerts and distress calls (level 1) should be given priority treatment by providing immediate access to satellite channels. For store and forward systems, distress alerts and calls should be placed ahead of all other traffic.

.2 Satellite systems used for providing other mobile satellite communications in addition to maritime communications should be capable of automatically recognizing requests for maritime communications from:

.1 SESs; and

.2 recognized entities of critical importance for safety at sea, i.e. RCCs, hydrographic and meteorological offices, telemedical assistance services (TMASs) and maritime assistance services (MASs) registered with the recognized satellite system.

The system should process such maritime communications in the ship-to-shore and shore-to-ship directions for levels 1 to 3 with priority over other communications.

.3 In processing maritime distress, urgency and safety communications, the satellite system and the earth station should be capable of:

.1 automatically recognizing the message or access priority for ship-to-shore communications;

.2 automatically recognizing the message or access priority for shore-to-ship communications, if any are provided, from, as a minimum, recognized entities of importance for safety at sea, registered by the earth station;

.3 preserving and transferring the priority;

.4 giving distress alerts and distress calls immediate access, if necessary by pre-empting ongoing communications of routine priority;

.5 automatically recognizing maritime distress communications and automatically routeing maritime distress alerts and distress calls directly to an associated RCC, or a responsible RCC if this capability exists; and

.6 processing maritime urgency and safety communications in the ship-to-shore and shore-to-ship directions with the required priority, for example by allocating the first vacant channel, if no channel is immediately available.

.4 Selection and use of message or access priority for urgency and safety transmissions by SESs should preferably be automatic and should be restricted to calls to special, recognized entities such as TMASs, MASs, hydrographic and meteorological offices, etc., registered with the satellite system. The earth station should automatically route such calls directly to the relevant entity.

3.4 Coverage area

3.4.1 The definition of the coverage area is given in section 1.3.

3.4.2 The coverage area is to be delineated on a map and also described in relation to the sea areas defined in regulation IV/2 of the 1974 SOLAS Convention. Documentation on the coverage area of the satellite system, as defined in section 1.3, should be forwarded to the Organization.

3.4.3 Information on coverage areas for satellite systems forming part of the GMDSS should be published by the Organization in the *Master Plan of shore-based facilities for the GMDSS* through the Global Integrated Shipping Information System (GISIS).

3.5 Availability

3.5.1 The satellite system should provide continuous availability for maritime distress, urgency and safety communications in the ship-to-shore and shore-to-ship directions.

3.5.2 Where a recognized satellite system is unavailable in a part of the coverage area, the RMSS provider should consult with IMSO on a formula to be used to calculate the service availability within the coverage area as a whole. IMSO should include in the annual report the outcome of such an outage or degradation of the recognized satellite system.

3.5.3 The availability of the recognized satellite system, provision of spare satellite(s) and the network control function (i.e. the network availability), as defined in section 1.6 above, should be monitored by IMSO, which should report on the recorded availability of the system to the Organization at least once every year.

3.5.4 Service providers should advise their associated RCCs and IMSO of planned outages of recognized services and advise ships of scheduled downtime and known interruptions in service, and supply any other relevant network information. Service providers should also advise IMSO of unscheduled interruptions in any recognized services, as soon after the commencement of the interruption as possible, and when the recognized services have been restored.

3.5.5 The complete mobile satellite communication network, including earth stations for the recognized services, is expected to achieve at least 99.9% availability (equivalent to a total of 8 hours and 48 minutes downtime per year).

3.6 Restoration and spare satellites

3.6.1 The recognized satellite system should have the means and arrangements to ensure continuity of service during planned work or in case of an unplanned outage. All identified system-critical components of the recognized satellite system should have adequate redundancy for the uninterrupted provision of the RMSS, or for its restoration within one hour after a confirmed outage. This includes the space segment which should have spare satellite(s) and arrangements in place to ensure that, in the event of a partial or total satellite failure, the RMSS in the geographical area concerned can be restored to their normal availability.

3.6.2 Full information on the means and arrangements prepared for restoration of the RMSS in the event of a system-critical component failure should be notified to IMSO. In agreement, IMSO and the RMSS provider should conduct contingency exercises regularly (no more than four times per calendar year) to prove and practice the efficiency and effectiveness of such arrangements.

3.7 Identification

The satellite system should be capable of automatically recognizing and preserving the identification of SESs.

3.8 Information to be made available to SAR authorities

For all distress urgency and safety communications, the maritime mobile terminal identification number or Maritime Mobile Service Identity (MMSI) should be an integral part of the distress alert and be provided to the RCC with the alert. When available, all additional registration, commissioning or other data relevant to the SAR or prosecution of a false alert should be referenced to this number and made available to the proper SAR authority or RCC upon request.

3.9 Reception of distress alerts

The satellite system should allow for addressing a maritime distress alert to a specific RCC chosen by the ship's operator and covering the area concerned, but should also provide for automatic routeing of manually initiated maritime distress alerts. Means should be provided to allow the RCC to easily identify the system and specific SES from which an alert or other priority message has been received, to enable the RCC to establish shore-to-ship communications with the ship concerned.

3.10 Control of SESs

Access control arrangements for controlling and giving, or temporarily denying, access by SESs to the satellite system should at all times allow SESs access for transmission of maritime distress alerts/calls and distress messages.

3.11 Test facilities

The satellite system should provide facilities making it possible for SESs to test the distress capability of their stations without initiating a distress alert/call.

4 CRITERIA AND REQUIREMENTS FOR EARTH STATIONS

4.1 Functional requirements

4.1.1 Earth stations serving the GMDSS should:

.1 be in continuous operation;

.2 be connected to an associated RCC;

.3 keep continuous watch on all appropriate satellite communication channels; and

.4 be capable of transmission and reception of at least the maritime distress, urgency and safety communications included in paragraph 3.1.

4.2 Priority

4.2.1 The earth station should be capable of automatically recognizing the priority of ship-to-shore and shore-to-ship communications, and should process maritime mobile communications while preserving the four levels of priority specified in paragraph 3.3.1.

4.2.2 Priority access should be given for distress alerts and calls in real time. In any case, distress alerts and calls should be given priority treatment by providing immediate access to satellite channels, and distress alerts and calls for store and forward systems should be placed ahead of all routine traffic. Any satellite system designed for use in the GMDSS should be able to recognize the four levels of priority and give appropriate access for communications in the ship-to-shore direction and in the shore-to-ship direction for distress, urgency and safety traffic originating from RCCs.

4.2.3 Limitations in existing public switched networks concerning facilities for indication and use of priority access codes might necessitate special arrangements such as the use of leased lines between, for example, MSI providers and the earth station, until such facilities become available in the public switched network.

4.3 Pre-emption

Satellite systems participating in the GMDSS should make arrangements to ensure that it will always be possible for an RCC to obtain an immediate connection to an SES and that the RCC could use the systems for SAR alerting and communication without any delay. This may be achieved by a process of pre-emption or by other suitable means approved by IMSO.

4.4 Routeing of maritime distress alerts

4.4.1 The satellite system should have reliable communication links to one or more associated RCCs. These links may be implemented directly between the RCC and an earth station, or some other suitable point in the system's network. The arrangements between the system and the RCC are subject to approval by the national administration.

4.4.2 The satellite system network should be capable of automatically recognizing maritime distress, urgency and safety communications and of routeing, as far as possible automatically, maritime distress alerts/calls directly to the associated RCC, via a highly reliable communication link. In cases where the capability exists, the system may route alerts directly to the responsible RCC as defined under an international common procedure as agreed by the Organization.[2]

[2] Refer to COMSAR/Circ.60 on *Procedure for routeing distress alerts*.

4.4.3 The earth station or other relevant part of the satellite system network should be provided with an aural and visual alarm to alert a designated responsible person in the event that automatic connection to the RCC cannot be achieved within 60 seconds. In this case, all necessary action should be taken to immediately inform the RCC of the details of the distress alert or call. Personnel should always be available to react to such an alarm so as to ensure that the distress alert or call can be forwarded to an RCC within 5 minutes of the alarm being triggered. All messages with distress or urgency priority should sound an alarm at the earth station or other relevant part of the satellite system network, which should require manual cancellation.

4.4.4 The RCC should be provided with reliable communication links to the satellite system network for efficient handling of shore-to-ship distress alert relays and distress traffic, preferably via dedicated communication links.

4.5 Identification

The system should be capable of automatically identifying SESs. If other identification than the MMSI is used in the system, the means should be provided 24 hours per day to easily identify the ship and to provide the RCC with all the appropriate additional information necessary for effecting the rescue, including the MMSI where available.

4.6 Voice communication systems

4.6.1 The communication links for mobile satellite voice communication systems should be connectable to the terrestrial network in accordance with relevant ITU-T Recommendations.

4.6.2 Satellite systems using the terrestrial network for routeing maritime distress calls and distress traffic to and from RCCs should, upon receipt of ship-to-shore or shore-to-ship distress alerts/calls or distress traffic, immediately attempt to establish the connection necessary for the transfer of the distress alert or distress message.

4.7 Data communication systems

4.7.1 The communication links for mobile satellite data communication systems should be connectable to the terrestrial network in accordance with relevant ITU-T Recommendations. The system should provide the capability to transfer the identity of the calling subscriber to the called subscriber. Maritime distress alerts/calls and distress messages should include the ship identity and the earth station identity, or other means of identifying the point of access to the satellite network.

4.7.2 Satellite systems using the terrestrial network for routeing distress alerts/calls and distress traffic to and from RCCs should, on receipt of ship-to-shore or shore-to-ship distress alerts/calls or distress traffic, immediately attempt to establish the connection necessary for the transfer of the distress alert or distress message.

4.8 Network communication protocol or store and forward systems

4.8.1 Satellite systems using a network communication protocol (e.g. Internet protocol (IP)) or store and forward communication system should:

.1 make an initial attempt to deliver a ship-to-shore or shore-to-ship message within 60 seconds for any maritime distress alert or distress traffic, and within 10 minutes for all other maritime messages, from the time the receiving station receives the message (the message should include the ship identity and the earth station or system identity); and

.2 generate notification of non-delivery immediately once the message is considered non-deliverable, for maritime distress alerts and distress messages not later than four minutes after reception of the alert or message.

4.9 Facilities for broadcasting MSI and SAR related information

4.9.1 Satellite systems forming part of the GMDSS should technically be capable of offering facilities for broadcasting MSI and SAR related information from RCCs and authorized MSI providers to ships.

4.9.2 Such facilities for the broadcast of MSI should provide for automatic, continuous and reliable reception on board ships and should, as a minimum, fulfil the requirements specified in paragraphs 4.9.3 to 4.9.8 below.

4.9.3 The facilities should provide for recognition and processing of distress, urgency and safety priority levels.

4.9.4 It should be possible to address the broadcast of MSI and SAR related information to all properly equipped ships within a specified area, for at least the following types of areas:

.1 the coverage area of the satellite system over which the transmission is made;

.2 the NAVAREAs/METAREAs as established by the International Maritime Organization (IMO), the International Hydrographic Organization (IHO) and the World Meteorological Organization (WMO) respectively; and

.3 a temporary area chosen and specified by the originator of the MSI or SAR related information, including circular or rectangular user-specified areas.

4.9.5 The facilities should provide for transmission of at least the types of MSI and SAR related information required by SOLAS, as follows:

.1 SAR coordination information, including distress alert relays;

.2 navigational warnings; and

.3 meteorological warnings and forecasts.

4.9.6 The facilities for the broadcast of navigational and meteorological warnings should include possibilities for:

.1 scheduling the broadcast at fixed times or transmitting messages as unscheduled broadcast transmissions; and

.2 automatic repetition of the broadcast with time intervals and number of broadcast transmissions as specified by the MSI provider, or until cancelled by the MSI provider.

4.9.7 The facilities should provide for marking MSI and SAR related information messages with a unique identity, enabling the SES that receives these broadcasts to automatically ignore messages already received.

4.9.8 The broadcasting service should in addition provide facilities for broadcasts similar to NAVTEX to coastal areas not covered by the International NAVTEX Service, in accordance with the identification system (i.e. the identification characters B1, B2, B3, B4) used in the International NAVTEX Service.

5 ADDITIONAL RECOMMENDED CAPABILITIES

5.1 RMSS providers are encouraged to:

.1 include Automatic Location Identification (ALI) and Automatic Number Identification (ANI) associated with voice and data calls originating from SESs;

.2 automatically route information contained in registration databases in accordance with resolution A.887(21), in a recognizable format and including the distress call to the responsible RCC, once means are established for doing so;

.3 be capable of retrieving MSI in a timely manner from NAVAREA, METAREA, other relevant coordinators, and the International Ice Patrol Service, in a standard format and process established by those coordinators; and

.4 directly notify international organizations maintaining a registry of GMDSS identities such as the ITU Maritime Mobile Access and Retrieval System (MARS), of satellite identification number information for ships registered under the administrations, which are responsible for such notifications, and which have authorized the RMSS providers to do so on their behalf.

6 NOVEL TECHNIQUES

Satellite systems may be permitted to use novel techniques to provide any of the capabilities required by this resolution. Approval to use such novel techniques for a period of up to 12 months may be given provisionally by the Organization in order to allow early introduction and proper evaluation of the technique. Final recognition of a novel technique may be given by the Organization, only after receiving a report allowing full technical and operational evaluation of the technique.

7 LEGACY SERVICES

7.1 All satellite-based systems and services for the GMDSS which were already recognized before the entry into force of this resolution are exempt from the requirements of paragraphs 2.1 to 2.3. These services are:

.1 Inmarsat-C;

.2 International SafetyNET Services;

.3 Inmarsat Fleet Safety;

.4 Iridium SafetyCast;

.5 Iridium Safety Messaging;

.6 Iridium Safety Voice;

.7 BDMSS Safety Messaging; and

.8 BDMSS SafetyLink.

7.2 The services specified in paragraph 7.1 are subject to the requirements of paragraphs 2.4 and 2.5, as appropriate.

APPENDIX 1

INFORMATION REQUIRED FOR APPLICATION OF RECOGNITION

The Governments concerned should provide a complete description of the proposed satellite system. The information and evidence that will be necessary for a full and comprehensive evaluation of any submission to be carried out are very wide-ranging and quite detailed. Experience in designing, implementing and operating the present satellite-based elements of the GMDSS, and evaluating their initial and continuing operational and other capabilities, has shown that it will not be sufficient, for example, to accept a plain statement such as "the system can deliver a distress alert to an RCC within 60 seconds of it being originated". In such a case, in order to provide an assurance to the Committee that the candidate system will meet this target reliably on a high percentage of occasions, Governments proposing such mobile satellite services for possible recognition and use in the GMDSS should provide evidence to show that:

.1 the satellite system and the mobile satellite services conform with all the criteria and requirements of the Organization;

.2 frequency spectrum: the MSS provider has considered any coordination requirements necessary to make use of the orbits and associated frequencies defining the candidate satellite constellation, in accordance with the applicable procedures and provisions of the ITU Radio Regulations. Such public information should include any technical and operational constraints resulting from the application of the ITU procedures on frequency coordination, and any potential impact on the system's performance resulting from such frequency coordination;

.3 constellation: number and arrangement of satellites; link budget; number of on-orbit spares required and provided; inter-satellite hand-offs; lifespan of current satellites; plan for replacement, identification of satellites; etc;

.4 ground segment: number and geographical disposition of ground stations; satellite and communication network control arrangements; contingency arrangements in the event of satellite or network failures; availability; time of contingency service restoration; communication links to RCCs; distress alert distribution arrangements; message prioritization; personnel availability, shift patterns, training, etc;

.5 SES: design, manufacture and market availability; test procedures, IEC compliance; capabilities; signalling modes and protocols; ship installation guidelines and arrangements, etc;

.6 live end-to-end system and contingency tests;

.7 the MSS provider has interim arrangements with MSI providers for NAVAREA and METAREA and two or more providers of SAR related information under its coverage area;

.8 the method used in the calculation of availability, including cases in which downtime affects individual regions or functions rather than the whole system;

.9 measures taken to protect the satellite system against cybersecurity threats;

.10 the charging policies of ITU and provisions of the relevant instruments adopted by the Organization, are complied with;

.11 there is a well-founded confidence that the MSS provider concerned will remain viable for the foreseeable future and will remain in a position to deliver the required services over an extended period, in keeping with the continuity, durability and reliability of the service;

.12 the MSS provider is ready to submit the recognized services for oversight by IMSO and sign the required PSA with that organization; and

.13 operational procedures are in place.

APPENDIX 2

IMPLEMENTATION ACTIONS REQUIRED TO BE COMPLETED BEFORE THE COMMENCEMENT OF SERVICE

Implementation actions required to be completed before the commencement of service:

.1 the MSC should adopt a resolution recognizing the MSS provider;

.2 the MSS provider should sign a PSA with IMSO for oversight of the RMSS;

.3 a manual should be available for the new EGC service;

.4 the MSS provider should have internal operational procedures ready to support RMSSs;

.5 a type-approved SES should be made available for the operation of the new mobile satellite services;

.6 ITU-related requirements necessary to make use of the satellite orbits, associated frequencies defining the candidate satellite constellation, necessary coordination and spectrum identification in RR Appendix 15 should be successfully completed;

.7 any other issues indicated by the MSC should be resolved;

.8 formal association with two RCCs should be demonstrated; and

.9 the MSS provider should be contracted with all NAVAREA and METEAREA coordinators, and have the capability to broadcast MSI to all NAVAREA/METAREAS within the coverage area or the coverage area in the statement of recognition of the RMSS.

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ANNEX 15

DRAFT AMENDMENTS TO SOLAS REGULATION V/23 AND THE APPENDIX (CERTIFICATES)

(Refer to document NCSR 11/WP.7, annex 2, for track changes)

CHAPTER V SAFETY OF NAVIGATION

Regulation 23 – Pilot transfer arrangements

1 Regulation 23 is replaced by the following:

"Regulation 23 – Pilot transfer arrangements

1 Ships on which pilots may be employed shall be provided with pilot transfer arrangements.

2 Pilot transfer arrangements shall enable pilots and other personnel to embark and disembark safely in all seagoing conditions of draught and trim.

3 Pilot transfer arrangements provided in accordance with paragraph 1 and installed on or after 1 January 2028 shall be designed, manufactured, constructed, secured and installed in accordance with the introduction and parts A, B and C of the performance standards adopted by the Maritime Safety Committee by resolution MSC.[…], as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I.

4 Pilot transfer arrangements installed before 1 January 2028 on ships to which chapter I applies shall comply with the requirements provided in paragraph 3 not later than the first survey* on or after 1 January 2029.

5 Pilot transfer arrangements installed before 1 January 2028 on ships to which chapter I does not apply shall comply with the requirements provided in paragraph 3 not later than [1 January 2030].

6 Inspection, stowage, maintenance, replacement and familiarization of all pilot transfer arrangements, regardless of the installation date, shall comply with the introduction and parts D and E of the performance standards adopted by the Maritime Safety Committee by resolution MSC.[…], as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I.

7 For the purpose of the present regulation, the expression "installed on or after 1 January 2028" means a contractual delivery date for the pilot transfer arrangement or, in the absence of a contractual delivery date, the actual delivery date of the arrangement to the ship on or after 1 January 2028.

8 Pilot transfer arrangements provided for in paragraph 3 shall be approved by the Administration in accordance with part F of the performance standards adopted by the Maritime Safety Committee by resolution MSC.[…], as may be amended by

the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I.

9 Pilot transfer arrangements provided for in paragraph 3 on ships to which chapter I applies shall be inspected in accordance with regulations I/6 and I/7 or I/8. Pilot transfer arrangements on ships to which chapter I does not apply shall be inspected to the satisfaction of the Administration.

10 Mechanical pilot hoists shall not be used.

11 Adequate means of illumination, either fixed or portable, shall be capable of illuminating all pilot transfer arrangements overside and the position on deck where pilots and other personnel embark or disembark. Portable lights, when used, shall have brackets to permit their positioning.

12 Where a pilot or person suspects the pilot transfer arrangement provided is non-compliant, they should inform the master and refuse to use the arrangement until it is made compliant.

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* Refer to *Unified interpretation of the term "first survey" referred to in SOLAS regulations* (MSC.1/Circ.1290)."

APPENDIX

CERTIFICATES

Record of equipment for passenger ship safety (Form P)

2 In section 5 (Details of navigational systems and equipment), new items 16.1 to 16.3 are added as follows:

"16.1 Pilot ladder and manropes
16.2 Spare pilot ladder and manropes
16.3 Means of securing pilot ladder at intermediate length"

Record of equipment for cargo ship safety (Form E)

3 In section 3 (Details of navigational systems and equipment), new items 17.1 to 17.3 are added as follows:

"17.1 Pilot ladder and manropes
17.2 Spare pilot ladder and manropes
17.3 Means of securing pilot ladder at intermediate length"

Record of equipment for cargo ship safety (Form C)

4 In section 5 (Details of navigational systems and equipment), new items 17.1 to 17.3 are added as follows:

"17.1 Pilot ladder and manropes
17.2 Spare pilot ladder and manropes
17.3 Means of securing pilot ladder at intermediate length"

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ANNEX 16

DRAFT MSC RESOLUTION

PERFORMANCE STANDARDS FOR PILOT TRANSFER ARRANGEMENTS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21) on *Procedure for the adoption of, and amendments to, performance standards and technical specifications*, by which the Assembly resolved that the function of adopting performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee, on behalf of the Organization,

RECALLING FURTHER resolution A.1045(27) on *Pilot transfer arrangements*, which was amended by resolution A.1108(29),

NOTING resolution MSC.[…] by which it adopted amendments to regulation V/23 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention") to make the performance standards on pilot transfer arrangements mandatory under the Convention,

RECOGNIZING that the responsibility for safe practices for the transfer of pilots and other personnel rests with each person involved in the activity including the shipowner, operator, master and crew, pilotage provider, pilot and pilot boat crew, as well as the person being transferred,

HAVING CONSIDERED, at its 109th session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its eleventh session,

1 ADOPTS the *Performance standards for pilot transfer arrangements*, set out in the annex to the present resolution;

2 INVITES Contracting Governments to the Convention to note that the *Performance standards for pilot transfer arrangements* will take effect on [1 January 2028] upon entry into force of the amendments to regulation V/23 of the Convention adopted by resolution MSC.[…];

3 NOTES that, under the provisions of regulation V/23.3 of the Convention, the *Performance standards for pilot transfer arrangements* shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of the Convention concerning the amendment procedure applicable to the annex to the Convention other than chapter I;

4 REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the *Performance standards for pilot transfer arrangements* contained in the annex to all Contracting Governments to the Convention;

5 ALSO REQUESTS the Secretary-General to transmit copies of this resolution and the annex to all Members of the Organization which are not Contracting Governments to the Convention;

6 INVITES Governments to encourage the development of novel technologies aimed at improving the safety of pilot transfer arrangements and to keep the Organization advised of any positive results;

7 URGES all parties concerned to observe both the spirit and intent of these performance standards, to ensure safety is not compromised;

8 DETERMINES that the performance standards contained in the annex to the present resolution supersede the *Recommendations on pilot transfer arrangements* contained in the annex to resolution A.1045(27), as amended by resolution A.1108(29), as from […];

9 INVITES the Assembly to endorse the action taken by the Maritime Safety Committee and to revoke resolutions A.1045(27) and A.1108(29) as of […].

ANNEX

PERFORMANCE STANDARDS FOR PILOT TRANSFER ARRANGEMENTS

INTRODUCTION

1 Purpose

These performance standards provide for requirements for the design, manufacture, construction, rigging, installation of pilot ladder winch reels, operational readiness, onboard inspection and maintenance, familiarization and approval in relation to pilot transfer arrangements required under regulation V/23 of the 1974 SOLAS Convention, adopted by resolution MSC.[…].

2 Definitions

For the purpose of these performance standards, the following definitions apply:

.1 *Pilot transfer arrangements* refer to all equipment and arrangements used solely for the embarkation and disembarkation of pilots and other personnel, including pilot ladders, accommodation ladders, embarkation platforms, manropes, pilot ladder winch reels, securing arrangements and other associated equipment.

.2 *Point of access* means the location at which pilots or other personnel transfer between a pilot ladder or accommodation ladder and the deck or side opening of a ship.

.3 *Manropes* means ropes hung on either side of a pilot ladder for assistance in ascending and descending.

.4 *Trapdoor* means an aperture with a cover located in a platform allowing the pilot ladder, manropes to pass through without obstruction or distortion and used by pilots or other personnel to transfer between the pilot ladder and the accommodation ladder.

.5 *Securing a pilot ladder at intermediate length* means securing a pilot ladder at a point other than the thimble ends.

3 General

3.1 Pilot transfer arrangements shall be designed, installed, inspected, maintained and rigged to enable pilots and other personnel to embark and disembark safely in all seagoing conditions of draught and trim.

3.2 The height of climb on a pilot ladder shall not be less than 1.5 m and not more than 9 m from the surface of the water to the point of access in all seagoing conditions of draught and trim. Whenever the height of climb on a pilot ladder from the surface of the water to the point of access exceeds 9 m, the ship shall be provided with and rig an accommodation ladder in conjunction with the pilot ladder (i.e. a combination arrangement).

3.3 Where the height of climb is less than 1.5 m from the surface of the water and a pilot ladder is not used as part of a pilot transfer arrangement, this does not relieve any vessel or anyone involved with the transfer of having to ensure that the transfer is completed safely, is adequately risk assessed and that any equipment, other than a pilot ladder, which may be used shall be done so in accordance with these performance standards.

3.4 Pilot transfer arrangements shall be provided to enable pilots and other personnel to embark and disembark safely on either side of the ship. Necessary equipment shall be carried on each side unless the equipment is capable of being transferred for use on either side.

3.5 All pilot ladders and manropes used for the transfer of pilots and other personnel shall be clearly identified with permanent marking so as to enable identification of each appliance for the purposes of survey, inspection and record-keeping.

3.6 Reference in these performance standards to an accommodation ladder[1] includes a sloping ladder used as part of the pilot transfer arrangements.

3.7 The onboard inspection and rigging of the pilot transfer arrangements and the embarkation and disembarkation of pilots and other personnel shall be supervised by a designated responsible officer. During the transfer of pilots or other personnel, the responsible officer shall have means of communication with the navigation bridge and shall arrange for the escort of the pilot by a safe route to and from the navigation bridge and other personnel to an appropriate safe location.

PART A – DESIGN, MANUFACTURE AND CONSTRUCTION

4 Pilot ladders

4.1 The steps of the pilot ladders shall comply with the following requirements:

.1 if made of hardwood, they shall be made in one piece, free of any knots. Wood shall not be treated or coated with paint, varnish or other coatings;

.2 if made of material other than hardwood, they shall be made from resilient plastic or rubber of equivalent strength, stiffness and durability;

.3 the four lowest steps shall be of rubber of sufficient strength and stiffness or other equivalent material;

.4 they shall have an efficient non-slip surface;

.5 they shall be long enough to accommodate a distance between the inner surface of the side ropes of not less than 400 mm, and shall be 115 mm in width and 25 mm in depth, excluding any non-slip device or grooving;

.6 they shall be equally spaced not less than 310 mm and not more than 350 mm apart measured from the top of each step or spreader step; and

.7 they shall be secured in such a manner that each will remain horizontal.

4.2 Pilot ladders with more than five steps shall have spreader steps complying with paragraph 4.1 and each spreader step shall be not less than 1.8 m in length. The lowest spreader step shall be the fifth step from the bottom of the ladder and additional spreader steps shall be provided at such intervals as will prevent the pilot ladder from twisting conforming to standards accepted by the Organization.[2]

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1 Refer to SOLAS regulation II-1/3-9 on Means of embarkation on and disembarkation from ships.

2 Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 799-1:2019 *Ships and marine technology – Pilot ladders – Design and specification*.

4.3 Permanent measuring marking shall be provided at a regular interval of every three steps (approximately every 1 m) throughout the length of the pilot ladder consistent with ladder design, use and maintenance in order to facilitate the rigging of the ladder to the required height.

4.4 Pilot ladders shall be permanently marked by the manufacturer with at least the following information on the underside of the uppermost step and the lowermost spreader step:

.1 the name of the manufacturer;

.2 an equipment serial number or other means of unique identification which the manufacturer shall be able to validate;

.3 date of manufacture; and

.4 name and details of the approving authority.

4.5 Pilot ladders shall be of a single length capable of reaching the surface of the water from the point of access or, where a combination arrangement is used, from the platform of the combination arrangement, in all seagoing conditions of draught and trim and the specific condition of an adverse list of 15° in the lightest seagoing condition.

4.6 The side ropes on each side of the pilot ladder should consist of a double length of uncovered rope not less than 20 mm and not more than 22 mm in diameter. The double length shall be made from a continuous length of rope with no joints having a breaking strength of at least 24 kN. The midpoint of the double length shall be located on a thimble. The ends of each side rope shall be properly finished.[3]

4.7 Each side rope shall be mildew-resistant manila rope[4] or other material of equivalent strength, durability, elongation characteristics and grip which has been protected against actinic degradation.

4.8 Each side ropes shall be secured together both above and below each step with an arrangement properly designed for this purpose. Where a seizing method[5] with step fixtures (chocks or wedges) is used, it shall hold each step horizontal in all planes at all times. Where a mechanical clamping device is used to secure each side rope together, it shall grip each side rope in the pair independently and with the same grip force. Any surface of a mechanical clamping device that pilots or other personnel may handle shall be suitable to be grasped by bare hands. The use of cable ties, u-clamps, worm driven clips as a means of securing steps within with side ropes is prohibited.

3 Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 799-1:2019 *Ships and marine technology – Pilot ladders – Part 1: Design and specification*.

4 Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 1181:2004.

5 Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 799-1:2019 *Ships and marine technology – Pilot ladders – Part 1: Design and specification*.

5 Combination arrangements

5.1 The length of the accommodation ladder shall be sufficient to ensure that its angle of slope does not exceed 45°. In ships with large draught ranges, several pilot ladder hanging positions shall be provided, resulting in lesser angles of slope. The accommodation ladder shall be at least 600 mm in width. The accommodation ladder hoisting and lowering mechanism includes protection that ensures the mechanism cannot be inadvertently operated during the transfer of pilots and other personnel.

5.2 Intermediate platforms, if fitted, shall be self-levelling. Treads and steps of the accommodation ladder shall be so designed that an adequate and safe anti-skid foothold is given at the operative angles.

5.3 The accommodation ladder and platform shall be equipped on both sides with stanchions and rigid handrails, but if hand ropes are used, they shall be tight and properly secured. The vertical space between the handrail or hand rope and the stringers of the ladder shall be securely fenced.

5.4 Accommodation ladders, together with any suspension arrangements or attachments fitted and intended for use in accordance with these performance standards, shall meet the requirements for the means of embarkation on and disembarkation from ships as required by regulation II-1/3-9.

5.5 In the case of a combination arrangement using an accommodation ladder with a trapdoor in the lower platform, the lower platform shall:

- .1 have an aperture with dimensions not less than 750 mm x 750 mm which is open to the ship's hull on the inboard side and which is designed to ensure that the horizontal distance between the pilot ladder and adjacent edges of the aperture is between 0.1 and 0.2 m;

- .2 be designed and constructed to:

  - .1 allow the pilot ladder and manropes to pass through the aperture without obstruction or distortion;

  - .2 ensure the pilot ladder lies flat against the ship's side;

  - .3 ensure that structural members shall not interfere with or lay against the pilot ladders; and

  - .4 ensure the highest step of the pilot ladder is at least 2 m above the lower platform and remain compliant with part B;

- .3 not be provided with fixtures other than the frame referred to in paragraph 5.5.7, which allows a pilot ladder to be suspended from the lower platform of the accommodation ladder;

- .4 have a trapdoor which opens upwards and which is secured flat on the embarkation platform or against a stanchion either at the aft end or outboard side of the platform, and in any case not obstructing the access the ship;

- .5 be provided with sufficient round handholds with a diameter of no less than 28 mm and not more than 32 mm to allow safe mounting or dismounting of the pilot ladder. The structure of the platform itself shall not be relied upon to provide handholds;

.6 be provided with sufficient handholds with a height of not less than 1.2 m above the platform;

.7 where a structural frame is used to comply with paragraph 5.5.2, the following shall apply:

.1 the accommodation ladder platform, frame, pilot ladder connection points, accommodation ladder winch, running gear, pad eyes of manropes and locking arrangements shall be designed to withstand vertical forces of at least 48 kN;

.2 the highest step of the pilot ladder is at least 2 m above the platform and is secured to pad eyes on the inboard side of the frame so that it rests firmly against the side of the ship; and

.3 manropes are secured directly to additional pad eyes 2 m above the platform on the inboard side of the frame.

5.6 On all ships to which section 5 applies, a two-tone visual mark, the upper half being white and the lower half being red, not less than 4 m in height and 0.5 m in width shall be provided in the midship half-length of the ship in the vicinity of the pilot boarding position to indicate to the user whether or not a combination arrangement should be rigged. The dividing line between the upper and the lower halves of the pilot line shall be 9 m below the point access.

6 Securing arrangements

6.1 All strong points, shackles and securing ropes provided or used in accordance with part A or part B shall have a breaking strength of not less than 48 kN. Securing ropes, if used to aid in rigging the pilot ladder, shall be at least 3 m in length. The securing arrangements shall be positioned not less than 915 mm, or, if not possible, the maximum permitted by the width of the deck, from the edge of the deck, except for the case of a combination arrangement using an accommodation ladder. Strong points and shackles shall have breaking strength or equivalent safe working load limits clearly and permanently marked. Documentation of the conformance of the strong points, shackles and securing ropes shall be maintained on board and available for inspection purposes.

6.2 Permanent or removable means of bowsing a pilot ladder or embarkation platform to the ship's hull shall not be used to support the weight of the boarding arrangement or pilot and shall not be used for any other purpose than to secure the arrangement against the ship's side. Removable means of bowsing a pilot ladder or embarkation platform to the ship's side shall be able to be applied and removed by a single person and shall have a holding force of not less than 4 kN when used for the purpose of securing the lower platform of an accommodation ladder or 3 kN when used for securing the pilot ladder or manropes.[6]

6.3 There shall be a means of securing a pilot ladder at intermediate lengths which shall be capable of securing the pilot ladder to strong points described in paragraph 6.1 by gripping each set of side ropes of the pilot ladder. The means of securing, shall have a breaking strength of not less than 48 kN and be designed to prevent any slippage of the side ropes under the conditions of the ladder and step attachment strength test and unrolling tests described in a

[6] Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 799-3:2022 *Ships and marine technology – Pilot ladders, part 3: Attachment and associated equipment*.

standard acceptable to the Organization.[7] When type approving means of securing a pilot ladder at intermediate lengths in accordance with Part F, these tests shall be modified to reflect the attachment of the pilot ladder using a means of securing the pilot ladder other than using its own attachments.

7 Ship's side openings, doors and platforms

7.1 Ship's side doors used for the transfer of pilots or other personnel shall not open outwards unless located below the freeboard deck.[8] The side opening shall enable a safe, convenient and unobstructed passage large enough for the transfer of pilots and other personnel, with a minimum clearance of 2,200 mm in height and 915 mm in width.

7.2 Ship's side openings without a boarding platform shall be provided with strong points which are on the lowest deck of the opening and inboard of the ship's side opening. Strong points shall also be provided on the deck head and inboard of the ship side opening if it is intended to rig manropes in the manner provided for in paragraph 15.1.3.

7.3 Boarding platforms deployed from ship's side openings and outboard of the ship in any event shall not be provided where the distance from the platform to the surface of the water in all seagoing conditions of draught and trim associated with the normal operation of the ship is less than 5 m. Platforms shall be mechanically attached to the ship and be marked with safe working load limits. Certification of successful testing shall be maintained on board and available for inspection.

7.4 The boarding platform shall extend outboard from the ship's side for a minimum distance of 750 mm, with a longitudinal length of a minimum of 750 mm. The platform shall be securely guarded by handrails.

8 Access to ship's deck

Means shall be provided to ensure safe, convenient and unobstructed passage for any person embarking on, or disembarking from, the ship between the head of the pilot ladder, or of any accommodation ladder, and the ship's deck; such access shall be gained directly by a clean and unobstructed platform securely guarded by handrails. Where such passage is by means of:

.1 a gateway in the rails or bulwark, adequate handholds with a diameter of not less than 32 mm and not more than 36 mm shall be provided at the point of embarking on or disembarking from the ship on each side which shall be not less than 0.7 m and not more than 0.8 m apart in clear width. Each handhold shall be rigidly secured and locked to the ship's structure at or near its base and also at a higher point, and shall extend not less than 1.2 m above the deck to which it is fitted. Stanchions or handrails of the gateway shall not be attached to the bulwark ladder to prevent the bulwark ladder from overturning and shall be positioned no greater than 0.12 m inboard of the edge of the deck. A ring or eye with an inner diameter not less than 60 mm at a height of the stanchion above the deck shall be provided to accommodate manropes;

.2 a bulwark ladder, it shall be securely attached to the ship to prevent overturning. Two separate handhold stanchions with a diameter of not less than 32 mm and not more than 36 mm shall be fitted at the point of embarking

[7] Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 799-1:2019 *Ships and marine technology – Pilot ladders – part 1: Design and specification*.

[8] Refer to regulation 21 of annex I of the International Convention on Load Lines.

on or disembarking from the ship on each side which shall be not less than 0.7 m and not more than 0.8 m apart in clear width. Each stanchion shall be rigidly secured and locked to the ship's structure at or near its base and also at a higher point and shall extend not less than 1.2 m above the top of the bulwarks. Stanchions or handrails of the gateway shall not be attached to the bulwark ladder to prevent the bulwark from overturning and shall be positioned no greater than 0.12 m inboard of the edge of the deck. A ring or eye with an inner diameter not less than 60 mm at a height of the stanchion above the deck shall be provided to accommodate manropes; and

.3 a shipside opening or door, adequate handholds with a diameter of not less than 32 mm and not more than 36 mm shall be provided at the point of embarking on or disembarking from the ship on each side which shall be not less than 0.7 m and not more than 0.8m apart in clear width. Each handhold shall be rigidly secured and locked to the ship's structure at its base in two places and be locked into place to prevent dislodgement and shall extend not less than 1.2 m above the entry threshold. Stanchions or handrails shall be positioned no greater than 0.12 m inboard of the edge of the deck. A ring or eye with an inner diameter not less than 60 mm at a height of the stanchion above the deck shall be provided to accommodate manropes.

9 Protection from chafing

Regardless of the arrangement used, equipment and arrangements shall be designed and installed so that it is not possible for a pilot ladder side rope or manrope to make contact with any part of the ship's hull or associated fixtures and fittings which could have the potential to cause sharp bends, chafing, abrasion, pinching or otherwise degrade their performance. Where contact is unavoidable, contact points shall be rounded to minimize chafing. The means of rounding could be a permanent fixture, such as a rounded pipe. Where it is not possible to round contact points owing to ship design, removable chafing pads or other temporary arrangements may be used. They shall be considered acceptable to the Administration, provided these arrangements do not prevent pre-use inspections, are removed after use and stowed in accordance with paragraph 23.

10 Safe approach of the pilot boat

Where rubbing bands or other constructional features prevent the safe approach of a pilot boat, these shall be cut back to provide at least 6 m of unobstructed ship's side. Specialized offshore ships less than 90 m or other similar ships less than 90 m for which a 6 m gap in the rubbing bands would not be practicable, as determined by the Administration, may be exempted. In this case, other appropriate measures shall be taken to ensure that pilots and other personnel are able to embark and disembark safely.

11 Associated equipment

Manropes shall be:

.1 not less than 28 mm and not more than 32 mm in diameter and shall be mildew-resistant manila rope,[9] or other material of equivalent strength, durability, elongation characteristics and grip;

[9] Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 1181:2004.

.2 of a single length free from splices and knots; and

.3 tagged or otherwise permanently marked by the manufacturer with at least the following information:

.1 the name of the manufacturer;

.2 an equipment serial number or other means of unique identification which the manufacturer shall be able to validate;

.3 date of manufacture; and

.4 name and details of the approving authority.

PART B – RIGGING

12 Pilot ladder

In all ships, when it is intended to embark and disembark pilots or other personnel by means of the pilot ladder, the pilot ladder shall be secured to the dedicated strong points meeting the requirements of paragraph 6.1 and positioned that:

.1 it is clear of any possible discharge from the ships and at all times hangs vertically, free and without obstruction;

.2 it is within the parallel body length of the ship and within the midship half-length of the ship;

.3 each step rests firmly against the ship's side and is horizontal in all planes throughout the entire vertical length of the ladder;

.4 when used in conjunction with ship's side openings, the ladder shall be secured in accordance with section 14;

.5 when a retrieval line is considered necessary to ensure the safe rigging of a pilot ladder, the line shall be secured to the forward end, at or above the lowest spreader step and shall lead forward. The retrieval line shall not hinder the pilot nor obstruct the safe approach of the pilot boat; and

.6 the lowest step of the pilot ladder, by using the means of paragraph 6.3, is at the height above the surface of the water requested by the pilot or personnel being transferred.

13 Combination arrangements

13.1 The combination arrangement shall be so positioned and secure that:

.1 the pilot ladder complies with the requirements in section 12;

.2 the accommodation ladder leads aft and is clear of any discharges;

.3 the lower platform of the accommodation ladder is secured to the ship's side by means of permanent fixtures or removable fixtures within the parallel body length of the ship and within the midship half-length;

.4 the lower platform shall be in a horizontal position when in use and shall be a minimum of 5 m above the surface of the water in all seagoing conditions of draught and trim;

.5 the pilot ladder and manropes are secured to the ship's side at a point of nominally 1.5 m above the lower platform of the accommodation ladder except as outlined in paragraph 5.5.7;

.6 the pilot ladder and manropes are not secured to the lower platform of the accommodation ladder at any time; and

.7 the pilot ladder shall be rigged immediately adjacent to the lower platform of the accommodation ladder and the highest step of the pilot ladder is at least 2 m above the lower platform. The horizontal distance between the pilot ladder and the lower platform shall be between 0.1 and 0.2 m.

13.2 In the case of a combination arrangement using an accommodation ladder with a trapdoor in the lower platform, the lower platform shall be positioned and rigged in accordance with the requirements of paragraphs 5.5 and 13.1.

14 Ship's side openings

14.1 Pilot ladders rigged from ship's side openings without a boarding platform shall not extend above the lowest deck of the opening and shall not be rigged from any other position, including the freeboard deck.

14.2 Pilot ladders used in conjunction with ship's side openings with a boarding platform complying with paragraph 7.3 shall be rigged aft of such platforms and may be rigged from the freeboard deck provided that the ladder and manropes are secured above the platform in accordance with paragraphs 13.1.5 and 13.1.7.

15 Associated equipment

15.1 The following associated equipment shall be available and ready for immediate use at the point of access whilst the pilot or other personnel are being transferred:

.1 two manropes complying with the requirements stipulated within section 11 which shall:

  .1 be free from contamination and knots; however, knots used to tie or secure manropes to strong points are acceptable;

  .2 when required by pilots or other personnel embarking or disembarking, be rigged and secured in accordance with relevant requirements of these performance standards; and

  .3 when rigged, be fixed at the rope end to dedicated strong points on the deck and pass through the ring or eye fitted at the top of the stanchions at the point of access to the deck. When rigged from a ship side opening, manropes may be rigged from the deck head, provided that the manropes pass through the ring or the eye at the top of the stanchions at the point of access.

.2 a lifebuoy equipped with a self-igniting light; and

.3 a heaving line free from contamination and having a length which can reach the waterline in any seagoing condition of draught or trim.

15.2 When required by section 8 of these performance standards, stanchions and bulwark ladders shall be provided.

PART C – INSTALLATION OF PILOT LADDER WINCH REELS

16 Stowage of pilot ladders on winch reels

If a pilot ladder is to be stowed on a winch drum, the drum diameter shall be not less than 0.16 m and the drum shall be provided with sunken securing points.

17 Point of access

17.1 When a pilot ladder winch reel is provided it shall be situated at a position which will ensure pilots and other personnel embarking on, or disembarking from, the ship between the pilot ladder and the point of access to the ship, have safe, convenient and unobstructed access to or egress from the ship.

17.2 The point of access position and adjacent area shall be clear of obstructions, including the pilot ladder winch reel, for distances as follows:

.1 a distance of 915 mm in width measured longitudinally;

.2 a distance of 915 mm in depth, measured from the ship's side plating inwards; and

.3 a distance of 2,200 mm in height, measured vertically from the access deck.

18 Physical positioning of pilot ladder winch reels

18.1 Pilot ladder winch reels which are fitted on a ship's upper deck for the purpose of providing a pilot ladder which services a ship's side opening below the upper deck or, alternatively, an accommodation ladder when a combination arrangement is provided shall:

.1 be situated at a location on the upper deck from which the pilot ladder is able to be suspended vertically, in a straight line, to a point adjacent to the ship's side opening access point or the lower platform of the accommodation ladder;

.2 be situated at a location which provides a safe, convenient and unobstructed passage for any pilot or personnel embarking on, or disembarking from, the ship between the pilot ladder and the place of access on the ship; and

.3 enable compliance with the relevant requirements of part A and part B.

18.2 Pilot ladder winch reels fitted inside a ship's side opening shall:

.1 be situated at a position which provides a safe, convenient and unobstructed passage for any pilot or personnel embarking on, or disembarking from, the ship between the pilot ladder and the place of access on the ship;

.2 be situated at a position which provides an unobstructed clear area with a minimum length of 915 mm and minimum width of 915 mm and minimum vertical height of 2,200 mm; and

.3 if situated at a position which necessitates a section of the pilot ladder to be partially secured in a horizontal position on the deck so as to provide a clear access as described above, then allowance shall be made so that this section of the pilot ladder may be covered with a rigid platform for a minimum distance of 915 mm measured horizontally from the ship's side inwards.

19 Handrails and handgrips

Handrails and handgrips shall be provided in accordance with section 8 to assist the pilot and other personnel to safely transfer between the pilot ladder and the ship, except as noted in paragraph 7.4 for arrangements with platforms extending outboard. The horizontal distance between the handrails and/or the handgrips shall be not less than 0.7 m or more than 0.8 m apart.

20 Securing of the pilot ladder

Where the pilot ladder is stowed on a pilot ladder winch reel which is located either within the ship's side opening or on the upper deck:

.1 the pilot ladder winch reel shall not be relied upon to support the pilot ladder when the pilot ladder is in use;

.2 the pilot ladder shall be secured to strong points, independent of the pilot ladder winch reel; and

.3 the pilot ladder shall be secured at deck level inside the ship's side opening or, when located on the ship's upper deck, at a distance of not less than 915 mm measured horizontally from the ship's side inwards.

21 Mechanical securing of pilot ladder winch reel

21.1 All pilot ladder winch reels shall have means of preventing the winch reel from being accidentally operated as a result of mechanical failure or human error.

21.2 Pilot ladder winch reels may be manually operated or, alternatively, powered by either electrical, hydraulic or pneumatic means.

21.3 Manually operated pilot ladder winch reels shall be provided with a brake or other suitable arrangements to control the lowering of the pilot ladder and to lock the winch reel in position once the pilot ladder is lowered into position.

21.4 Electrical, hydraulic or pneumatically driven pilot ladder winch reels shall be fitted with safety devices which are capable of cutting off the power supply to the winch reel and thus locking the winch reel in position.

21.5 Powered winch reels shall have clearly marked control levers or handles which may be locked in a neutral position.

21.6 A mechanical device or locking pin shall also be utilized to lock powered winch reels.

PART D – OPERATIONAL READINESS, ONBOARD INSPECTION AND MAINTENANCE

22 Periodic maintenance and inspections shall be carried out to ensure the pilot transfer arrangements are in good condition, free from contamination and ready for use. Regardless of date of installation, maintenance and inspection of accommodation ladders used in the combination arrangement shall be carried out in accordance with SOLAS regulation II-1/3-9.3.

23 Pilot ladders, manropes and all associated equipment, when not in use, shall be stowed to prevent degradation caused by moisture, icing and sunlight, chemicals and greases and similar contaminants, and in accordance with the manufacturer's instructions.

24 There shall be instructions supplied for care, maintenance, inspection and stowage with each pilot ladders, manropes and all associated equipment. These instructions shall include:

.1 pre-and post-use inspection instructions;

.2 detailed periodic inspection procedures, including those for side ropes;

.3 instructions for inspecting and repairing rope seizings or securing devices, along with a list of permitted onboard repairs;

.4 care and stowage instructions, including warnings about chemical exposure, sunlight impact and other potential causes of ladder degradation;

.5 factors affecting pilot ladder life, including stowage arrangements;

.6 acceptable method(s) of securing ladder to strong points;

.7 pictorial examples and detailed written description of damage or conditions warranting withdrawing the ladder from service; and

.8 care and maintenance specifics for natural fibre rope ladders.

25 Pilot transfer arrangements shall be subject to:

.1 inspection before and after each use by a responsible officer on board; and

.2 a detailed inspection every three months by a responsible officer on board.

26 In order to determine the suitability for ongoing use of the pilot transfer arrangements, inspections shall include the following:

.1 the pilot ladder including spares;

.2 the accommodation ladder used in a combination arrangement;

.3 winch reels;

.4 securing arrangements;

.5 conditions of point of access;

.6 relevant equipment, in particular stanchions and stanchions sockets welded on deck; and

.7 stowage arrangements.

27 A maintenance plan shall be developed and shall be available for inspection. The maintenance plan shall be easily understood, illustrated as appropriate wherever possible, and shall include the following:

.1 a checklist for use when carrying out the inspections required by paragraph 25;

.2 maintenance, repair and stowage instructions, in accordance with manufacturer's instructions;

.3 schedule of periodic inspection and maintenance;

.4 list of sources of spare parts or replacements;

.5 log for records of inspections and maintenance; and

.6 record of when the pilot ladder or manropes were brought into service and their anticipated date of withdrawal from service in accordance with paragraph 30 of these performance standards.

28 Repair or replacement of pilot ladder steps or spreader steps shall be prohibited.

29 At least one spare compliant pilot ladder and one spare set of compliant manropes shall be carried on board the ship.

30 Pilot ladders and manropes, including their spares, shall be removed from service, either at any time not complying with these performance standards, or within 36 months after the date of manufacture or within 30 months after the date of being placed into service, whichever comes first, and shall not be used for the embarkation and disembarkation of pilots or other personnel.

PART E – FAMILIARIZATION

31 Onboard personnel involved in the inspection, maintenance, rigging or operation of any equipment for pilot transfer arrangements shall receive familiarization to perform their assigned duties. This shall form part of the onboard familiarization of the crew.

32 On ships to which SOLAS chapter IX applies, the company, as defined in SOLAS regulation IX/1.2, ensures that onboard personnel involved in the operation of inspection, maintenance, rigging or operation of any equipment for pilot transfer arrangements are familiarized with the onboard pilot transfer arrangements for safe operation in accordance with STCW regulation I/14.

33 On ships to which SOLAS chapter IX does not apply, familiarization on board shall include, but not be limited to:

.1 operation and use of the equipment and arrangements for the transfer of pilots and other personnel provided on board the ship;

.2 the characteristics of pilot transfer arrangements which shall not be used for the transfer of pilots or other personnel;

.3 carrying out inspections and maintenance of the pilot transfer arrangements, including spare ladders on board;

.4 replacement procedures of pilot ladders and manropes; and

.5 when applicable, measures and additional equipment or operational considerations to be made to ensure the integrity of the pilot ladder in special conditions, i.e. freezing or windy condition or rough weather especially when there is moderate swell.

PART F – APPROVAL

34 Pilot transfer arrangements installed in accordance with SOLAS regulation V/23.3 shall be approved by the Administration as complying with these performance standards before being put into service for the first time and after repair, alteration or modification to the arrangements provided for in paragraphs 5 to 8 and paragraph 10 of part A, or part C, of these performance standards.

35 Pilot transfer arrangements installed in accordance with SOLAS regulations V/23.4 and .5 shall be approved by the Administration as complying with these performance standards after alteration or modification, if any, or repair, to the arrangements provided for in paragraphs 5 to 8 and paragraph 10 of part A, or part C, of these performance standards.

36 A pilot ladder, including the means of securing the pilot ladder at intermediate lengths, and manropes provided to meet the requirements of these performance standards shall be type-approved by the Administration as complying with these performance standards.

37 A manufacturer quality control system shall be required and shall be audited by a competent authority to ensure continuous compliance with the type approval conditions. Alternatively, the Administration may use final product verification procedures where compliance with the type approval certificate is verified by a competent authority before the product is installed on board ships.

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ANNEX 17

DRAFT AMENDMENTS TO 1994 HSC CODE

ANNEX 1

FORM OF SAFETY CERTIFICATE FOR HIGH-SPEED CRAFT

Record of Equipment for High-Speed Craft Safety Certificate

5 Details of navigational systems and equipment

In the table "Details of navigational systems and equipment", new entries 16.1 to 16.3 are added under entry 15, as follows:

"

16.1	Pilot ladder and manropes	………………..
16.2	Spare pilot ladder and manropes	………………..
16.3	Means of securing pilot ladder at intermediate length	………………..

"

***

ANNEX 18

DRAFT AMENDMENTS TO 2000 HSC CODE

ANNEX 1

FORM OF HIGH-SPEED CRAFT SAFETY CERTIFICATE AND RECORD OF EQUIPMENT

Record of Equipment for High-Speed Craft Safety Certificate

3 Details of navigational systems and equipment

In the table "Details of navigational systems and equipment", new entries 18.1 to 18.3 are added under entry 17, as follows:

"

18.1	Pilot ladder and manropes	………………..
18.2	Spare pilot ladder and manropes	………………..
18.3	Means of securing pilot ladder at intermediate length	………………..

"

***

ANNEX 19

DRAFT AMENDMENTS TO 2008 SPS CODE

ANNEX

FORM OF SAFETY CERTIFICATE FOR SPECIAL PURPOSE SHIPS

APPENDIX

Record of Equipment for the Special Purpose Ship Safety Certificate (Form SPS)

In section 5 (Details of navigational systems and equipment), new items 14.1 to 14.3 are added as follows:

"14.1 Pilot ladder and manropes
14.2 Spare pilot ladder and manropes
14.3 Means of securing pilot ladder at intermediate length".

***

ANNEX 20

DRAFT AMENDMENTS TO THE CODE OF SAFETY FOR FISHERMEN AND FISHING VESSELS, 2005

PART B

SAFETY AND HEALTH REQUIREMENTS FOR THE CONSTRUCTION AND EQUIPMENT OF FISHING VESSELS

Chapter 6
Protection of the crew

1 Paragraph 6.5.2 is amended as follows:

"6.5.2 If an accommodation ladder or gangway is not practicable, a substantial straight ladder, of adequate length and extending at least 900 mm above the upper landing surface, should be provided. Where conditions are such that a ladder cannot be used, a pilot ladder meeting the provisions of ~~annex VI to this part of the Code~~ SOLAS regulation V/23 should be provided."

Chapter 10
Shipborne navigational equipment and arrangements

2 Paragraph 10.5.3 is amended as follows:

"10.5.3 Such transfer arrangements should comply with the provisions of ~~annex VI in this part of the Code~~ SOLAS regulation V/23."

ANNEX VI

Recommended standards for pilot ladders

3 The title and provisions in sections 1 to 8 of annex VI are deleted and the text "intentionally left blank" inserted.

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ANNEX 21

DRAFT MSC CIRCULAR

REQUIRED PILOT TRANSFER ARRANGEMENTS FOR PILOTS AND OTHER PERSONNEL

1 The Maritime Safety Committee, at its [110th session ([…])], adopted amendments to SOLAS regulation V/23 on Pilot transfer arrangements (resolution MSC.[…(110)]) and the *Performance standards for pilot transfer arrangements* (resolution MSC.[…(110)]), developed by the eleventh session of the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) (4 to 13 June 2024).

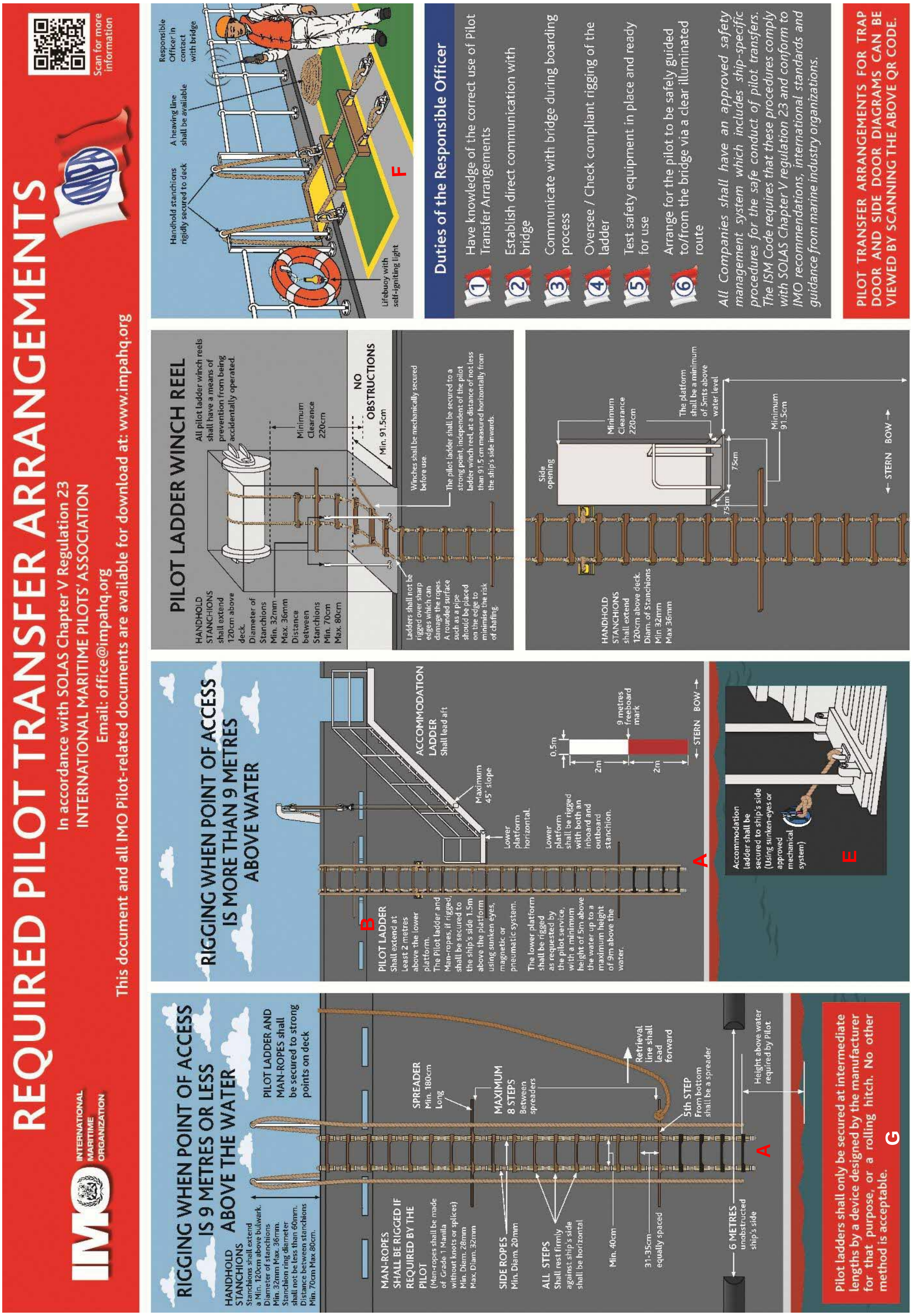
2 The aforementioned amendments are expected to enter into force on [1 January 2028].

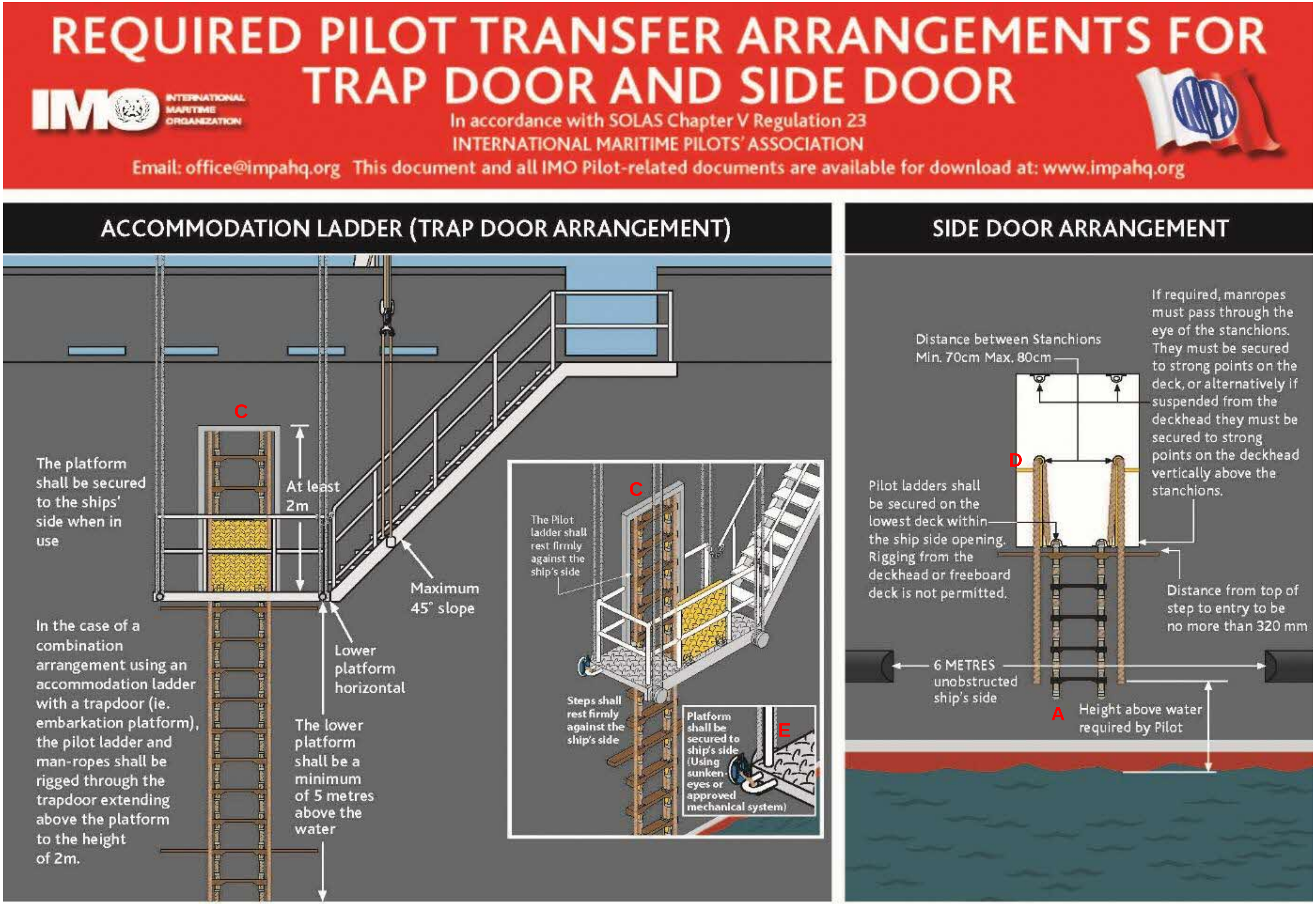
3 The Committee concurred with the recommendation of NCSR 11 regarding the revised required transfer arrangements for pilots and approved a revision to MSC.1/Circ.1428, and the poster previously circulated thereby, as set out in the annex. The illustrations are also available for download from www.impahq.org.

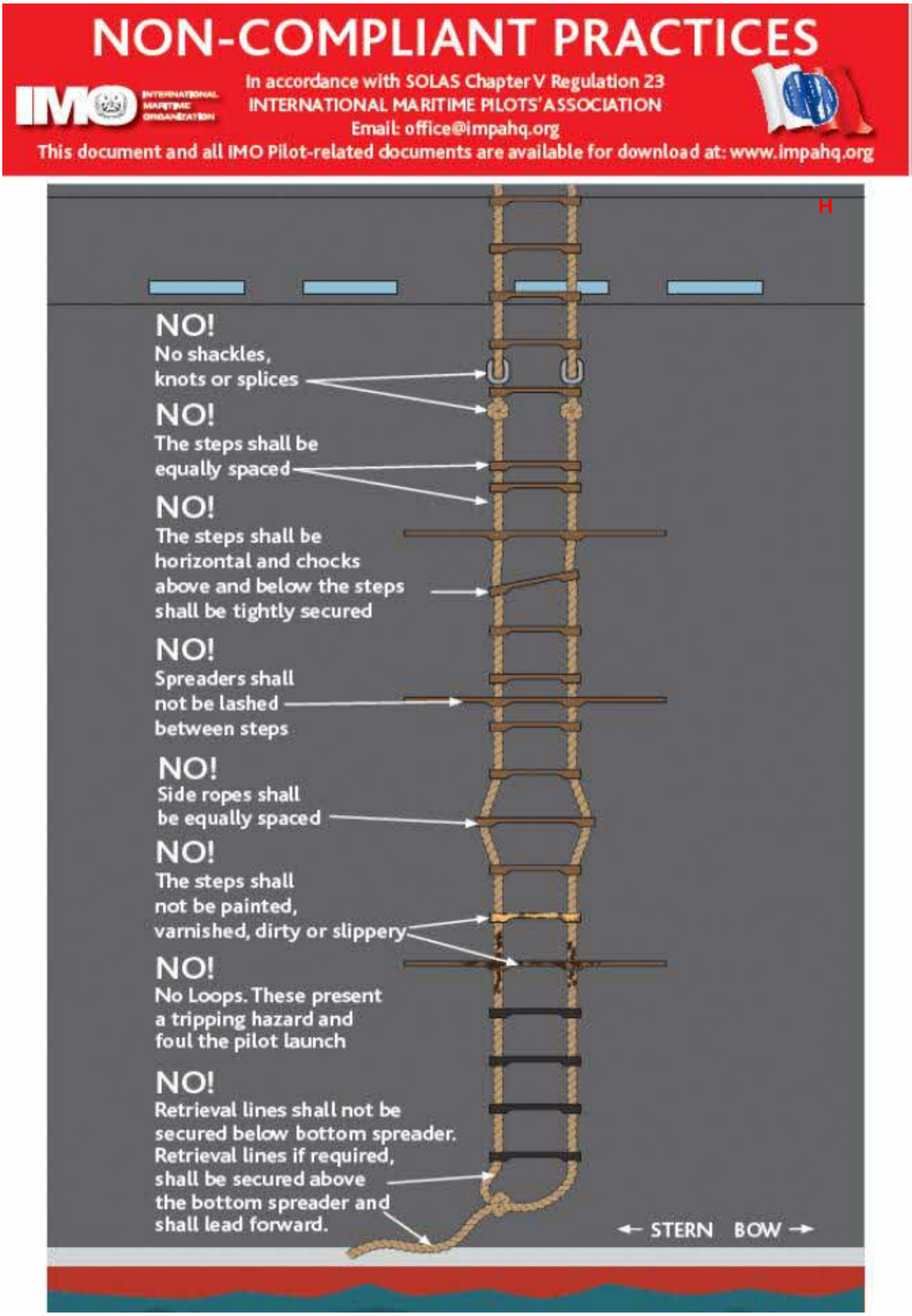
4 Member States are invited to bring the revised illustrations to the attention of their pilots, seafarers, shipowners, ship operators and others concerned with pilot boarding arrangements.

5 This circular supersedes MSC.1/Circ.1428 as of […], subject to the entry into force of the aforementioned amendments.

ANNEX


REQUIRED PILOT TRANSFER ARRANGEMENTS
In accordance with SOLAS Chapter V Regulation 23
INTERNATIONAL MARITIME PILOTS' ASSOCIATION
Email: office@impahq.org
This document and all IMO Pilot-related documents are available for download at: www.impahq.org
IMO INTERNATIONAL MARITIME ORGANIZATION
Scan for more information
RIGGING WHEN POINT OF ACCESS IS 9 METRES OR LESS ABOVE THE WATER
HANDHOLD STANCHIONS Stanchions shall extend a Min. 120cm above bulwark. Diameter of stanchions Min. 32mm Max. 36mm. Stanchion ring diameter shall not be less than 60mm. Distance between stanchions Min. 70cm Max 80cm.
PILOT LADDER AND MAN-ROPES shall be secured to strong points on deck
MAN-ROPES SHALL BE RIGGED IF REQUIRED BY THE PILOT (Man-ropes shall be made of Grade 1 Manila without knots or splices) Min. Diam. 28mm Max. Diam. 32mm
SPREADER Min. 180cm Long
SIDE ROPES Min. Diam. 20mm
MAXIMUM 8 STEPS Between spreaders
ALL STEPS Shall rest firmly against ship's side shall be horizontal
Min. 40cm
31-35cm equally spaced
Retrieval line shall lead forward
5th STEP From bottom shall be a spreader
6 METRES unobstructed ship's side
Height above water required by Pilot
A
Pilot ladders shall only be secured at intermediate lengths by a device designed by the manufacturer for that purpose, or a rolling hitch. No other method is acceptable.
G
RIGGING WHEN POINT OF ACCESS IS MORE THAN 9 METRES ABOVE WATER
B
PILOT LADDER Shall extend at Least 2 metres above the lower platform. The Pilot ladder and Man-ropes, if rigged, shall be secured to the ship's side 1.5m above the platform using sunken eyes, magnetic or pneumatic system.
The lower platform shall be rigged as requested by the pilot service, with a minimum height of 5m above the water up to a maximum height of 9m above the water.
ACCOMMODATION LADDER Shall lead aft
Maximum 45° slope
Lower platform horizontal.
Lower platform shall be rigged with both an inboard and outboard stanchion.
0.5m
2m
2m
9 metres freeboard mark
← STERN BOW →
A
Accommodation ladder shall be secured to ship's side (Using sunken-eyes or approved mechanical system)
E
PILOT LADDER WINCH REEL
HANDHOLD STANCHIONS shall extend 120cm above deck. Diameter of Stanchions Min. 32mm Max. 36mm Distance between Stanchions Min. 70cm Max. 80cm
All pilot ladder winch reels shall have a means of prevention from being accidentally operated.
Minimum Clearance 220cm
NO OBSTRUCTIONS
Min. 91.5cm
Ladders shall not be rigged over sharp edges which can damage the ropes. A rounded surface such as a pipe should be placed on the edge to minimise the risk of chafing.
Winches shall be mechanically secured before use.
The pilot ladder shall be secured to a strong point, independent of the pilot ladder winch reel, at a distance of not less than 91.5 cm measured horizontally from the ship's side inwards.
Side opening
HANDHOLD STANCHIONS shall extend 120cm above deck. Diam. of Stanchions Min 32mm Max 36mm
Minimum Clearance 220cm
The platform shall be a minimum of 5mts above water level
75cm
75cm
Minimum 91.5cm
← STERN BOW →
Handhold stanchions rigidly secured to deck
A heaving line shall be available
Responsible Officer in contact with bridge
Lifebuoy with self-igniting light
F
Duties of the Responsible Officer
1 Have knowledge of the correct use of Pilot Transfer Arrangements
2 Establish direct communication with bridge
3 Communicate with bridge during boarding process
4 Oversee / Check compliant rigging of the ladder
5 Test safety equipment in place and ready for use
6 Arrange for the pilot to be safely guided to/from the bridge via a clear illuminated route
All Companies shall have an approved safety management system which includes ship-specific procedures for the safe conduct of pilot transfers. The ISM Code requires that these procedures comply with SOLAS Chapter V regulation 23 and conform to IMO recommendations, international standards and guidance from marine industry organizations.
PILOT TRANSFER ARRANGEMENTS FOR TRAP DOOR AND SIDE DOOR DIAGRAMS CAN BE VIEWED BY SCANNING THE ABOVE QR CODE.


REQUIRED PILOT TRANSFER ARRANGEMENTS FOR
TRAP DOOR AND SIDE DOOR
INTERNATIONAL MARITIME ORGANIZATION
In accordance with SOLAS Chapter V Regulation 23
INTERNATIONAL MARITIME PILOTS' ASSOCIATION
Email: office@impahq.org This document and all IMO Pilot-related documents are available for download at: www.impahq.org
ACCOMMODATION LADDER (TRAP DOOR ARRANGEMENT)
C
The platform shall be secured to the ships' side when in use
At least 2m
Maximum 45° slope
Lower platform horizontal
In the case of a combination arrangement using an accommodation ladder with a trapdoor (ie. embarkation platform), the pilot ladder and man-ropes shall be rigged through the trapdoor extending above the platform to the height of 2m.
The lower platform shall be a minimum of 5 metres above the water
C
The Pilot ladder shall rest firmly against the ship's side
Steps shall rest firmly against the ship's side
Platform shall be secured to ship's side (Using sunken eyes or approved mechanical system)
E
SIDE DOOR ARRANGEMENT
Distance between Stanchions Min. 70cm Max. 80cm
If required, manropes must pass through the eye of the stanchions. They must be secured to strong points on the deck, or alternatively if suspended from the deckhead they must be secured to strong points on the deckhead vertically above the stanchions.
D
Pilot ladders shall be secured on the lowest deck within the ship side opening. Rigging from the deckhead or freeboard deck is not permitted.
Distance from top of step to entry to be no more than 320 mm
6 METRES unobstructed ship's side
A
Height above water required by Pilot


NON-COMPLIANT PRACTICES
In accordance with SOLAS Chapter V Regulation 23
INTERNATIONAL MARITIME PILOTS' ASSOCIATION
Email: office@impahq.org
This document and all IMO Pilot-related documents are available for download at: www.impahq.org
H
NO!
No shackles, knots or splices
NO!
The steps shall be equally spaced
NO!
The steps shall be horizontal and chocks above and below the steps shall be tightly secured
NO!
Spreaders shall not be lashed between steps
NO!
Side ropes shall be equally spaced
NO!
The steps shall not be painted, varnished, dirty or slippery
NO!
No Loops. These present a tripping hazard and foul the pilot launch
NO!
Retrieval lines shall not be secured below bottom spreader. Retrieval lines if required, shall be secured above the bottom spreader and shall lead forward.
← STERN BOW →

***

ANNEX 22

DRAFT MSC CIRCULAR

VOLUNTARY EARLY IMPLEMENTATION OF THE AMENDMENTS TO SOLAS REGULATION V/23 ON PILOT TRANSFER ARRANGEMENTS

1 The Maritime Safety Committee, at its [110th] session ([date]), adopted amendments to SOLAS regulation V/23 on Pilot transfer arrangements by resolution MSC.[…].

2 The entry-into-force date of the aforementioned amendments is [1 January 2028].

3 In adopting the amendments to SOLAS regulation V/23 on Pilot transfer arrangements, the Committee, having considered the need for their voluntary early implementation, in accordance with the *Guidelines on the voluntary early implementation of amendments to the 1974 SOLAS Convention and related mandatory instruments* (MSC.1/Circ.1565), agreed to encourage the Contracting Governments to the International Convention for the Safety of Life at Sea, 1974, to implement them prior to the entry-into-force date.

4 Voluntary early implementation should be communicated by a Contracting Government to the Organization for dissemination through GISIS (module on survey and certification).

5 In addition to the aforementioned communication, a Contracting Government may also consider the use of the existing provisions for equivalent arrangements under SOLAS regulation I/5 to cover the interim period between the date of the voluntary early implementation and the entry-into-force date of the amendments.

6 A Contracting Government, in line with paragraph 1.2.4 of the *Procedures for Port State Control, 2023* (resolution A.1185(33)), as may be amended, when acting as a port State, should refrain from enforcing its decision to voluntarily early implement the amendments to SOLAS regulation V/23 on Pilot transfer arrangements to ships entitled to fly the flag of other Contracting Governments, calling at its ports.

7 The Contracting Governments, when undertaking port State control activities, should take into account the present invitation and any subsequent notifications communicated by other Contracting Governments through GISIS.

8 Contracting Governments are invited to be guided accordingly and to bring the contents of this circular to the attention of all concerned, especially port State control authorities and recognized organizations.

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ANNEX 23

RESOLUTION MSC.570(109)
(adopted on 6 December 2024)

PERFORMANCE STANDARDS FOR A UNIVERSAL SHIPBORNE AUTOMATIC IDENTIFICATION SYSTEM (AIS)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

RECALLING FURTHER resolution MSC.74(69), annex 3, by which the Committee adopted the *Recommendation on performance standards for a universal automatic identification system (AIS)* to improve the safety of navigation,

TAKING INTO ACCOUNT resolution A.1192(33), by which the Assembly urged Member States and all relevant stakeholders to promote actions to prevent illegal operations in the maritime sector by the "dark fleet" or "shadow fleet",

RECOGNIZING the need for measures to prevent unauthorized entry or tampering of the ship's identity information in shipborne automatic identification systems (AIS),

HAVING CONSIDERED, at its 109th session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its eleventh session,

1 ADOPTS revised *Performance standards for a universal shipborne automatic identification system (AIS)*, set out in the annex to the present resolution;

2 RECOMMENDS that Governments ensure that AIS equipment conforms to performance standards not inferior to those specified in:

- .1 the present resolution if the equipment is installed on:
  - .1 new ships for which the building contract is placed on or after 1 January 2029, or in the absence of the contract, the keel of which is laid or which are at a similar stage of construction on or after 1 January 2029; or
  - .2 ships other than those ships prescribed in sub-paragraph .1 above, all installations of the specified type, having a contractual delivery date on or after 1 January 2029, or in the absence of a contractual delivery date to the ship, actually delivered to the ship on or after 1 January 2029; or
- .2 annex 3 to resolution MSC.74(69) if the equipment is installed on ships other than those prescribed in paragraph 2.1 above.

ANNEX

**PERFORMANCE STANDARDS FOR
A UNIVERSAL SHIPBORNE AUTOMATIC IDENTIFICATION SYSTEM (AIS)**

1 Scope

1.1 These performance standards specify the requirements for the universal AIS.

1.2 The AIS should improve the safety of navigation by assisting in the efficient navigation of ships, protection of the environment, and operation of vessel traffic services (VTS), by satisfying the following functional requirements:

.1 in a ship-to-ship mode for collision avoidance;

.2 as a means for littoral States to obtain information about a ship and its cargo; and

.3 as a VTS tool, i.e. ship-to-shore (traffic management).

1.3 The AIS should be capable of providing to ships and to competent authorities information from the ship, automatically and with the required accuracy and frequency, to facilitate accurate tracking. Transmission of the data should be with the minimum involvement of a ship's personnel and with a high level of availability.

1.4 The installation, in addition to meeting the requirements of the Radio Regulations, applicable ITU-R Recommendations and the general requirements as set out in resolution A.694(17), should comply with the following performance standards.

2 Functionality

The system should be capable of operating in a number of modes:

.1 an "autonomous and continuous" mode for operation in all areas. This mode should be capable of being switched to/from one of the following alternate modes by a competent authority;

.2 an "assigned" mode for operation in an area subject to a competent authority responsible for traffic monitoring such that the data transmission interval and/or time slots may be set remotely by that authority; and

.3 a "polling" or controlled mode where the data transfer occurs in response to interrogation from a ship or competent authority.

3 Capability

3.1 The AIS should comprise:

.1 a communication processor, capable of operating over a range of maritime frequencies, with an appropriate channel selecting and switching method, in support of both short- and long-range applications;

.2 a means of processing data from an electronic position-fixing system which provides a resolution of one ten-thousandth of a minute of arc and uses the WGS-84 datum;

.3 a means to automatically input data from other sensors meeting the provisions as specified in paragraph 6.2;

.4 a means to input and retrieve data manually;

.5 a means of error checking the transmitted and received data; and

.6 built-in test equipment (BITE).

3.2 The AIS should be capable of:

.1 providing information automatically and continuously to a competent authority and other ships, without involvement of ship's personnel;

.2 receiving and processing information from other sources, including that from a competent authority and from other ships;

.3 responding to high-priority and safety-related calls with a minimum delay; and

.4 providing positional and manoeuvring information at a data rate adequate to facilitate accurate tracking by a competent authority and other ships.

4 User interface

To enable a user to access, select and display the information on a separate system, the AIS should be provided with an interface conforming to an appropriate international marine interface standard.

5 Identification

For the purpose of ship and message identification, the ship's Maritime Mobile Service Identity (MMSI) should be used.

6 Information

6.1 The information provided by the AIS should include:

.1 Static:

- IMO number[1]
- Call sign and name
- Length and beam
- Type of ship
- Location of position-fixing antenna on the ship (aft of bow and port or starboard of centreline)

[1] In accordance with *IMO ship identification number scheme* adopted by the Organization (resolution A.1117(30)). If not required to have an IMO number, an official flag State number may be used (refer to Recommendation ITU-R M.1371 for the entry of an official flag State number).

.2 Dynamic:

- Ship's position with accuracy indication and integrity status
- Time in UTC [2]
- Course over ground
- Speed over ground
- Heading
- Navigational status (e.g. NUC, at anchor, etc. - manual input)
- Rate of turn (where available)
- Optional - Angle of heel (where available)[3]
- Optional - Pitch and roll (where available)[3]

.3 Voyage-related:

- Ship's draught
- Hazardous cargo (type)[4]
- Destination and ETA (at master's discretion)
- Optional - Route plan (waypoints)[3]

.4 Short safety-related messages

.5 Equipment Identification message[5]

6.2 Information update rates for autonomous mode

The different information types are valid for a different time period and thus need a different update rate:

- Static information:	Every 6 minutes and on request
- Dynamic information:	Dependant on speed and course alteration according to table 1
- Voyage-related information:	Every 6 minutes, when data has been amended and on request
- Safety-related message:	As required

2 Date to be established by receiving equipment.

3 Field not provided in basic message.

4 As required by a competent authority.

5 The AIS equipment should broadcast a unique manufacturer equipment identification number, which should also be physically marked on the equipment.

TABLE 1

Type of ship	Reporting interval
Ship at anchor	3 minutes
Ship 0-14 knots	12 seconds
Ship 0-14 knots and changing course	4 seconds
Ship 14-23 knots	6 seconds
Ship 14-23 knots and changing course	2 seconds
Ship > 23 knots	3 seconds
Ship > 23 knots and changing course	2 seconds

Ship Reporting Capacity – the system should be able to handle a minimum of 2,000 reports per minute to adequately provide for all operational scenarios envisioned.

6.3 Security

A security mechanism should be provided to detect disabling and to prevent unauthorized alteration of input or transmitted data. To protect against unauthorized dissemination of data, the IMO guidelines (Guidelines and Criteria for Ship Reporting Systems[6]) should be followed. A change to the IMO ship identification number in the equipment should only be possible by an authorized manufacturer's agent.

7 Permissible initialization period

The installation should be operational within 2 minutes of switching on.

8 Power supply

The AIS and associated sensors should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the AIS and associated sensors from an alternative source of electrical energy.

9 Technical characteristics

The technical characteristics of the AIS such as variable transmitter output power, operating frequencies (dedicated internationally and selected regionally), modulation and antenna system should comply with the appropriate ITU-R Recommendations.[7]

***

[6] Resolution MSC.433(98).

[7] ITU-R M.1371 series refer.

ANNEX 24

DRAFT AMENDMENTS TO THE IGC CODE

(Refer to document CCC 10/WP.4, annex 1, for track changes)

DRAFT MSC RESOLUTION

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.5(48), by which it adopted the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk ("the IGC Code"), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation VII/11.1 of the Convention concerning the procedure for amending the IGC Code,

HAVING CONSIDERED, at its [110th] session, amendments to the IGC Code proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1 ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the IGC Code, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on [1 July 2027], unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet have notified their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on [1 January 2028] upon their acceptance in accordance with paragraph 2 above;

4 DETERMINES that MSC.1/Circ.1543, MSC.1/Circ.1559, MSC.1/Circ.1590, MSC.1/Circ.1606, MSC.1/Circ.1617, MSC.1/Circ.1625, MSC.1/Circ.1651, MSC.1/Circ.1669 and MSC.1/Circ.1679 are superseded, taking effect when the said amendments enter into force; however, they remain in effect for existing ships constructed prior to the entry into force of this resolution;

5 REQUESTS the Secretary-General, for the purposes of article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

6 ALSO REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

CHAPTER 1
GENERAL

1.1 Application and implementation

1 Paragraphs 1.1.1.1 and 1.1.1.2 are inserted as follows:

"1.1.1.1 Ships subject to this Code may use products listed in chapter 19 as fuel, subject to the requirements of chapter 16. If the product is not carried as cargo and only used as fuel, the ship shall comply with the most stringent requirements for the cargo or fuel, as applicable."

"1.1.1.2 The products used as fuel shall be listed on the ship's International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk and identified as fuel."

1.2 Definitions

2 The following new definitions are inserted in the respective alphabetical order, together with the associated footnote, and subsequent paragraphs are renumbered accordingly:

"1.2.18 *Essential safety functions* are safety functions required by the Code, which include a system that initiates required actions to prevent escalation of potential hazards."

"1.2.24 *Gastight* means a physical barrier which prevents any significant quantity of flammable gas from entering into an adjoining area in accordance with standards acceptable to the Organization.*"

"* Refer to the recommendations published by the International Electrotechnical Commission, IEC 60092:502."

"1.2.30 *Integrated system* is a combination of computer-based systems which are interconnected in order to allow centralized access to sensor information and/or command and control. Integration of systems shall ensure that no failure of any component of the system will result in an unacceptable loss of control, alarm or safety functions."

"1.2.46 *Reversionary control* is an alternative means of control that may be local manual or local automatic."

CHAPTER 2

SHIP SURVIVAL CAPABILITY AND LOCATION OF CARGO TANKS

2.1 General

3 Paragraph 2.1.4 is amended to read as follows:

"2.1.4 If a ship is intended to carry more than one of the products listed in chapter 19, the standard of damage shall correspond to the product having the most stringent ship type requirements. If a product listed in chapter 19 is only used as fuel, not carried as a cargo, and bunkered in dedicated deck tanks, the standard of damage shall correspond to the ship type requirements of the ship's cargo. The requirements for the location of individual cargo and gas fuel tanks, however, are those for ship types related to the respective products intended to be carried."

2.7.1 Survival requirements

4 In paragraph 2.7.2.1, at the end, the following sentence is added:

", except for those ventilators (in compliance with regulation 19(4) of the International Convention on Load Lines, 1966/88) which have to remain open to supply air to the engine-room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship and;"

CHAPTER 3
SHIP ARRANGEMENTS

3.2 Accommodation, service and machinery spaces and control stations

5 In paragraph 3.2.6, the following sub-paragraphs are added, and the existing paragraph 3.2.6 is renumbered to 3.2.6.1:

".2 Engine-room casings, cargo machinery spaces, electric motor rooms and steering gear compartments are generally considered as spaces not covered by paragraph 3.2.6.1 and, therefore, the requirement for closing devices need not be applied to these spaces.

.3 The closing devices shall be gastight. Ordinary steel fire-flaps without gaskets/seals are not considered to be satisfactory.

.4 Regardless of paragraphs 3.2.6.2 and 3.2.6.3, the closing devices for main inlets and outlets of all ventilation systems shall be operable from outside of the protected space in accordance with SOLAS regulation II-2/5.2.1.1."

3.5 Access to spaces in the cargo area

6 In paragraph 3.5.3.1.2, at the end, the following sentence is added:

"For ships constructed on or after 1 January 2028, the minimum clear opening of 600 mm x 600 mm may have corner radii up to 100 mm maximum. In such a case where, as a consequence of structural analysis of a given design the stress is to be reduced around the opening, it is considered appropriate to take measures to reduce the stress such as making the opening larger with increased radii, e.g. 600 x 800 with 300 mm radii, in which a clear opening of 600 mm x 600 mm with corner radii up to 100 mm maximum fits."

7 In paragraph 3.5.3.1.3, at the end, the following sentences and figures are added, and the following figures in this chapter are renumbered accordingly:

"For ships constructed on or after 1 January 2028, the minimum clear opening of not less than 600 mm x 800 mm may also include an opening with corner radii of 300 mm (see figure 3.1). An opening of 600 mm in height x 800 mm in width may be accepted as access openings in vertical structures where it is not desirable to make large opening in the structural strength aspects, i.e. girders and floors in double bottom tanks.

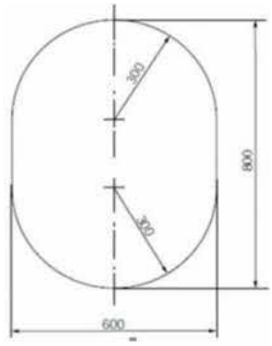

Figure 3.1

Subject to verification of easy evacuation of an injured person on a stretcher the vertical opening 850 mm x 620 mm with wider upper half than 600 mm, while the lower half may be less than 600 mm with the overall height not less than 850 mm is considered an acceptable alternative to the traditional opening of 600 mm x 800 mm with corner radii of 300 mm (see figure 3.2).

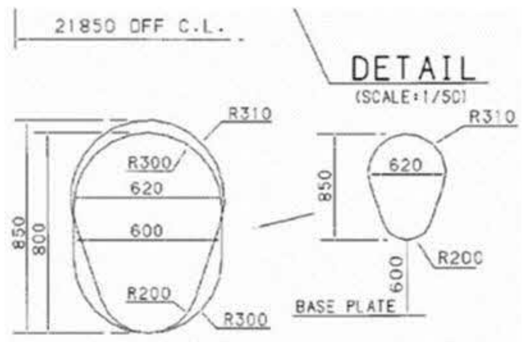

Figure 3.2

If a vertical opening is at a height of more than 600 mm, steps and handgrips are to be provided. In such arrangements it is to be demonstrated that an injured person can be easily evacuated".

3.7 Bilge, ballast and fuel oil arrangements

8 In paragraph 3.7.5, at the end, the following sentence is added:

"The requirements of "Pump vents shall not be open to machinery spaces" apply only to pumps in the machinery spaces serving dry duct keels through which ballast piping passes."

CHAPTER 4
CARGO CONTAINMENT

4.19.1 Materials forming ship structure

9 In paragraph 4.19.1.6.2, the existing text is amended to read as follows:

"the heating system shall be considered as an essential auxiliary. All electrical components of at least one of the systems provided in accordance with paragraph 4.19.1.6.1 shall be supplied from the emergency source of electrical power; and"

10 In paragraph 4.19.1, a new paragraph is added as follows:

"4.19.1.7 For ships constructed on or after 1 January 2028, heating system referred to in paragraph 4.19.1.6.1 is to be such that, in case of a single failure of a mechanical or electrical component in any part of the system, heating can be maintained at not less than 100% of the theoretical heat requirement. Where the above requirements are met by duplication of the system components, i.e. heaters, glycol circulation pumps, electrical control panel, auxiliary boilers etc., all electrical components of at least one of the systems are to be supplied from the emergency source of electrical power. Where duplication of the primary source of heat, e.g. oil-fired boiler is not feasible, alternative proposals can be accepted such as an electric heater capable of providing 100% of the theoretical heat requirement provided and supplied by an individual circuit arranged separately on the emergency switchboard. Other solutions may be considered to satisfy the requirements of paragraph 4.19.1.6.1, provided a suitable risk assessment is conducted to the satisfaction of the Administration. In all cases, essential electrical components shall be supplied from the emergency source of electrical power."

11 In paragraph 4.20.1.1, the existing paragraph is amended to read as follows:

"4.20.1.1 For ships constructed on or after 1 January 2028, ~~A~~ll welded joints of the shells of type A independent tanks and type B independent tanks, primarily constructed of plane surfaces, shall be of the in-plane butt weld full penetration type. This includes the tank corners which are constructed using bent plating which is aligned with the tank surfaces and connected with in-plane welds. For dome-to-shell connections only, tee welds of the full penetration type may be used depending on the results of the tests carried out at the approval of the welding procedure and in accordance with the following:

.1 except for small penetrations on domes, nozzle welds shall also be designed with full penetration;

.2 welded corners (i.e. corners made of weld metal) shall not be used in the main tank shell construction, i.e. corners between shell side (sloped plane surfaces parallel to hopper or top side inclusive if any) and bottom or top of the tank, and between tank end transverse bulkheads and bottom, top or shell sides (sloped plane surfaces inclusive if any) of the tank. Instead, tank corners which are constructed using bent plating aligned with the tank surfaces and connected with in-plane welds are to be used; and

.3 tee welds can be accepted for other localized constructions of the shell, such as suction well, sump, dome, etc., where tee welds of full penetration type shall also be used."

12 In paragraph 4.20.1.2 and sub-paragraph .1, the existing text is amended to read as follows, and the following figures in this chapter are renumbered accordingly:

"4.20.1.2 For ships constructed on or after 1 January 2028, welding joint details for type C independent tanks. including bi-lobe tanks, primarily constructed of curved surfaces fitted with a centreline bulkhead, and for the liquid-tight primary barriers of type B independent tanks primarily constructed of curved surfaces, shall be as follows:

.1 all longitudinal and circumferential joints shall be of butt welded, full penetration, double vee or single vee type. Full penetration butt welds shall be obtained by double welding or by the use of backing rings. If used, backing rings shall be removed except from very small process pressure vessels. Cruciform full penetration welded joints in a bi-lobe tank with centreline bulkhead can be accepted for the tank structure construction at tank centreline welds with bevel preparation subject to the approval of the Administration or recognized organization acting on its behalf, depending on the results of the tests carried out at the approval of the welding procedure (see figure 4.1). Other edge preparations may be permitted, depending on the results of the tests carried out at the approval of the welding procedure; and

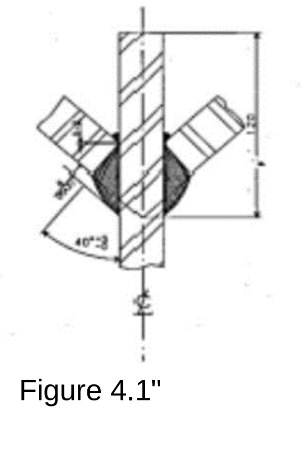

Figure 4.1"

4.23 Type C independent tanks

13 Paragraph 4.23.1.1 is replaced by the following:

"4.23.1.1 The design basis for type C independent tanks is based on pressure vessel criteria modified to include fracture mechanics and crack propagation criteria. The minimum design vapour pressure defined in 4.23.1.2 is intended to ensure that ~~and~~ the dynamic stress range shall be sufficiently small so that an initial surface flaw will not have significant propagation."

14 The following new paragraph 4.23.3.3 is inserted after paragraph 4.23.3.2:

"4.23.3.3 For ships constructed on or after 1 January 2028, guidance is given in 4.28.4 and 4.28.5 for finite element analysis and buckling assessment respectively."

15 The existing paragraph 4.23.4 is renumbered and replaced to read as follows:

"4.23.4.1 For large type C independent tanks, the Administration or recognized organization acting on its behalf may require additional fatigue verification as follows:

.1 C_w shall be less than or equal to 0.1; or

.2 predicted failure development time, from the assumed initial defect until reaching a critical state, shall not be less than three times the lifetime of the tank."

4.28 Guidance notes for chapter 4

16 The following new paragraphs 4.28.4 and 4.28.5 are inserted after paragraph 4.28.3:

"4.28.4 **Guidance to finite element analysis of type C tanks for ships constructed on or after 1 January 2028**

4.28.4.1 ***General***

4.28.4.1.1 The allowable stresses described in 4.23.3.1 are applicable for the finite element analysis of the type C tanks.

4.28.4.1.2 As a supplement to the prescriptive requirements, the finite element analysis of the type C cargo tanks may be carried out for the following cases:

.1 Locations where a structural strength cannot be assessed by the prescriptive requirements, e.g. structural discontinuities in way of tank support, Y connection of bi-lobe and multi-lobe tank, etc.

.2 Tanks of novel design or configuration.

4.28.4.1.3 The procedure for finite element analysis should be in accordance with the recognized standards, such as ASME Boiler and Pressure Vessel Code, section VIII, Division 2, or other equivalent which is acceptable to the Administration, provided the maximum strength utilizations in 4.23.3.1 are complied with.

4.28.4.1.4 The scantling defined by the prescriptive requirements on the type C tank of the Code is not to be reduced by any form of alternative calculations using finite element analysis.

4.28.4.1.5 For calculation of reaction forces at the tank supports the following factors shall be taken into account:

.1 elasticity of support material (intermediate layer of wood or similar material); and

.2 change in contact surface between tank and support, and of the relevant reactions, due to thermal shrinkage of tank and elastic deformations of tank and support material.

The final distribution of the reaction forces at the supports shall not show any tensile forces.

4.28.4.2 Allowable stresses for finite element analysis

4.28.4.2.1 In general, finite element models composed of 2D shell element or solid 3D element are considered acceptable for stress calculation. The mesh size of the finite element model shall be to the satisfaction of the Administration or recognized organization acting on its behalf.

4.28.4.2.2 The application of allowable stresses for linear finite element analysis of the type C tank body using 2D shell element or solid 3D element is given in the following table.

4.28.4.2.3 The strength of stiffening rings of type C tanks are to be checked. The calculated stresses of the stiffening ring of type C tanks using finite element method are to be performed according to 4.28.4, and the permissible stresses of the stiffening rings shall not exceed that of the tank body defined in 4.28.4.

Application of allowable stresses for finite element analysis of the type C tank body using the finite element analysis of 2D shell element or 3D solid element for ships constructed on or after 1 January 2028

Code criterion given in 4.23.3.1	Application for FE 2D shell element or 3D element	
	Finite element results check	**Locations where check should be applied**
$\sigma_m \leq f$	$\sigma_{e\_membrane} \leq f$ 1)	(A) Areas remote from structural discontinuities
$\sigma_L \leq 1.5f$	$\sigma_{e\_membrane} \leq 1.5f$ 1)	(B) Area in way of structural discontinuities
$\sigma_b \leq 1.5f$	$\sigma_{e\_surface} \leq 1.5f$ 1)	(C) Any area (A) or (B) where bending stresses exist
$\sigma_L + \sigma_b \leq 1.5f$	$\sigma_{e\_surface} \leq 1.5f$ 1)	See (B) and (C)
$\sigma_m + \sigma_b \leq 1.5f$	$\sigma_{e\_surface} \leq 1.5f$ 1)	See (A) and (C)
$\sigma_m + \sigma_b + \sigma_g \leq 3.0f$	$\sigma_{e\_surface} \leq 3.0f$ 1), 2)	See (A) and (C)
$\sigma_L + \sigma_b + \sigma_g \leq 3.0f$	$\sigma_{e\_surface} \leq 3.0f$ 1), 2)	See (B) and (C)

where:

$\sigma_{e\_membrane}$ is element equivalent stress derived from the stress components at the mid layer/thickness of the element.

$\sigma_{e\_surface}$ is element equivalent stress derived from the stress components at the top and bottom layer/surface of the element, whichever is greater.

Note:

1) For accident and testing load conditions, the allowable stresses can be modified according to 4.23.5.2 and 4.23.6.1 of the IGC Code

2) The factor f is defined in 4.23.3 of the IGC Code.

3) For the criterion $\leq 3.0f$, it should be carefully evaluated especially for materials with under matched weld properties. In such cases, the transverse weld tensile strength shall not be less than the actual yield strength of the parent metal, the respective R_e and R_m of the weld, after any applied heat treatment, shall be used.

4.28.5 **Buckling assessment of type C cargo tanks for ships constructed on or after 1 January 2028**

4.28.5.1 ***General***

4.28.5.1.1 The buckling assessment of type C cargo tanks should be carried out in accordance with a recognized pressure vessel standard acceptable to the Administration or recognized organization acting on its behalf. The selected standard should be used for design and fabrication. The scantlings of a type C tank subject to external pressure is not to be less than the value required by the formulas in 4.28.5.2.

4.28.5.1.2 Regarding the lateral buckling of stiffening ring, it should be considered additionally in accordance with international standards (e.g. PD5500) or equivalent regulations.

4.28.5.1.3 For novel configurations where the requirements given in this subsection or recognized standards are not applicable, more advanced buckling assessment methods may be used, as deemed appropriate by the Administration.

4.28.5.1.4 Non-linear finite element analysis, considering geometrical and material non-linearity, may be accepted as an advanced method, provided that the buckling capacity reflects the plate edge misalignment, ovality and deviation from true circular form over a specified arc or chord length.

4.28.5.2 ***Scantling of shells and stiffening rings under external pressure***

4.28.5.2.1 For cylindrical shell, the critical buckling pressure P_c, in MPa, can be taken as:

$$P_c = \frac{1}{3}\left[n^2 - 1 + \frac{2n^2 - 1 - \nu}{n^2\left(\frac{2L}{\pi D}\right)^2 - 1}\right]\frac{2E}{(1-\nu^2)}\left(\frac{t}{D}\right)^3 + \frac{2E\,\frac{t}{D}}{(n^2-1)\left[n^2\left(\frac{2L}{\pi D}\right)^2 + 1\right]^2}$$

where:
D=outside diameter of the cylindrical shell, in mm, based on gross scantling
t=net thickness of the cylindrical shell, in mm, exclusive of corrosion allowance
E=Young's modulus, in N/mm^2
v=Poisson's ratio
n= number of circumferential buckling waves. It is to be taken as the integral value to minimize the critical pressure P_c with $n \geq Max\left(2, \frac{\pi D}{2L}\right)$.
L=effective distance between stiffening rings, in mm

4.28.5.2.2 For spherical shells, such as hemispherical, torispherical and ellipsoidal ends, the critical buckling pressure P_c, in MPa, can be taken as:

$$P_c = 1.21\mathrm{E}\left(\frac{t}{R}\right)^2$$

where:
R=outside radius of the sphere shell, in mm, based on gross scantling
E=Young's modulus, in N/mm^2
t=net thickness of the spherical shell, in mm, exclusive of corrosion allowance

The critical buckling pressure formula for the spherical shell above is to be used for hemispherical, torispherical and ellipsoidal tank ends, where R is taken as the outside radius of the corresponding spherical shell for hemispherical and tori spherical tank ends, and the maximum outside radius of the crown for an ellipsoidal tank end, i.e. D2/(4h), where h is the external height of the tank end measured based on gross scantling from the connection plane between the cylindrical shell and tank end.

4.28.5.2.3 For stiffening ring, the moment of inertia I, in mm^4, shall not be less than

$$I = \frac{0.18D^3LP_e}{E}$$

where:
D = outside diameter of the cylindrical shell, in mm, based on gross scantling
E=Young's modulus, in N/mm^2
L=effective distance between stiffening rings, in mm
Pe=external design pressure, in MPa
The width of shell, in mm, contributing to the moment of inertia shall not be greater than 0.75$\sqrt{Dt}$, where t=net thickness of the cylindrical shell, in mm, exclusive of corrosion allowance.

4.28.5.2.4 Cylindrical and spherical shells are to satisfy the following criteria:

$\frac{P_c}{P_e} \geq 4$ for cylindrical shell

$\frac{P_c}{P_e} \geq 15$ for spherical shell
where:
Pc=critical buckling pressure, in MPa
Pe=external design pressure, in MPa".

CHAPTER 5
PROCESS PRESSURE VESSELS AND LIQUID, VAPOUR AND PRESSURE PIPING SYSTEMS

5.2 System requirements

17 Paragraph 5.2.2.1 and sub-paragraph .1 are amended to read as follows:

"5.2.2.1 Any piping system addressed in 5.1.1 that may contain cargo liquid or vapour shall:

.1 be segregated from other piping systems, except where interconnections are required for cargo related operations such as purging, gas freeing or inerting. The requirements of 9.4.4 and 16.4.1.3 shall be taken into account with regard to preventing back-flow of cargo. In such cases, precautions shall be taken to ensure that cargo or cargo vapour cannot enter other piping systems through the interconnections;"

18 The following new paragraph 5.2.2.1.2 is added after paragraph 5.2.2.1.1 and subsequent paragraphs 5.2.2.1.2 to 5.2.2.1.5 are renumbered as paragraphs 5.2.2.1.3 to 5.2.2.1.6.

"5.2.2.1.2 Notwithstanding that, ships operating in fixed locations, in a re-gasification and gas discharge mode or a gas receiving, processing, liquefaction and storage mode are not considered as vessels "at sea" with regard to sub-paragraph .6 of this paragraph. Cargo piping only operated in fixed locations (example: re-gasification systems and its piping) and kept depressurized inerted and isolated at sea, other than athwartship shore connection piping or emergency cargo jettisoning piping systems, may also be located outboard of the transverse tank location requirements of 2.4.1, but not closer than a minimum distance of 0.8 metre from the ship outer shell;"

5.4 Design pressure

19 In paragraph 5.4.4, the text is replaced to read as follows:

"5.4.4 The design pressure of the outer pipe or duct of gas fuel systems shall not be less than the maximum built-up pressure arising in the annular space considering the local instantaneous peak pressure in way of any rupture and a suitable pressure relief system shall be considered in the design:

.1 for gas fuel systems with inner pipe working pressures not greater than 1 MPa, the maximum built-up pressure arising in the annular space, after the inner pipe rupture shall not be less than the maximum working pressure of inner gas pipe; and

.2 for ships constructed on or after 1 January 2028, for gas fuel systems with inner pipe having a working pressure greater than 1 MPa, the maximum built-up pressure arising in the annular space, after the inner pipe rupture, which is to be calculated in accordance with paragraph 5.11.4.2. "

5.5 Cargo system valve requirements

20 Paragraph 5.5.1.2*bis* is added after paragraph 5.5.1.2 as follows:

"5.5.1.2*bis* For ships constructed on or after 1 January 2028, in addition, remotely operated valves shall also be fitted, as appropriate, as part of the emergency shutdown (ESD) system (see paragraph 18.10)."

21 Paragraphs 5.5.2.1 and 5.5.2.2 are amended to read as follows:

"5.5.2.1 All liquid and vapour connections, except for safety relief valve inlet and discharge lines, and liquid level gauging devices, shall have shut-off valves located as close to the tank as practicable. These valves shall provide full closure and shall be capable of local manual operation."

"5.5.2.2 For ships constructed on or after 1 January 2028, all liquid and vapour connections, except for safety relief valve inlet and discharge lines and liquid level gauging devices, shall be equipped with remotely controlled ESD valves, located as close to the tank as practicable. Such ESD valves shall comply with the requirements of 18.10.2 and provide full closure of the line. A single valve may be substituted for the two separate valves, provided the valve complies with the requirements of 18.10.2 and provides full closure of the line."

22 Paragraphs 5.5.3.1 and 5.5.3.2 are amended to read as follows:

"5.5.3.1 One remotely controlled ESD valve shall be provided at each cargo transfer connection to stop liquid and vapour transfer to or from the ship. Transfer connections not in use shall be isolated with suitable blank flanges."

"5.5.3.2 In addition to the ESD valve, a manual valve shall be provided for each liquid connection. A manual valve shall also be provided for vapour connections where cargo tank MARVS exceeds 0.07MPa. The manual valves may be inboard or outboard of the ESD valve to suit the ship's design."

5.6 Cargo transfer arrangements

23 In paragraph 5.6.5.1, at the end, the following sentence is added:

"However, the aforementioned requirements are only applicable if such a sampling system is fitted on board. Connections used for control of atmosphere in cargo tanks during inerting or gassing up are not considered as cargo sampling connections."

24 In paragraph 5.6.6, the existing paragraph is renumbered as 5.6.6.1 and a new paragraph is added as follows:

"5.6.6.2 Means to indicate that filters are becoming blocked and filter maintenance is required is to be provided for fixed in-line filter arrangement and portable filter installations where dedicated filter housing piping is provided. Where portable filters for fitting to manifold presentation flanges are used without dedicated filter housing, and these can be visually inspected after each loading and discharging operation, no additional arrangements for indicating blockage or facilitating drainage are required."

5.11 Piping system component requirements

25 Paragraph 5.11.2.2 is amended to read as follows:

"5.11.2.2 The minimum wall thickness shall be calculated as follows:

$t = (t_0 + b + c) / (1 - |a|\cancel{a}/100)$ (mm) where:
t_0 = theoretical thickness, determined by the following formula
$t_0 = PD / (2K \times e + P)$ (mm)
with:
P = design pressure (MPa) referred to in 5.4;
D = outside diameter (mm);
K = allowable stress (N/mm^2) referred to in 5.11.3; and
e = efficiency factor equal to 1.0 for seamless pipes and for longitudinally or spirally welded pipes, delivered by approved manufacturers of welded pipes, that are considered equivalent to seamless pipes when non-destructive testing on welds is carried out in accordance with recognized standards. In other cases an efficiency factor of less than 1.0, in accordance with recognized standards, may be required depending on the manufacturing process;

b = allowance for bending (mm). The value of b shall be chosen so that the calculated stress in the bend, owing to internal pressure only, does not exceed the allowable stress. Where such justification is not given, b shall be:

$b = D \cdot t_0 / 2.5r$ (mm) with:

r = mean radius of the bend (mm)

c = corrosion allowance (mm). If corrosion or erosion is expected the wall thickness of the piping shall be increased over that required by other design regulations. This allowance shall be consistent with the expected life of the piping; and

a = negative manufacturing tolerance for thickness (%). If a is -5%, i.e. $|a|$ is equal to 5, the denominator of the formula of the minimum wall thickness of pipes shall be 1- (5/100)."

5.11.4 High-pressure gas fuel outer pipes or ducting scantlings

26 Paragraph 5.11.4 is amended and 5.11.4.2 added as follows:

5.11.4.1 For ships constructed on or after 1 January 2028, in fuel gas piping systems of design pressure greater than the peak pressure specified in 5.11.4.2, the tangential membrane stress of a straight section of pipe or ducting shall not exceed the tensile strength divided by 1.5 (R_m /1.5) when subjected to the design pressure specified in 5.4. The pressure ratings of all other piping components shall reflect the same level of strength as straight pipes.

"5.11.4.2 For ships constructed on or after 1 January 2028, for inner pipes having a working pressure greater than 1 MPa, the design pressure of the outer pipe or the duct shall be taken as the higher of the following:

.1 the maximum built-up pressure: static pressure in way of the rupture resulting from the gas flowing in the annular space;

.2 the local instantaneous peak pressure in way of the rupture is given by the following expression:

$$p = p_0 \left(\frac{2}{k+1} \right)^{\frac{k}{k-1}}$$

Where:

p_0 = maximum working pressure of the inner pipe (absolute pressure)

$k = C_p/C_v$ constant pressure specific heat divided by the constant volume specific heat

As an alternative to the above formula, the peak pressure found from representative tests can be used. Tests reports shall then be submitted."

27 Paragraph 5.11.6.1 is amended as follows:

5.11.6.1 Flanges, valves, bellows expansion joints and other fittings shall comply with recognized standards, taking into account the material selected and the design pressure defined in 5.4. For ships constructed before 1 January 2028, bellows expansion joints used in vapour service, a lower minimum design pressure may be accepted, except for any new installation or replacement.

5.12 Materials

28 Paragraph 5.12.4 is renumbered and amended to read as follows:

"5.12.3 Where the cargo piping system is located in a salt-laden atmosphere, including on the exposed deck, adequate measures to avoid corrosion and stress corrosion cracking occurring shall be taken by material selection and protection against exposure to salt water. For ships constructed on or after 1 January 2028, the following apply:

.1 use of stainless steel having a pitting resistance equivalent number (PREN = 1 • %Cr + 3.3 (%Mo + 0.5 • %W) + 16 • %N) more than 22, such as 316/316L; or

.2 use of stainless steel not meeting the above requirements, such as 304/304L provided the piping is protected by a coating system suitable for the intended service conditions, including cryogenic temperature—ultraviolet solar radiation; or

.3 use of other materials permitted by table 6.4 of the IGC Code, protected by a coating system suitable for the intended service conditions, including cryogenic temperature—ultraviolet solar radiation."

5.12.4 Cargo piping insulation system

29 Paragraphs 5.12.3.1 and 5.12.3.2 are renumbered and amended to read as follows:

"5.12.4.1 For ships constructed on or after 1 January 2028, cargo piping systems shall be provided with a thermal insulation system as necessary to minimize heat leak into the cargo during transfer operations and to protect personnel from direct contact with cold or hot surfaces as follows:

.1 The properties of the piping insulation shall be considered when calculating the heat balance of the containment system and capacity of the pressure/temperature control system.

.2 Surfaces of cargo piping, process pressure vessels, and equipment with which personnel are likely to contact under normal conditions shall be protected by thermal insulation, except for the following:

.1 surfaces which are protected by physical screening measures to prevent direct contact;

.2 surfaces of manual valves having extended spindles that protect the operator from the cargo temperature;

.3 surfaces whose design temperature, based on inner fluid temperature, is above minus 10°C or below 60°C; and

.4 surfaces located where contact by personnel is unlikely under normal conditions based on recognized standards, preferably more than 2.0 m vertically and/or 0.6 m horizontally away from walkways or floors of working areas."

"5.12.4.2 Where applicable, owing to location or environmental conditions, insulation materials shall have suitable properties of resistance to fire and flame spread and shall be adequately protected against penetration of water vapour and mechanical damage."

5.13 Testing requirements

30 In paragraph 5.13.1.1, the existing paragraph is amended to read as follows:

"Each type of valve intended to be used at a working temperature below -55°C shall be subject to the following type tests:

.1 each size and type of valve shall be subjected to seat tightness testing over the full range of operating pressures for bi-directional flow and temperatures, at intervals, up to the rated design pressure of the valve. Allowable leakage rates shall be to the requirements of the Administration or recognized organization acting on its behalf. During the testing, satisfactory operation of the valve shall be verified;

.2 the flow or capacity shall be certified to a recognized standard for each size and type of valve, which annotates that;

.1 for pressure relief valves (PRVs) that are subject to paragraph 8.2.5, the flow or capacity are to be certified by the Administration or recognized organization acting on its behalf and;

.2 for other types of valves, the manufacturer is to certify the flow properties of the valves based on tests carried out according to recognized standards.

.3 pressurized components shall be pressure tested to at least 1.5 times the rated pressure; and

.4 for emergency shutdown valves, with materials contributing to shell or seat tightness of the valve having melting temperatures lower than 925°C, the type testing shall include a fire test to a standard acceptable to the Administration."

31 In paragraph 5.13.2.1, the existing paragraph is amended to read as follows:

"5.13.2.1 The requirements of this section shall apply to piping inside and outside the cargo tanks. However, the Administration may accept relaxations from these requirements for open-ended piping and piping inside cargo tanks, except pumps discharge lines."

32 In paragraph 5.13.2.4, at the end, the following sentence is added:

"The maximum pressure at gas pipe rupture is the maximum pressure to which the outer pipe or duct is subjected after the inner pipe rupture and for testing purposes it is the same as the design pressure used in paragraph 5.4.4.1."

CHAPTER 8
VENT SYSTEMS FOR CARGO CONTAINMENT

8.1 General

33 In paragraph 8.1, the existing paragraph is renumbered as 8.1.1 to read as follows:

"8.1.1 All cargo tanks shall be provided with a pressure relief system appropriate to the design of the cargo containment system and the cargo being carried. Hold spaces and interbarrier spaces, which may be subject to pressures beyond their design capabilities, shall also be provided with a suitable pressure relief system. Pressure control systems specified in chapter 7 shall be independent of the pressure relief systems."

34 In paragraph 8.1, a new paragraph is added as follows:

"8.1.2 For ships constructed on or after 1 January 2028, interbarrier spaces, which may be subject to pressures beyond their design capabilities, shall also be provided with a suitable pressure relief system, as defined below:

.1 The formula for determining the relieving capacity given in 8.2.3 is for interbarrier spaces surrounding independent type A cargo tanks, where the thermal insulation is fitted to the cargo tanks.

.2 The relieving capacity of pressure relief devices of interbarrier spaces surrounding independent type B cargo tanks may be determined on the basis of the method given in 8.2.3. However, the leakage rate is to be determined in accordance with paragraph 4.7.2.

.3 The relieving capacity of pressure relief devices for interbarrier spaces of membrane and semi-membrane tanks is to be evaluated on the basis of specific membrane/semi-membrane tank design.

.4 The relieving capacity of pressure relief devices for interbarrier spaces adjacent to integral type cargo tanks may, if applicable, be determined as for type A independent cargo tanks."

8.2 Pressure relief systems

35 In paragraph 8.2, a new paragraph is added after paragraph 8.2.4:

"8.2.4*bis* For ships constructed on or after 1 January 2028, the combined relieving capacity of the pressure relief devices for interbarrier spaces surrounding type A independent cargo tanks where the insulation is fitted to the cargo tanks may be determined by the following formula:

$$Q_{sa} = 3{,}4.\, A_c \frac{\rho}{\rho_V} \sqrt{h} \quad (m^3/s)$$

where:

Q_{sa} = minimum required discharge rate of air at standard conditions of 273 K and 1.013 bar

A_c = design crack opening area (m^2)

$$A_c = \pi/4 \cdot \delta \cdot l(m^2)$$

δ = max, crack opening width (m)

δ = 0.2 t (m)

t = thickness of tank bottom plating (m)

l = design crack length (m) equal to the diagonal of the largest plate panel of the tank bottom, see figure 8.1.

h = max liquid height above tank bottom plus 10.MARVS (m)

ρ = density of product liquid phase (kg/m^3) at the set pressure of the interbarrier space relief device

ρ_V = density of product vapour phase (kg/m^3) at the set pressure of the interbarrier space relief device and a temperature of 273 K

MARVS = max allowable relief valve setting of the cargo tank (bar).

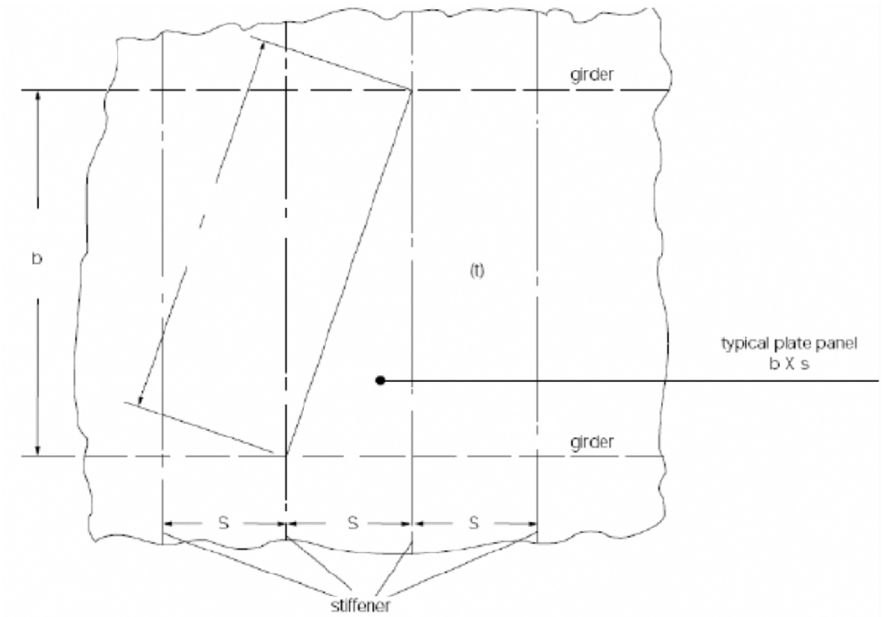

Figure 8.1"

With the insertion of the figure above, the other figures are renumbered and cross references to those figures in this chapter revised accordingly.

36 Paragraph 8.2.9 is amended as follows:

8.2.9 In the event of a failure of a cargo tank installed PRV, a safe means of emergency isolation shall be available:

.1 Procedures shall be provided and included in the cargo operations manual (see 18.2).

.2 For ships constructed on or after 1 January 2028, if an isolation valve is installed, a mechanical locking system shall be used to prevent full or partial isolation so that only one of the cargo tank installed PRVs can be isolated. If the PRVs are fitted with a remotely sensed pilot line, an isolation valve shall also be fitted with a locking system synchronized with the locking system of the isolation of the main PRV.

.3 For ships constructed on or after 1 January 2028, if an isolation valve is installed, safe means to depressurize the trapped cargo between that isolation valve and PRV shall be provided.

.4 Isolation of the PRV shall be carried out under the supervision of the master. This action shall be recorded in the ship's log and a sign posted in the cargo control room, if provided, and at the PRV.

.5 The tank shall not be loaded until the full relieving capacity is restored.

37 Paragraph 8.2.18 is replaced to read as follows:

"8.2.18 The adequacy of the vent system designed for two phase flow for tanks having a MARVS above 0.07 MPa shall be demonstrated, taking into account the recommendations developed by the Organization.* A relevant certificate shall be permanently kept on the ship. For the purpose of this paragraph, vent system means:

.1 from the tank outlet and piping to the PRV;

.2 the PRV; and

.3 the piping from the PRV downstream to the location of the discharge to the atmosphere, including any interconnections and piping that joins other tanks.

This section need not apply when the reference temperature is defined as per 15.1.3.1."

* Refer to the *Guidelines for the evaluation of the adequacy of type C tank vent systems* (resolution A.829(19))."

8.4.1 Sizing of pressure relieving system

38 In paragraph 8.4.1, a new paragraph is added after paragraph 8.4.1.3 as follows:

"8.4.1.4 For ships constructed on or after 1 January 2028, for prismatic tanks, vapours generated under fire exposure computed using the formula given in paragraph 8.4.1.2 and the following formula variable:

.1 L_{min}, for non-tapered tanks, is the smaller of the horizontal dimensions of the flat bottom of the tank. For tapered tanks, as would be used for the forward tank, $\underline{L_{min}}$ is the smaller of the length and the average width.

.2 For prismatic tanks whose distance between the flat bottom of the tank and bottom of the hold space is equal to or less than $L_{min}/10$:

A = external surface area minus flat bottom surface area.

.3 For prismatic tanks whose distance between the flat bottom of the tank and bottom of the hold space is greater than $L_{min}/10$:

A = external surface area. "

39 Paragraphs 8.4.2, 8.4.3 and 8.4.5 are amended to read as follows:

"8.4.2 ***Sizing of vent system***

8.4.2.1 Pressure losses upstream and downstream of the PRVs shall be taken into account when determining the pipe size and routeing to ensure the flow capacity required by 8.4.1.

8.4.2.2 For ships constructed on or after 1 January 2028, the inclusion of isolation valves in which the flow area of the valve is equal to or larger than the inlet flow area of the pressure relief device and do not affect the PRV flow, capacity and stability are acceptable."

"8.4.3 ***Upstream pressure losses***

8.4.3.1 The pressure losses in the vent line from the tank to the PRV inlet shall be supported by flow calculations. These losses shall not exceed 3% of the valve set pressure at the calculated flow rate, in accordance with 8.4.1.

8.4.3.2 Pilot-operated PRV sensing lines shall be sized to avoid pressure losses which affect the function of the PRV. The sensing line shall be self-draining and without liquid pockets."

"8.4.5 To ensure stable PRV operation, the blow-down shall not be less than the sum of the inlet pressure loss and 0.02 MARVS at the rated capacity. This limitation does not apply to pilot-operated PRV fitted with a remote sensing line if confirmed by the PRV manufacturer."

CHAPTER 9
CARGO CONTAINMENT SYSTEM ATMOSPHERE CONTROL

40 Paragraph 9.4.6 is amended to read as follows:

"9.4.6 Where insulation spaces are continually supplied with an inert gas as part of a leak detection system, effective means shall be provided to monitor the quantity of gas being supplied to each individual space."

41 The following new paragraph 9.4.7 is added after paragraph 9.4.6:

"9.4.7 For ships constructed on or after 1 January 2028, abnormal flow of inert gas in leak detection system shall trigger audible and visible alarms at the locations specified in 13.6.13. The alarm(s) set points shall be defined by the designer and accepted by the Administration or recognized organization acting on its behalf with due consideration of the operational pressure which shall be maintained in the space and flow rate(s) necessary for reliable gas leak detection."

CHAPTER 10
ELECTRICAL INSTALLATIONS

42 Paragraph 10.2.6 is amended to read as follows:

"10.2.6 Electrical generation and distribution systems, including their control systems, shall be designed such that a single fault will not result in the loss of ability to maintain cargo tank pressures, as required by 7.8.1, and hull structure temperature, as required by 4.19.1.6, within normal operating limits. Failure modes and effects shall be analysed and documented to a standard not inferior to those acceptable to the Administration.*

* IEC 60812, Edition 2.0 200601 "Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)"

43 Paragraph 10.2.8 is amended to read as follows:

"10.2.8 Electronic devices which are not intrinsically safe, including depth sounding or log devices, radar and impressed current cathodic protection system anodes, if located in the hazardous areas, shall be housed in gastight enclosures."

CHAPTER 11
FIRE PROTECTION AND EXTINCTION

11.1 Fire safety requirements

44 In paragraph 11.1.4, at the end, the following sentence is added:

"For ships constructed on or after 1 January 2028, where 'F.O. tanks' are installed at the after end of the aftermost hold space or at the forward end of the forwardmost hold space instead of cofferdams as allowed for in paragraphs 3.1.2 and 3.1.3 of the IGC Code, the weather deck area above these tanks shall be regarded as a 'cargo area' for the purpose of applying paragraph 11.3.6 of this Code."

11.2 Fire mains and hydrants

45 In paragraph 11.2, new paragraphs are added as follows:

"11.2.6 For ships constructed on or after 1 January 2028, the maximum capacity calculation for emergency fire pump is as follows:

11.2.6.1 If all the fire pumps (required in accordance with SOLAS regulation II-2/10.2.2.2.2) mentioned in paragraph 11.3.4, supplying the water-spray system (for covering the superstructures and deckhouses) are disabled owing to a fire in any one compartment, then the emergency fire pump shall be sized to cover:

.1 the water-spray system for the boundaries of the superstructures and deckhouses, and lifeboats, liferafts and muster areas facing the cargo area, (as per paragraph 11.3.4); and

.2 two fire hydrants (as per paragraph 11.2).

11.2.6.2 When the ship is also fitted with a total flooding high expansion foam system or a fixed pressure water-spraying fire- extinguishing system protecting the engine-room (to comply with SOLAS regulation II-2/10.4.1.1.2 or SOLAS regulations II-2/10.4.1.1.3 and 10.5.1.1) and the emergency fire pump is intended to supply seawater to this system, then, the emergency fire pump shall also be sized to cover the foam system for dealing with an engine-room fire, when the main fire pumps are disabled.

11.2.6.3 On the basis of the principle of dealing with one single fire incident at a time, the emergency fire pump does not need to be sized to cover all three systems in paragraph 11.2.6.1 and paragraph 11.2.6.2 above (i.e. water-spray, hydrants and foam) at the same time and shall need only be sized to cover the most demanding area and required systems, as follows:

.1 the foam system + two hydrants; or

.2 the water-spray system + two hydrants;

whichever is greater."

11.3 Water-spray system

46 In paragraph 11.3.1, a new sub-paragraph is added as follows and the subsequent sub-paragraph .8 is renumbered as .9:

".8 remote survival crafts facing cargo area, taking into consideration cargo area extension for fire-fighting purposes as stated in paragraph 11.1.4. Remote liferafts located in areas covered by water-spray protection as required in .6 shall be considered as adequately protected; and"

47 Paragraph 11.3.2.2 is amended to read as follows:

"11.3.2.2 On vertical surfaces and for structures having not clearly defined horizontal or vertical surface, spacing of nozzles protecting lower areas may take account of anticipated rundown from higher areas. Stop valves shall be fitted in the main supply line(s) in the water-spray system, at intervals not exceeding 40 m, for the purpose of isolating damaged sections. Alternatively, the system may be divided into two or more sections that may be operated independently, provided the necessary controls are located together in a readily accessible position outside the cargo area. A section protecting any area included in 11.3.1.1 and .2 shall cover at least the entire athwartship tank grouping in that area. Any gas process unit(s) included in 11.3.1.3 may be served by an independent section."

48 In paragraph 11.3.3, the existing text is amended to read as follows:

"11.3.3 The capacity of the water-spray pumps shall be capable of simultaneous protection of the greater of the following:

".1 any two complete tank groupings, where one group is defined as tanks located in transverse direction from ship side to ship side, representing an area equal to the combined area of the largest tank groupings, including any gas process units within these areas. Where there is only one cargo tank occupying a hold space from ship side to ship side, it will be considered as a grouping for the purpose of above requirement; or

.2 for ships intended for operation as listed in 1.1.10, necessary protection subject to special consideration under 11.3.1 of any added fire hazard and the adjacent athwartship tank grouping.

in addition to the surfaces specified in 11.3.1.4 to 11.3.1.9. Alternatively, the main fire pumps may be used for this service, provided that their total capacity is increased by the amount needed for the water-spray system. In either case, a connection, through a stop valve, shall be made between the fire main and water-spray system main supply line outside the cargo area."

49 In paragraph 11.3.4, the existing text is amended to read as follows:

"11.3.4 The boundaries of superstructures and deckhouses normally manned, and lifeboats, liferafts and muster areas facing the cargo area, shall also be capable of being served by one of the fire pumps (required in accordance with SOLAS regulation II-2/10.2.2.2.2) or the emergency fire pump, if a fire in one compartment could disable both fire pumps (required in accordance with SOLAS regulation II-2/10.2.2.2.2)."

and the following new paragraphs are added:

"11.3.4.1 For ships constructed on or after 1 January 2028, in cases where the emergency fire pump is used to meet paragraph 11.3.4, its capacity, in addition to being capable of maintaining two jets of water as required by paragraph 12.2.2.1.1 of the FSS Code, shall be increased taking into account the spray application rates stated in paragraph 11.3.2.1, but limiting coverage to boundaries of normally manned superstructures and deckhouses, survival crafts and their muster areas. Also, see paragraph 11.2.6 for requirements regarding maximum capacity calculation for emergency fire pump."

"11.3.4.2 For ships constructed on or after 1 January 2028, fire pumps and emergency fire pumps in paragraph 11.3.4 are fire pumps required by SOLAS regulation II-2/10.2.2 installed outside the space where spray pump(s) are located."

"11.3.4.3 For ships constructed on or after 1 January 2028, compartment in paragraph 11.3.4 is a compartment provided with A class boundaries in which is located the fire pump(s), or the source of power of the fire pump(s), serving the water-spray system in accordance with paragraph 11.3.3."

50 Paragraph 11.3.6 is amended to read as follows:

"11.3.6 All pipes, valves, nozzles and other fittings in the water-spray system shall be resistant to corrosion by seawater. Piping, fittings and related components within the cargo area (except gaskets) shall be designed to withstand 925°C. The water-spray system shall be arranged with in-line filters to prevent blockage of pipes and nozzles. In addition, means shall be provided to flush or back-flush the system with fresh water to prevent any blockages."

51 The following new paragraph 11.3.8 is added after paragraph 11.3.7 and subsequent paragraph 11.3.8 is renumbered as paragraph 11.3.9:

"11.3.8 For ships constructed on or after 1 January 2028, when isolating valves are fitted in the water-spray system to maintain the required water supply in the case that the system is fed from the emergency fire pump as indicated by 11.3.4, the operating position of the isolating valves shall be located outside the cargo area, so that they are readily accessible and, for valves that are normally closed, located in accordance with 11.3.7."

11.4 Dry chemical powder fire-extinguishing systems

52 In paragraph 11.4.8, the following new paragraph is added:

"11.4.8.1 Testing arrangements are to involve discharge using dry chemical powder from all monitors and hand hose lines on board, but a full discharge of the installed quantity of dry powder is not required. This testing can also be used to satisfy the requirement that the piping is free of obstructions, in lieu of blowing through with dry air all the distribution piping. However, after completion of this testing, the system, including all monitors and hand hose lines, are to be blown through with dry air; but only for the purpose of the system subsequently being clear from any residues of dry chemical powder."

CHAPTER 12
ARTIFICIAL VENTILATION IN THE CARGO AREA

12.1 Spaces required to be entered during normal cargo handling operations

53 The following new paragraph is added after paragraph 12.1.1, together with the associated footnote:

"12.1.1.1 For ships constructed on or after 1 January 2028, electric motor rooms located outside cargo area defined by 1.2.7 shall comply with requirements for separation of gas-safe and gas hazardous areas, including 12.1.10 and be designed in accordance with standards acceptable to the Organization.*

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* Refer to the recommendations published by the International Electrotechnical Commission (IEC 60092:502:1999)."

54 Paragraph 12.1.8 is amended to read as follows:

"12.1.8 Where fans are required by this chapter, full required ventilation capacity for each space shall be available after failure of any single fan, or spare parts shall be provided for at least one entire fan comprising a motor, starter spares and complete rotating element including shaft and bearings of each type. Full ventilation capacity shall be restored before use of the space for operational purposes."

55 Paragraph 12.2.2 is amended to read as follows:

"12.2.2 For permanent installations, the capacity of 8 air changes per hour shall be provided and for portable systems, the capacity of 16 air changes per hour shall be provided. Hold spaces and cofferdams accessed shall be provided with ventilation not less than the capacity of 2 air changes per hour, subject to meeting the requirements of 18.8."

CHAPTER 13
INSTRUMENTATION AND AUTOMATION SYSTEMS

13.2 Level indicators for cargo tanks

56 Paragraph 13.2.2 is amended to read as follows:

"Where only one liquid level gauge is fitted, it shall be arranged so that it can be maintained in an operational condition without the need to empty or gas free the tank. Any part of this level gauge, other than components not subject to failure under normal service, shall be capable of being repaired with the tank in service."

13.3 Overflow control

57 Paragraph 13.3.1 is amended to read as follows:

"13.3.1 Each cargo tank shall be fitted with an independent high liquid level alarm giving an audible and visual warning when activated."

58 Paragraph 13.3.2 is amended to read as follows:

"13.3.2 An additional independent sensor shall automatically actuate a shut-off valve in a manner that will both avoid excessive liquid pressure in the loading line and prevent the tank from becoming liquid full."

59 The following new paragraph 13.3.3 is added after paragraph 13.3.2 and the subsequent paragraph 13.3.3 is renumbered as 13.3.4:

"13.3.3 For ships constructed on or after 1 January 2028, the sensors in 13.3.1 and 13.3.2 shall be independent from other liquid level indicators."

60 Renumbered paragraph 13.3.4 is amended to read as follows:

"13.3.4 The emergency shutdown valve referred to in 5.5.2 and 18.10 may be used for this purpose."

61 Paragraph 13.3.4 starting with "A high liquid level alarm …" is deleted and paragraph 13.3.5 is amended to read as follows:

"13.3.5 The position of the sensors required by 13.3.1 and 13.3.2 shall be verified at each of the following occasions:

.1 at the first full cargo loading, or after the initial survey required in 1.4.2.1; and

.2 after each renewal survey as required in 1.4.2.2.

Function testing of high-level alarms shall be conducted by raising the cargo liquid level in the cargo tank to the alarm point. Alternative equivalent function testing arrangements may be considered, subject to the satisfaction of the Administration or recognized organization acting on its behalf."

62 The following new paragraph 13.3.8 is inserted after paragraph 13.3.7:

"13.3.8 The override system permitted by 13.3.7 may be used at sea to prevent false alarms or shutdowns. When level alarms are overridden, operation of cargo pumps and the opening of manifold ESD valves shall be inhibited except when high-level alarm testing is carried out in accordance with 13.3.5 (see 18.10.3.4)."

13.6 Gas detection

63 In paragraph 13.6.4, the following new paragraph is added:

"13.6.4.1 For ships constructed on or after 1 January 2028, two oxygen sensors are to be positioned at appropriate locations in the space or spaces containing the inert gas system, in accordance with paragraph 15.2.2.4.5.4 of the FSS Code, for all gas carriers, irrespective of the carriage of cargo indicated by an "A" in column "f" in the table in chapter 19 of the Code."

64 Paragraph 13.6.17 is amended to read as follows:

"13.6.17 For other spaces described by 13.6.2, alarms shall be activated when the vapour concentration reaches 30% LFL and safety functions required by chapter 16 shall be activated before the vapour concentration reaches 60% LFL. Where required by 16.7.3.3, the crankcases of internal combustion engines that can run on gas shall be arranged to alarm before 100% LFL."

65 In paragraph 13.9.3, the existing text is amended to read as follows:

"13.9.3 Key hazards of the integrated system based on combination and of computer-based technologies and interconnection of computer systems used for control, monitoring/alarm and safety systems for carriage, handling and conditioning of cargo liquid and vapours shall be identified using appropriate risk-based techniques. Such integrated systems shall ensure reliable communication between computer-based system components* and allow centralized access to monitoring/alarm and safety information and/or command/control.

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* Refer to *Guidelines for the onboard use and application of computers* (MSC/Circ.891)."

CHAPTER 15
FILLING LIMITS FOR CARGO TANKS

15.1 Definitions

66 In paragraph 15.1.3, sub-paragraph .1 is amended to read as follows:

".1 when no cargo vapour pressure/temperature control, as referred to in chapter 7, is provided, or for products requiring a type 1G ship, the temperature corresponding to the vapour pressure of the cargo at the set pressure of the PRVs; and"

67 Paragraph 15.2 is amended to read as follows:

"**15.2 General requirements**

15.2.1 The default value for the filling limit (FL) of cargo tanks is 98% at the reference temperature. Exceptions to this value shall meet the requirements of 15.3. The maximum filling limit of cargo tanks shall be so determined that the vapour space has a minimum volume at reference temperature allowing for:

.1 tolerance of instruments such as level and temperature gauges; and

.2 volumetric expansion of the cargo between the PRV set pressure and the maximum allowable rise stated in 8.4.

15.2.2 The ship shall be designed and operated in a manner to ensure the liquid level in the cargo tank shall not exceed the filling limit under all design conditions."

68 Paragraph 15.3 is amended to read as follows:

"**15.3 Determination of increased filling limit**

15.3.1 This section does not apply to type C tanks or tanks with MARVS greater than 0.07 MPa except where it is verified and accepted by the Administration or recognized organization acting on its behalf that the risks associated with the higher design pressure of these tanks are properly mitigated taking into account the specific design features, including venting systems requirement in paragraph 8.2.18, of the individual tank.

15.3.2 A filling limit greater than the limit of 98% specified in 15.2.1 may be permitted under the trim and list conditions specified in 8.2.17, providing:

.1 the PRV inlet arrangement shall remain in the vapour space; and

.2 allowances shall be provided for:

   .1 volumetric expansion of the liquid cargo due to the pressure increase from the MARVS to full flow relieving pressure in accordance with 8.4.1;

   .2 an operational margin of minimum 0.1% of tank volume; and

.3 tolerances of instrumentation such as level and temperature gauges.

15.3.3 In no case shall a filling limit exceeding 99.5% at reference temperature be permitted."

69 Paragraph 15.4 is amended to read as follows:

"**15.4 Maximum loading limit**

15.4.1 The maximum loading limit (LL) to which cargo tank may be loaded shall be determined by the following formula:

$$LL = FL \; \rho_R / \rho_L$$

where:

LL = loading limit as defined in 15.1.2, expressed in percentage;

FL = filling limit as specified in 15.1.1 expressed in percentage;

ρ_L = relative density of cargo at the loading temperature;

ρ_R = relative density of cargo at the reference temperature

15.4.2 The Administration or recognized organization acting on its behalf may allow type C tanks to be loaded according to the formula in 15.4.1 with the relative density ρ_R as defined below, provided that the tank vent system has been approved in accordance with 8.2.18:

ρ_R = relative density of cargo at the highest temperature that the cargo may reach upon termination of loading, during transport, or at unloading, under the ambient design temperature conditions described in 15.1.4.

This paragraph does not apply to product requiring a type 1G ship."

70 Paragraph 15.5 is deleted and paragraph 15.6 renumbered as paragraph 15.5.

CHAPTER 16
USE OF CARGO AS FUEL

16.1 General

71 Paragraph 16.1 is amended to read as follows and paragraph 16.1.2 added:

"16.1.1 Except as provided for in 16.9, methane (LNG) (CH_4), ethane (C_2H_6) and LPG are the only hydrocarbon fuels that may be utilized in machinery spaces of category A, and, in these spaces, they may only be utilized in systems such as boilers, inert gas generators, internal combustion engines, gas combustion units and gas turbines."

"16.1.2 LPG, for the purpose of chapter 16, is composed of propane (C_3H_8), butane (C_4H_{10}), or a propane-butane mixture as listed in chapter 19 and may contain small amounts of other hydrocarbons. It can be in either a liquefied or gaseous state. LPG in the liquefied state is referred to as LPG liquid, and LPG in the gaseous state is referred to as LPG vapour."

72 Paragraph 16.2 is retitled to read as follows:

"**16.2 General requirements for gas consumers and fuel systems**"

73 Paragraph 16.2.1 is amended to read as follows:

"16.2.1 For all fuels covered by 16.1**,** the fuel supply system shall comply with the requirements of 16.4.1, 16.4.2 and 16.4.3".

74 Paragraphs 16.2.3. 16.2.4 and 16.2.5 are added as follows:

"16.2.3 LPG or ethane fuel consumers and associated systems shall be designed for operation within the possible range of composition of the intended fuel. Information about the range of acceptable compositions shall be provided on board."

"16.2.4 The LPG or ethane fuel consumers shall exhibit no external visible flame and shall maintain the uptake exhaust temperature or, if impractical, sufficiently below the auto-ignition temperature of the fuel. In a mixture of gases, the component with the lowest auto-ignition temperature shall be the appropriate reference. The LPG or ethane fuel consumer exhaust gas temperature shall be continuously monitored. In case of consumer with a turbocharger, the temperature shall be measured after the turbocharger."

"16.2.5 A risk assessment using acceptable and recognized risk analysis techniques shall be conducted for LPG or ethane fuel supply arrangements including associated systems demonstrating an equivalent level of safety to utilizing LNG vapour as fuel and the results documented. The scope of the risk assessment shall include aspects of the cargo-handling system that are part of the fuel supply, including consumers. Consideration shall be given to the hazards associated with the arrangement, operation and maintenance of the fuel system, considering reasonably foreseeable failures. The risk assessment shall address the consequences of fuel leakage, considering the properties of LPG or ethane vapour and its accumulation or escape into another space."

75 Paragraph 16.3 is retitled to read as follows:

"16.3 Arrangement of spaces containing gas consumers or gas equipment"

76 Paragraphs 16.3.5 and 16.3.6 are added after paragraph 16.3.4 as follows:

"16.3.5 For spaces outside the cargo area containing LPG or ethane fuel systems, special consideration shall be given to the density and lower flammability limit (LFL) of LPG or ethane vapour. Ventilation capacity, including ventilation inlet and outlet location, shall be supported by numerical calculations performed in accordance with a recognized standard, such as a computational fluid dynamics (CFD), gas dispersion analysis, or approval by the Administration or recognized organization. Notwithstanding, for enclosed spaces within the cargo area, on the open deck and containing LPG or ethane fuel conditioning equipment, the requirements of paragraph 12.1.3 shall apply."

"16.3.6 For spaces outside the cargo area containing LPG or ethane fuel systems, in addition to the requirements of paragraph 13.6.12, gas detection heads shall be fitted in spaces where LPG or ethane vapour may accumulate particularly where air circulation is reduced or near the bottom of the space. The suitability of their location shall be supported by numerical calculations performed in accordance with a recognized standard, such as a CFD, gas dispersion analysis, a physical smoke test or approval by the Administration or recognized organization. The numerical calculations shall include the possible range of composition of the intended fuel."

77 Paragraph 16.3.4 is amended to read as follows:

"16.3.4 All vents and bleed lines that may contain or be contaminated by gas fuel shall be routed to ~~a~~ safe location external to the machinery space and be fitted with flame screen. For ships constructed on or after 1 January 2028, these vent and bleed lines shall be independent from cargo and cargo vent piping systems."

16.4 Gas fuel supply

78 Paragraph 16.4.1.1*bis* and paragraph 16.4.1.1*ter* are added after 16.4.1.1 as follows:

"16.4.1.1*bis* LPG or ethane fuel piping outside the cargo area shall be of double wall design or ducted and the outer boundary shall be continuous in the space. In spaces outside the cargo area, non-continuous double barriers shall not be used under the circumstances described in paragraph 16.4.6.2."

"16.4.1.1*ter* For LPG fuel supply systems, liquid, vent and purging shall lead to a fuel collection tank, gas-liquid separator or similar device located in the cargo area. Heating of the gas-liquid separator may be necessary for ships operating in cold areas. Fuel supply vent piping systems shall be designed to safely handle any fuel condensate which may occur without restricting the function of the system. Any liquids formed shall be safely disposed. Vent piping associated with the fuel supply system shall be fitted with an inert gas purging interface and shall include a means for preventing condensation of vapour in the system."

79 The following new paragraphs 16.4.1.3, 16.4.1.4, 16.4.1.4.1 and 16.4.1.4.2 are added after paragraph 16.4.1.2:

"16.4.1.3 For permanent installations, the inert gas piping connected to the fuel piping shall be fitted with double block and bleed valves. In addition, a non-return valve shall be installed in the inert gas piping upstream of the double block and bleed valves. For LPG liquid fuel supply systems, the piping shall have a means of being drained without release of liquid to the atmosphere. LPG liquid trapped in double block and bleed valves or the inert gas system piping shall have a means of being drained without release of liquid to the atmosphere."

"16.4.1.4. All safety functions related to gas burning form the Gas Burning Safety System. This system may be a part of the cargo automation and safety system as described in chapter 13.8.1 or a stand-alone system interfacing with the same and built to the same requirements."

"16.4.1.4.1 Main functions as described in the subsequent paragraphs as well as in other parts of this Code with reference to table 18.1 as guidance."

"16.4.1.4.2 A full cargo ESD shall initiate the closure of the Master Valves described in 16.4.6.1."

80 Paragraph 16.4.3 is renumbered as 16.4.3.1 and paragraph 16.4.3.2 is added as follows:

"16.4.3.2 For LPG or ethane fuel systems, the air inlet of the pipe or duct shall not be in a machinery space. In addition, the air inlet of the pipe or duct shall be in a location which would be safe in the absence of the air inlet. Consideration shall be given to the risk of liquid carry-over resulting from a liquid leak. Ventilation outlets of the pipe or duct shall be in the cargo area."

81 Paragraph 16.4.5 is amended to read as follows:

"16.4.5 The supply and return piping of each gas consumer unit shall be provided with fuel isolation by automatic double block and bleed, vented to a safe location, under both normal and emergency operation. The automatic valves shall be arranged to fail to the closed position on loss of actuating power. In a space containing multiple consumers, the shutdown of one shall not affect the gas fuel supply to the others. For LPG or ethane liquid fuel supply systems, the piping shall be able to be drained and bleed valves opened without release of liquid to the atmosphere."

16.5 Gas fuel plant and related storage tanks

82 Paragraph 16.5.2.2 is amended to read as follows:

"16.5.2.2 Fuel supply equipment is to be included into all safety actions/shutdowns required by any of the cargo system related safety systems insofar as fuel supply is not safe while the respective action is ongoing."

16.7 Special requirements for gas-fired internal combustion engines

83 In paragraph 16.7.1.4, the existing text is amended to read as follows:

"16.7.1.4 Unless designed with the strength to withstand the worst-case overpressure due to ignited gas leaks, air inlet manifolds, scavenge spaces, exhaust system and crank cases shall be fitted with suitable pressure relief systems. Pressure relief systems shall lead to a safe location, away from personnel, as follows:

.1 A suitable pressure relief system for air inlet manifolds, scavenge spaces and exhaust system is to be provided unless designed to accommodate the worst-case overpressure due to ignited gas leaks or justified by the safety concept of the engine. A detailed evaluation regarding the hazard potential of overpressure in air inlet manifolds, scavenge spaces and exhaust system is to be carried out and reflected in the safety concept of the engine.

.2 The case of crankcases, the explosion relief valves, as required by SOLAS regulation II-1/27.4, are to be considered suitable for the gas operation of the engine. For engines not covered by the said SOLAS regulation, a detailed evaluation regarding the hazard potential of fuel gas accumulation in the crankcase is to be carried out."

84 The following new paragraphs 16.7.3.3.1 to 16.7.3.3.3 are added after paragraph 16.7.3.3 and before paragraph 16.7.3.4:

"16.7.3.3.1 For ships constructed on or after 1 January 2028, for Otto combustion process gas and dual fuel engines where the space below the piston is in direct communication with the crankcase, gas detection shall be provided to the crankcase, sumps (vent space) and charge air manifolds unless otherwise justified by the safety concept of the engine."

"16.7.3.3.2 For ships constructed on or after 1 January 2028, for Otto combustion crosshead engine designs, gas detection shall be provided to the piston underspace side unless otherwise justified by the safety concept of the engine."

"16.7.3.3.3 For ships constructed on or after 1 January 2028, for all engine types (e.g.4-stroke, 2-stroke, trunk piston, crosshead, Otto or Diesel combustion process), a detailed evaluation regarding the hazard potential of fuel gas accumulation in the crankcase, sumps, scavenge spaces/charge air manifolds and cooling system vents shall be carried out and reflected in the safety concept of the engine. This may identify alternative means to detect and/or mitigate gas operation fault conditions."

16.8 Special requirements for gas turbines

85 Paragraph 16.8.1.1*bis* is added after 16.8.1.1 as follows:

"16.8.1.1*bis* Each turbine using LPG fuel shall be fitted with a gastight enclosure unless fuel supply piping meets the requirements of paragraph 16.4.3. The consequences of gas leakage shall be evaluated in the risk assessment required by 16.2.5."

CHAPTER 17
SPECIAL REQUIREMENTS

86 Paragraph 17.4 is amended as follows by adding a new unnumbered paragraph under the heading:

17.4 Refrigeration systems

"The special requirements in this paragraph listed under column "i" in the table in chapter 19 are applicable only when a refrigeration system is required or used to maintain the cargo tank pressure and temperature within design limits of the containment system and/or within the conditions of carriage of the cargo indicated on the Certificate of Fitness."

87 In paragraph 17.21, the existing text is amended to read as follows:

"**17.21 Carbon dioxide**

17.21.1 Uncontrolled pressure loss from the cargo can cause solidification and the cargo will change from the liquid to the solid state. The precise triple point temperature of a particular carbon dioxide cargo shall be supplied before loading the cargo, and will depend on the purity of that cargo. The set pressure for the alarms and automatic actions described in this section shall be set to at least 0.05 MPa above the highest triple point pressure of the cargo being carried under all expected conditions. The triple point for pure carbon dioxide occurs at 0.417 MPa gauge and -56.6°C."

88 Paragraph 17.21.4 is amended to read as follows:

"17.21.4 Cargo tanks shall be continuously monitored for low pressure when carbon dioxide cargo is carried. An audible and visual alarm shall be given at the cargo control position and on the bridge. If the cargo tank pressure falls to the set pressure for alarms and automatic actions specified in 17.21.1, the monitoring system shall automatically close all cargo manifold liquid and vapour valves and stop all cargo compressors and cargo pumps. The emergency shutdown system required by 18.10 may be used for this purpose."

89 Paragraph 17.21.6 is amended to read as follows:

"17.21.6 Cargo hold spaces, cargo compressor rooms and other enclosed spaces where carbon dioxide could accumulate shall be fitted with continuous monitoring for carbon dioxide build-up. The alarms shall be set to 5,000 ppm."

90 The following new paragraph~~s~~ 17.21.7 and 17.21.8 are added after paragraph 17.21.6:

"17.21.7 The materials of construction used in the cargo system shall also take into account the possibility of corrosion, in case carbon dioxide cargo contains impurities such as water or sulphur dioxide, which can cause acidic corrosion or other problems."

"17.21.8 Other requirements

17.21.8.1 The requirements for flammable products may be waived.

17.21.8.2 Carbon dioxide is considered a toxic product for the purpose of the Code.

The IGC Code requirements for toxic products are limited to the requirements indicated in the following paragraphs and as shown in table in chapter 19 for carbon dioxide.

17.21.8.3 The requirements of 3.2.5, 3.3.4, 3.6, 5.7.4, 12.1.7, 12.1.9, 13.6.11, 13.6.14, 13.6.15, 13.6.17 and 18.10.3.4, as well as chapters 10 (except for 10.2.6) and 11 do not apply to ships that exclusively carry this cargo.

17.21.8.4 In the application of 3.1.2 and 3.1.3, a single A-0 bulkhead shall be considered sufficient for this cargo.

17.21.8.5 In the application of 3.3.1, the requirement of SOLAS regulation II-2/9.2.3 for cargo spaces shall be applied instead of SOLAS regulation II-2/9.2.4 for cargo pump-rooms.

17.21.8.6 In the application of 3.8, bow or stern loading and unloading shall be allowed subject to the approval by the Administration.

17.21.8.7 When flammable or other toxic products are used for fuel or reliquefication systems, due consideration shall be applied to the additional risk.

17.21.8.8 In the application of chapter 9, inert gas may be not required based on the specific design. Dry air may be required to prevent condensation in hold space, cargo tanks and piping to gas free tanks.

17.21.8.9 In the application of chapter 13, all requirements (except those exclusively related to flammability) shall be applied except for 13.6.5 ."

91 Paragraph 17.22 is deleted.

CHAPTER 18
OPERATING REQUIREMENTS

18.9 Cargo sampling

92 In paragraph 18.9, the following new paragraph is added:

"18.9.6 The requirements as required from paragraphs 18.9.1 to 18.9.5 are only applicable if such a sampling system is fitted on board. Connections used for control of atmosphere in cargo tanks during inerting or gassing up are not considered as cargo sampling connections."

18.10 Cargo emergency shutdown (ESD) system

93 Paragraph 18.10.1.1 is amended to read as follows:

"18.10.1.1 A cargo emergency shutdown system shall be fitted to stop cargo flow in the event of an emergency, either internally within the ship, or during cargo transfer to ship or shore. The ESD system is intended to return the cargo system to a safe static condition so that any remedial action can be taken. The design of the ESD system shall avoid the potential generation of surge pressures within cargo transfer pipe work."

94 Paragraph 18.10.1.3 is amended to read as follows:

"18.10.1.3 The ESD system shall be activated by the manual and automatic initiations listed in table 18.1, which is a summary of ESD shutdown-related system functions taking into account those required by the relevant sections of the IGC Code, including chapter 16 and may not describe all requirements. The actual enforceable requirements are found in the text of the Code. Any additional initiations shall only be included in the ESD system if it can be shown that their inclusion does not reduce the integrity and reliability of the system overall. A failure of any part of the system shall activate an ESD. Failure of the system includes loss of motive power for ESD valves and main electric power failure."

95 Paragraph 18.10.2.1.3 is amended to read as follows, and paragraphs 18.10.2.1.4, 18.10.2.2 and 18.10.2.3 are deleted:

"18.10.2.1.3 ESD valves in liquid piping systems shall close fully and smoothly within 30 seconds of initiation of the emergency shutdown. Information about the closure time of the valves and their operating characteristics shall be available on board, and the closing time shall be verifiable and repeatable.

96 The following paragraphs 18.10.3.1 and 18.10.3.2 are added after the heading "18.10.3 ESD system controls", and the subsequent paragraphs 18.10.3.1 to 18.10.3.4 are renumbered as 18.10.3.3 to 18.10.3.6 accordingly:

"18.10.3.1 The ESD system shall be designed to be activated by the manual and automatic initiations as specified in the Code. Any additional initiations shall only be included in the ESD system if it can be shown that their inclusion does not reduce the integrity and reliability of the system overall."

"18.10.3.2 The ESD system shall be fail-safe. If any single part of the system fails, ESD shall be initiated."

97 Paragraph 18.10.3.3 is amended to read as follows:

"18.10.3.3 Cargo machinery that is running shall be stopped by activation of the ESD system by causes in the relevant sections of the Code with reference to table 18.1 as guidance."

98 Table 18.1 is replaced by the following table, together with the associated notes:

"**Table 18.1 – Shutdown-related system cause and effect functions**

Initiation		Shutdown action (See 8.10.1.1)								
		Emergency shutdown system (ESD)						Gas Burning Safety System (GBSS)		
		Cargo Pumps	Compressor used for cargo handling	ESD valves on manifold	Cargo tank ESD valves	ESD link (to terminal)	Reliquefication plant including relevant aux systems and compressor	Pumps used for gas fuel	Compressors used for gas fuel	Master valve
1	ESD System failure (see 18.10.1.3)	V	V	V	V	V	V	V	V	V
2	ESD Push-button (see 18.10.3.3)	V	V	V	V	V	V	V	V	V
3	Fire detection in cargo area. (see 18.10.3.4)	V	V	V	V	V	V	V	V	V
4	ESD link from terminal① (see 18.10.1.4)	V	V	V	V①	V	N/A	N/A	N/A	N/A
5	Overflow protection (See 13.3.2) ②	V	V	V	V	V	V	V	V	V
6	Low pressure protection in cargo tanks ④ (see 8.3.1.1, 18.10.4)	V	V	V	V	V	V	V	V	V
7	Master valve receives shut signal ③ (see 16.4.2, 16.4.3, 16.4.6.2.1, 16.4.6.3.1, 16.4.8)	N/A	N/A	N/A	N/A	N/A	N/A	V	V	V
8	Fuel gas push-button (see 16.4.6.2.2, 16.4.6.3.2, 16.5.2.1)	N/A	N/A	N/A	N/A	N/A	N/A	V	V	V
9	Low suction pressure in gas fuel (see 16.5.2.2) ④	N/A	N/A	N/A	N/A	N/A	N/A	V	V	V
10	Fire detection outside cargo area (see 16.5.2.2)	N/A	N/A	N/A	N/A	N/A	N/A	V	V	ü

Note:
① ESD link (from terminal) does not trip the gas fuel supply or cargo reliquefication as the emergency is on the terminal, tripping of necessary tank valves is optional.

② The sensors referred to in 13.3.2 may be used to automatically close the individual tank filling valve if this can be done in a manner that will avoid excessive liquid pressure in the loading line. Alternatively full ESD can be initiated as given in the table.

③ Master valve receive shut signal refers to main valve required by 16.4.6.1 and not individual consumers. In case several consumers are served by different supply systems, only common equipment needs to be shut down.

④ Vacuum protection of cargo tanks and low suction pressure in gas fuel can be the same protection.

99 In paragraph 18.10.4, the heading is amended to read as follows:

"18.10.4 *Associated safety systems*"

CHAPTER 19
SUMMARY OF MINIMUM REQUIREMENTS

100 In explanatory notes to the summary of minimum requirements, the existing entries in the table are amended, and a new entry is added, as follows:

Product name		***Ship type***	***Independent tank type C required***	***Control of vapour space within cargo tanks***	***Vapour detection***	***Gauging***		***Special requirements***
Carbon Dioxide		3G	'	'	T	C		17.21
			'	'				
VOC Condensate		2G/2PG	-	-	F + T*	C		14.4.2, 14.4.3, 17.9, 17.11

APPENDIX 2

MODEL FORM OF INTERNATIONAL CERTIFICATE OF FITNESS FOR THE CARRIAGE OF LIQUEFIED GASES IN BULK

101 The table in paragraph 3.3 is amended to read as follows, paragraph 3.5 is added, paragraph 4 is amended to read as follows, and a new paragraph 5 is added as follows. The existing paragraphs 5 to 7 are renumbered as 6 to 8:

".3

Tank type and number	Stress factors[5]				Materials[5]	MARVS[6]	Cargo/fuel
	A	B	C	D			
Cargo piping							
Fuel vapour or liquid piping							

.4 Mechanical properties of the cargo tank materials were determined at ….°C[7].

.5 Mechanical properties of the fuel tank materials were determined at ….°C.[7]"

"4 That the ship is suitable for the carriage in bulk of the following products as cargo provided that all the relevant operational provisions of the Code are observed.[8]

Products	**Conditions of carriage (tank numbers, etc.)**	**Minimum temperature**
Continued on attachment 1, additional signed and dated sheets. Tank numbers referred to in this list are identified on attachment 2, signed and dated tank plan.		

"

"5 That the ship is suitable for the carriage and use of the following products as fuel provided that all the relevant operational provisions of the Code are observed.[8]

Products	**Conditions of carriage and use (tank numbers, etc.)**	**Minimum temperature**
Continued on attachment 1, additional signed and dated sheets. Tank numbers referred to in this list are identified on attachment 2, signed and dated tank plan.		

"

APPENDIX

CHECK/MONITORING SHEET FOR THE PROCESS OF AMENDING THE CONVENTION AND RELATED MANDATORY INSTRUMENTS (PROPOSAL/DEVELOPMENT)

Part III – Process monitoring to be completed during the work process at the Sub-Committee and checked as part of the final approval process by the Committee (refer to paragraph 3.2.1.3)

1	The Sub-Committee, at an initial engagement, has allocated sufficient time for technical research and discussion before the target completion date, especially on issues needing to be addressed by more than one Sub-Committee and for which the timing of relevant sub-committees meetings and exchanges of the result of consideration needed to be carefully examined.	Yes
2	The scope of application agreed at the proposal stage was not changed without the approval of the Committee.	Yes
3	The technical base document/draft amendment addresses the proposal's issue(s) through the suggested instrument(s); where it does not, the Sub-Committee offers the Committee an alternative method of addressing the problem raised by the proposal.	N/A
4	Due attention is to be paid to the *Interim Guidelines for the systematic application of the grandfather clause* (MSC/Circ.765).	N/A
5	All references have been examined against the text that will be valid if the proposed amendment enters into force.	Yes
6	The location of the insertion or modified text is correct for the text that will be valid when the proposed text enters into force on a four-year cycle of entry into force, as other relevant amendments adopted might enter into force on the same date.	Yes
7	There are no inconsistencies in respect of scope of application between the technical regulation and the application statement contained in regulation 1 or 2 of the relevant chapter, and application is specifically addressed for existing and/or new ships, as necessary.	Yes
8	Where a new term has been introduced into a regulation and a clear definition is necessary, the definition is given in the article of the Convention or at the beginning of the chapter.	Yes
9	Where any of the terms "fitted", "provided", "installed" or "installation" are used, consideration has been given to clarifying the intended meaning of the term.	Yes

10	All necessary related and consequential amendments to other existing instruments, including non-mandatory instruments, in particular to the forms of certificates and records of equipment required in the instrument being amended, have been examined and included as part of the proposed amendment(s).	Yes
11	The forms of certificates and records of equipment have been harmonized, where appropriate, between the Convention and its Protocols.	N/A
12	It is confirmed that the amendment is being made to a currently valid text and that no other bodies are concurrently proposing changes to the same text.	Yes
13	All entry-into-force criteria (building contract, keel laying and delivery) have been considered and addressed.	Yes
14	Other impacts of the implementation of the proposed/approved amendment have been fully analysed, including consequential amendments to the "application" and "definition" regulations of the chapter.	Yes
15	The amendments presented for adoption clearly indicate changes made with respect to the original text, so as to facilitate their consideration.	Yes
16	For amendments to mandatory instruments, the relationship between the Convention and the related instrument has been observed and addressed, as appropriate.	Yes
17	The related record format has been completed or updated, as appropriate.	Yes

RECORD FORMAT

The following records should be created and kept updated for each regulatory development.

The records can be completed by providing references to paragraphs of related documents containing the relevant information, proposals, discussions and decisions.

1 Title (number and title of regulation(s))
IGC Code chapters 1,2,4,5,8,9,10,11,12,13,15,16,17,18, and the Model Form of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk
2 Origin of the requirement (original proposal document)
The output was proposed by MSC 102/21/1. The large number of UIs submitted to the CCC Sub-Committee since the entry into force of the IGC Code in 2016 indicates there is a clear need to update the IGC Code, taking account of the experience gained. Additional outputs were added by MSC 103/21 paragraph 18, Completion of agenda item 1.17 has been extended to 2024. Refer to biennial status report for 2022-23. See section 5 (history of discussion) for more information.
3 Main reason for the development (extract from the proposal document)
"Review of the IGC Code" has been extended to 2024, and those draft amendments that could not be completed at CCC 9, were finalized at CCC 10. The amendments include a variety of issues, including application of finite element analysis to type C tanks, carriage of CO_2 cargoes, the use of LPG and toxic cargoes as fuel, the causes and effects of an ESD and cargo tank filling limits.
4 Related output
Amendments to the IGC Code and development of guidelines for ammonia cargo as fuel

5	**History of the discussion (approval of work programmes, sessions of sub-committees, including CG/DG/WG arrangements)**
CCC 6 endorsed the work plan for the next phase of the development of the IGC Code and endorsed the output on "Review of the IGC Code". **CCC 9** developed amendments, for approval at MSC 109 and adoption at MSC 110. **CCC 10** Continued development of additional amendments which had not been agreed upon at CCC 9, with a view to entry into force on 1 January 2028.	
6	**Impact on other instruments (codes, performance standards, guidance circulars, certificates/records format, etc.)**
Model Form of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk [and Interim Guidelines on the use of Ammonia as Fuel]	
7	**Technical background**
7.1	***Scope and objective (to cross-check with items 4 and 5 in part II of the checklist)***
The amendments include a variety of issues including application of finite element analysis to type C tanks; carriage of CO_2 cargoes; the use of LPG and toxic cargoes as fuel; the causes and effects of an ESD; and cargo tank filling limits.	
7.2	***Technical/operational background and rationale (e.g. summary of FSA study, if available, or engineering challenge posed)***
Not applicable	
7.3	***Source/derivation of requirement (non-mandatory instrument, industry standard, national/regional requirement)***
Not applicable	
7.4	***Short summary of requirement (what is the new requirement – in short and lay terms)***
The amendments will enhance safety by regulating a variety of issues including application of finite element analysis to type C tanks; carriage of CO_2 cargoes; the use of LPG and toxic cargoes as fuel; the causes and effects of an ESD; and cargo tank filling limits.	
7.5	***Points of discussions (controversial points and conclusion)***
Not applicable	

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ANNEX 26

DRAFT AMENDMENTS TO THE ORGANIZATION AND METHOD OF WORK OF THE MARITIME SAFETY COMMITTEE AND THE MARINE ENVIRONMENT PROTECTION COMMITTEE AND THEIR SUBSIDIARY BODIES (MSC-MEPC.1/CIRC.5/REV.5)

1 The Maritime Safety Committee, at its [~~107th~~ 109th session (~~31 May to 9 June 2023~~2 to 6 December 2024)], and the Marine Environment Protection Committee, at its [eight~~ieth~~y-third] session (~~3 to 7 July 2023~~[7 to 11 April 202~~4~~5]), approved the revised document on *Organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies*, as set out in the annex, which reflects the decision of the Committees to introduce:

.1 new measures to address the workload of the Committees and their subsidiary bodies;

.2 procedures to facilitate assessment of capacity-building implications of new or amended mandatory instruments, as revised by the Working Group;

.3 safeguards and the decision-making process to be followed during consideration and approval of unified interpretations; and

.4 general improvements ~~a new paragraph 6.2 in the section "Preparation of documents" regarding document submission through the new Meeting Document Submission Portal~~.

2 Members are invited to apply the annexed document with immediate effect, as appropriate, and to bring it to the attention of their representatives at relevant IMO meetings, advising them to strictly observe its provisions.

3 This circular revokes MSC-MEPC.1/Circ.5/Rev.~~4~~5.

ANNEX

ORGANIZATION AND METHOD OF WORK OF THE MARITIME SAFETY COMMITTEE AND THE MARINE ENVIRONMENT PROTECTION COMMITTEE AND THEIR SUBSIDIARY BODIES

Table of contents

1 INTRODUCTION

Purpose and application

1.1 The purpose of this document is to provide a uniform basis for the Maritime Safety Committee (MSC) and the Marine Environment Protection Committee (MEPC) and their subsidiary bodies to conduct their work in an efficient and effective manner and to strengthen the linkage between the Organization's strategy, the work of the Committees and the biennial budget, with a view to achieving IMO's mission over a biennium. This in turn will enable the Committees to respond successfully to the needs for enhanced maritime safety, maritime security and protection of the marine environment, thus providing an efficient mechanism towards achieving the desired goals of the Organization.

1.2 Proper application of the document will also enhance the ability of Committee members and delegations to meetings of subsidiary bodies of the Committees to cover the full spectrum of IMO activities relevant to their work and thus provide for their effective participation in the rule-making process of the Organization. It is also expected that the document will enable the Committees to further improve their decision-making functions.

1.3 The document is applicable to the work of the Committees and their subsidiary bodies as well as to that of working, drafting, ~~and~~ correspondence, intersessional working and other groups set up by these bodies. The Chairs of the Committees, subsidiary bodies, and working, drafting, intersessional working and other groups as well as coordinators of correspondence groups should make all efforts to ensure strict compliance with the document.

1.4 The document will be kept under review and will be updated as necessary in the light of experience gained in its application, taking into account the document on *Application of the Strategic Plan of the Organization* (resolution ~~A.1111(30)~~A.1174(33)).

Objectives

1.5 The provisions of this document are aimed at achieving the following objectives:

.1 to align and strengthen the planning and reporting processes by linking agenda-setting and reporting clearly to the Strategic Plan;

.2 to strengthen the linkage between outputs on the biennial agenda and the resources required to deliver the outputs;

.3 to facilitate the efforts of the Committees in controlling and monitoring the Organization's work;

.4 to promote discipline in adherence to the planning procedures and documents;

.5 to promote objectivity, clarity and realistic time frames in the establishment of biennial agendas by the Committees and their subsidiary bodies;

.6 to ensure maximum possible participation by all Member States and by organizations with observer status in the work of the Committees and their subsidiary bodies; and

.7 to establish responsibilities and promote involvement in the planning and reporting processes.

2 DEFINITIONS

For the purpose of this document, the following definitions apply:

.1 *IMO organs* are the Assembly, Council and ~~committees~~ Committees of the Organization specified in Article 11 of the IMO Convention, including their subsidiary bodies.

.2 *Strategic Plan* is the Strategic Plan for the Organization for a six-year period as adopted by the Assembly, which includes key strategic directions to enable IMO to achieve its mission.

.3 *Output* is an item to be delivered by one or more IMO organs during the current biennium or accepted for a subsequent biennium.

.4 *Agenda* is a list of outputs for discussion at a particular meeting.

.5 *Biennial agenda* is a list of outputs to be delivered by a Committee or subsidiary body during a biennium.

.6 *Post-biennial agenda* is a list of outputs accepted by the Committees in one biennium that are to be delivered or initiated in the next biennium.

.7 *Parent organ* is the IMO organ responsible for delivering an output.

.8 *Coordinating organ* is the IMO organ assigned to coordinate the technical work undertaken by associated organ(s).

.9 *Associated organ* is an IMO organ assigned to undertake the technical work, if necessary, under the coordination of a coordinating organ, to facilitate the delivery of an output.

.10 *Continuous output* is a multiple session output without a target completion year that may be progressed annually or with variable intervals.

.11 *Road map* is an indicative plan providing the timeline of how an output is envisaged to progress across the Organization.

3 COORDINATION OF WORK

3.1 The Committees should function as policymaking bodies and their subsidiary bodies as purely technical bodies.

3.2 The Committees should routinely examine their outputs, allocate work to their subsidiary bodies, review the allocation of meeting weeks to each body and approve their respective biennial and provisional agendas, taking into account any recommendations made by meetings of the Committees' and subsidiary bodies' Chairs, convened as provided in paragraph 3.4.

3.3 The Committees should regularly review the status of all conventions, protocols and other major instruments under their purview.

3.4 The Committee Chairs may convene an in-person or hybrid/remote meeting of Chairs of the Committees' subsidiary bodies at least once a year. This meeting should preferably take place at the spring session of MSC or MEPC, to advise the Committees on subjects such as those referred to in paragraph 3.2, ensure coordination of the work and examine other matters pertinent to the effective conduct of business and management of the work of the Committees and their subsidiary bodies.

3.5 The Committee Chairs should, at the end of the first year of the biennium, submit to their respective Committees a joint plan covering the activities, priorities and meetings of the Committees and their subsidiary bodies for the coming biennium, for consideration in the subsequent year.

3.6 When both Committees have been charged by the Council, Assembly or a conference with considering a specific item and one Committee has finalized its consideration, the other Committee should consider it at its first subsequent session.

3.7 When an issue is transferred to one of the Committees by another ~~committee~~ Committee of the Organization for specific action, the Committee, before including the subject in question in the biennial agenda, should decide that the provisions of section 4, as appropriate, are fully satisfied, even if the issue, in accordance with the criteria of the referring ~~committee~~Committee, satisfies the requirements of resolutions A.500(XII), A.777(18) and A.900(21).

4 WORK PLANNING AND DELIVERY PROCESS

Outputs

4.1 The Committees shall identify, in a timely manner, the outputs to be included in the ~~list of outputs for the next biennium~~next biennial agenda, and the Secretariat should develop its Business Plan, as such identification provides a basis for making an estimate of the budget required for that biennium.

4.2 In the process of ~~constructing the list of outputs for the next biennium~~preparing the next biennial agenda, the following outputs should be included:

.1 continuous ~~and annual~~ outputs~~within the current list of outputs~~;

.2 outputs that have not been completed;

.3 outputs from the post-biennial agenda, subject to personnel and budgetary resources availab~~ility~~le; and

.4 any other proposals for new outputs, following their assessment in accordance with the provisions in paragraph 4.6.

4.3 ~~Decisions on the list of outputs for the next biennium~~ While preparing the next biennial agendas, the Committees shall be guided by the strategic directions in the Strategic Plan and shall take due account of:

.1 the specific necessity for an output to be started during the current biennium;[1]

[1] The normal action will be for outputs, if accepted, to be placed on the post-biennial agenda, and only in exceptional circumstances will outputs be added to the biennial agenda and ~~current list of outputs~~ the provisional agenda of the subsequent session of the relevant IMO organ.

.2 the potential impact that the inclusion of an output in the biennial agenda may have in the timely delivery of other outputs during the biennium;

.3 the potential impact that the inclusion of an output may have on the workload of the Committees and their subsidiary bodies delivering the output;

.4 the personnel and budgetary resources available;

.5 the potential adverse impacts on the ability of the Organization to meet its objectives if a decision is made not to accept a proposal for inclusion of an output in the biennial or post-biennial agendas; and

.6 the potential impact that the inclusion of an output in the biennial agenda may have on small island developing States (SIDS) and least developed countries (LDCs).

4.4 ~~Outputs~~ Biennial agendas of Committees may be revised during the biennium ~~by the Committees~~, taking into account the provisions of paragraph 4.3, if subsequently endorsed by the Council.

4.5 The overview of the Organization's overall planning hierarchy and its links to related processes, and of the Organization's strategic planning process and its related planning and reporting flows during the course of a biennium are shown in diagrams 1 and 2 contained in annex 1 to the document on *Application of the Strategic Plan of the Organization* (resolution ~~A.1111(30)~~A.1174(33)).

Submission of proposals for new outputs or the expansion of the scope of an output

4.6 Documents containing proposals for new outputs or expansion of scope of existing outputs shall only be submitted to the Committees. To enable the Committees to carry out a proper assessment ~~of proposals for new outputs~~, submissions containing such proposals must, at a minimum, contain the information, including demonstration and documentation, set out in annex 1 ~~(see also annexes 5 and 6)~~.

4.7 The Committees may receive the results of a Formal Safety Assessment (FSA) study carried out in accordance with *Revised guidelines for Formal Safety Assessment (FSA) for use in the IMO rule-making process* (FSA Guidelines) (MSC-MEPC.2/Circ.12/Rev.2). The criteria in paragraph 4.3 also apply to the outcomes of an FSA study that may be regarded by the Committees as proposals for new outputs (see also paragraph 4.~~17~~18).

4.8 Member States should refrain from submitting to the Committees proposals for new outputs under specific agenda items. The Secretariat should not accept such submissions and should advise the submitting Administrations accordingly.

~~4.9 Proposals for new outputs shall not be submitted to a subsidiary body. A subsidiary body shall not undertake work on outputs or expand the scope of outputs unless directed or authorized to do so by its parent organ.~~

4.~~10~~9 Proposals for new outputs or the expansion of the scope of an output may be developed and submitted by a subsidiary body when such proposals arise from ~~other~~ considerations relating to outputs already on the agenda other than "any other business" of that subsidiary body.

4.~~11~~10 Proposals for ~~the inclusion of~~new outputs or the expansion of the scope of an output submitted to the Committees by non-governmental organizations shall be co-sponsored by Member States.

4.~~12~~11 Follow-up action in response to specific requests for action emanating from the Assembly and diplomatic conferences convened by IMO, United Nations conferences and bodies, regional intergovernmental conferences and other international and intergovernmental organizations, etc. shall be evaluated in the light of paragraph 4.3, unless they are specifically identified as urgent matters requiring immediate actions, and it is demonstrated that the risk of not acting will adversely affect the Organization's ability to meet its purposes.

Preliminary assessment ~~by the Committees' Chairs~~ of proposals for new outputs or the expansion of the scope of an output

~~4.13 In order to facilitate the consideration of proposals for new outputs by the Committees, the Chair of the Committee concerned should undertake a preliminary assessment of such proposals. The Chair should, for that purpose, be supported by the Vice-Chair and the Secretariat and should consult the Chair of any subsidiary body concerned.~~

~~4.14 The outcome of the preliminary assessment should be submitted to the Committee concerned for considerationand approval, and should include the appraisal by the Chair of:~~

~~.1 whether the proposal complies with the requirements for the submission of proposals for outputs, as specified in paragraph 4.6;~~

~~.2 whether the proposal complies with the criteria specified in paragraph 4.15;~~

~~.3 whether the demonstrated need of the proposal requires its inclusion on the biennial agenda; and, if so; and~~

~~.4 whether the agenda of the Committee can absorb the work associated with the output.~~

~~Assessment of proposals for outputs~~

~~4.15 Before deciding to accept a proposal for a new output, the Committee concerned shall carry out an assessment of the proposal against the following criteria:~~

~~.1 Is the subject addressed by the proposal considered to be within the scope of the mission of IMO?~~

~~.2 Does the proposal involve the exercise of functions conferred upon a Committee by or under any international convention or related instrument?~~

~~.3 Has a need for the output been justified and documented?~~

~~.4 Has an analysis been provided that justifies and documents the practicality, feasibility and proportionality of the proposed output?~~

~~.5 Has the analysis of the issue sufficiently addressed both the cost to the maritime industry and the relevant legislative and administrative burdens?[2]~~

~~.6 Are the benefits (e.g. enhanced maritime safety, maritime security, protection of the marine environment, or facilitation of maritime traffic) that are expected to be derived from the inclusion of the proposed output clearly stated?~~

~~.7 Do adequate industry standards exist or are they being developed?~~

~~.8 Has the proposed output been properly specified in SMART terms (specific, measurable, achievable, realistic, time-bound)?~~

~~.9 Does the completed checklist for addressing the human element (see annex 5) demonstrate that the human element has been sufficiently considered and addressed?~~

~~.10 If inclusion of the output in the current biennium is proposed, is this action properly justified?~~

~~.11 Would a decision to reject or postpone the commencement of the work in relation to the proposal pose an unreasonable risk to the Organization's overall mission?~~

4.12 In order to facilitate the consideration of proposals for new outputs, or the expansion of the scope of an output, a preliminary assessment of such proposals should be undertaken in advance of the relevant Committee session by a standing body (i.e. "Group of Chairs"), composed of the Chair(s) and Vice-Chair(s) of the Committee and the subsidiary bodies concerned, as appropriate, supported by the Secretariat.

4.13 Upon receipt of documents containing proposals for new outputs, the Secretariat should perform a compliance check to ensure the documents meet the requirements specified in paragraphs 4.6 and 6.12.2. Documents not meeting these requirements should not be accepted or further processed by the Secretariat.

4.14 When conducting the preliminary assessment of proposals for new outputs or the expansion of the scope of an output, the Group of Chairs should be guided by the criteria set out in part 2 of the form in annex 8.

4.15 The outcome of the Group of Chairs' preliminary assessment should be submitted by means of a working paper, which should include the form set out in annex 8 duly completed, to the Committee concerned, no later than two weeks before the opening of the relevant session, for consideration and decision.

4.16 In addition to conducting a preliminary assessment of proposals, the Group of Chairs may provide general recommendations to the relevant Committee to assist with the management of the workload of the Committee and its subsidiary bodies.

4.~~16~~17 Nothing in this document shall prohibit the Committees from taking immediate action on urgent matters if the risk of not acting will adversely affect the Organization's ability to meet its purposes.

~~[2] Refer to the checklist in annex 6, which should be completed by all proponents of outputs and attached to their proposals for consideration by the Committees. The Committees may also use the checklist before adopting new, or amending existing, mandatory instruments, in order to satisfy themselves that administrative requirements have been minimized to the greatest extent possible.~~

4.~~17~~18 ~~Paragraph 4.15 above~~ The assessment criteria set out in part 2 of annex 8 is also applicable to the outcome of an FSA study (see also paragraph 4.7). Annex 6 provides guidance for considering and reviewing the outcomes of FSA studies.

Decision on acceptance and inclusion of outputs or the expansion of the scope of an output

~~4.18 Based on its assessment in accordance with paragraph 4.15, having taken due account of the Chair's appraisal of the proposal in accordance with paragraphs 4.13 and 4.14, a Committee may decide that:~~

4.19 Following consideration of the outcome of the Group of Chairs' preliminary assessment, as well as any related documents submitted, the Committee may decide that:

.1 the proposal is not within the scope of the mission of the Organization and should not, therefore, be accepted for inclusion;

.2 the need has not been sufficiently demonstrated and therefore the output should not be included or expanded, as appropriate;

.3 the human element has not been sufficiently considered and addressed, and therefore the output should not be included or expanded, as appropriate;

~~.4 for outputs for which extensive work is required, such as the revision of conventions or the preparation of codes, the Chair of the associated body, or the coordinating body if applicable, should be invited, with the support of the Secretariat, to prepare a comprehensive and coherent plan of work in order to inform the Committee of the full impact of the proposed output before it finalizes its decision on the output;~~

~~.5 the urgency of the proposed action did not justify inclusion within the current biennium, and therefore accept the output for inclusion in the next biennium;~~
.4 the urgency of the proposed action has not been sufficiently justified and, therefore, the output or the expansion of its scope should be accepted for inclusion in the next biennium;

.~~6~~5 the implications for the present workload and resources of the Organization are unacceptable within the current biennium, and therefore ~~accept~~ the output should be accepted for inclusion in the next biennium; or

.~~7~~6 the demonstrated need for the output, or the expansion of its scope, is such that it should be included, together with a target date for completion, in the biennial agenda, provided it is satisfied that the implications for the workload and planning are acceptable.

Mission	Need to carry out the work	Human element considered and addressed	Urgency to deliver the output	Workload/personnel and budgetary resources	Decision
Within the mission of the Organization	Demonstrated	Demonstrated	Justified	Implications of workload and ~~planning~~ resources are acceptable within the current biennium	Accept output for inclusion within the current biennium
				Implications ~~for the present~~of workload ~~of~~	Accept output for inclusion in

Mission	Need to carry out the work	Human element considered and addressed	Urgency to deliver the output	Workload/personnel and budgetary resources	Decision
				~~the Organization~~and resources are unacceptable within the current biennium	the next biennium
	Demonstrated	Demonstrated	Not justified	Acceptable to next biennium	Accept output for inclusion in the next biennium
	Not demonstrated	Not demonstrated	Not justified	No need to further consider	Output not to be accepted for inclusion
Outside the mission of the Organization	No need to further consider	No need to further consider	No need to further consider	No need to further consider	Output not to be accepted for inclusion

4.~~19~~20 Following a decision by a Committee to include an output in its biennial or post-biennial agenda, it shall decide whether the output contributes to the delivery of a strategic direction. Outputs that are not directly related to the strategic directions can be accepted as "Other work".

4.~~20~~21 Upon a decision by a Committee to include an output in its post-biennial agenda, the Committee shall include the accepted output, and the timescale for completion, in its proposals for the list of outputs for the next biennium.

4.~~21~~22 The Committees shall report on their decisions on proposals for new outputs in their regular reports to the Council, for endorsement and in order to facilitate the monitoring of the delivery of current biennial agendas and the planning of future work.

4.~~22~~23 In pursuance of resolution A.998(25) on *Need for capacity-building for the development and implementation of new, and amendments to existing, instruments*, the Committees should assess the implications for capacity-building and technical cooperation and assistance~~against the criteria for identification of capacity-building implications,~~ in accordance with the procedures set out in annex 2.

Decision on inclusion of outputs in the biennial agendas of subsidiary bodies

4.~~23~~24 A decision by a Committee to include an output in the biennial agenda of a subsidiary body shall include clear and detailed instructions for the work to be undertaken by the subsidiary body or bodies concerned, preferably by establishing the terms of reference under which such work should be undertaken.

Coordination of outputs included in the agenda of more than one subsidiary body

4.~~24~~25 In deciding to include an output on the agenda of more than one subsidiary body, the Committee shall:

.1 designate the subsidiary body that is to coordinate the work so as to avoid duplication, maintain consistency in the standards being developed and ensure effective communication between the subsidiary bodies concerned;

.2 ensure that the coordinating subsidiary body can complete the work by the target completion year;

.3 ensure that only those subsidiary bodies essential for the completion of the work will be involved, in order to avoid superfluous work and documentation;

.4 ensure that the work is included in the biennial agendas of all the subsidiary bodies concerned;

.5 ensure that all the subsidiary bodies concerned are provided with the instructions related to the output, including the completed checklist for addressing the human element (see annex 5) for consideration during their inputs to the work;

.6 ensure that the coordinating subsidiary body reports to its parent organ(s) on the status of the work; and

.7 for interrelated outputs contributing to the same overall objective, designate the subsidiary body to oversee the consistency of the work on those outputs.

Additional considerations

4.~~25~~26 Submissions to the Committees or subsidiary bodies highlighting problems or shortcomings identified in a particular area(s) of maritime safety, maritime security or protection of the marine environment should, in general and where possible, also suggest appropriate solutions.

4.~~26~~27 When new constructional requirements have been proposed for new ships, the Committees and subsidiary bodies should, in order to minimize the unavoidable gaps in safety standards between new and existing ships, consider applying the proposed new requirements, or any modifications to them, to existing ships using the *Interim guidelines for the systematic application of the grandfather clauses* (MSC/Circ.765-MEPC/Circ.315).

4.~~27~~28 The human element is complex and multidimensional. It affects maritime safety, maritime security and protection of the marine environment. The Committees and subsidiary bodies should consider the human element whenever new requirements are developed and existing requirements are reviewed, by taking into account the human element principles, as set out in the annex to resolution A.947(23) on *Human element vision, principles and goals for the Organization*.

4.~~28~~29 Outputs for which extensive work is required, such as the preparation of new codes, should, when appropriate, be placed on the provisional agendas of alternate sessions of the bodies concerned to allow adequate time for preparatory work by delegations.

4.~~29~~30 In respect of subjects requiring research, contributions from other organizations and appropriate entities should be encouraged and taken into account. ~~Exchange of information on technological development should be encouraged.~~Provision of information to IMO organs on matters concerning technological developments that may have an impact on maritime safety, maritime security and protection of the marine environment should be encouraged.

4.~~30~~31 In the context of resolution A.911(22) on *Uniform wording for referencing IMO instruments*, subsidiary bodies should be guided in their work, as appropriate, by the guidelines annexed thereto.

4.~~31~~32 Substantial modifications of draft amendments to mandatory instruments being considered by the Committees with a view to adoption should be accepted for discussion only if they have been submitted in writing. However, in exceptional circumstances, where the draft amendments under consideration include significant discrepancies or omissions, or where serious difficulties in their application can be foreseen, the Committees may accept to discuss oral proposals aimed at resolving any problems identified.

Management, control and reporting

4.33 Committees and subsidiary bodies should at each session review the status of the continuous outputs under their purview and, if considered to be practical and applicable, may determine suitable alternative mechanisms (e.g. via intersessional arrangements, by correspondence only or with less frequent intervals) for their consideration, subject to approval by the parent body and/or Council, as appropriate.

4.~~32~~34 In implementing the list of outputs, proper management and control mechanisms shall be in place to ensure that:

.1 biennial agendas and provisional agendas of IMO organs are both clearly linked to the Strategic Plan, including the list of outputs;

.2 the objectives of the Strategic Plan can be met within the resource constraints of the Organization and its membership;

.3 the Organization's response to changes in the environment within which it operates is consistent with the Strategic Plan; and

.4 monitoring and reporting are such that progress on biennial agendas is explicitly linked to progress made on outputs.

4.~~33~~35 In order to provide a transparent link between the Strategic Plan and the Organization's work, the following principles shall be applied:

.1 the ~~list of~~ outputs contained in the biennial agenda shall – together with the Secretariat's Business Plan – form the basis of the biennial work of all the IMO organs and the budget of the Organization;

.2 the ~~items~~ outputs contained in the ~~agendas~~ provisional and biennial agendas of all IMO organs shall all be outputs in the list of outputs or included in the Secretariat's Business Plan;

~~.3 the biennial agendas of the Committees and their subsidiary bodies shall follow format 1 set out in annex 3 and should be annexed to the reports of each session;~~

.~~4~~3 for outputs with target completion dates within the current biennium, the biennial agenda shall specify the planned year of completion ~~and include any tasks that are to be completed on an annual basis~~;

.~~5~~4 for an ~~action~~ output that is expected to take more than one biennium to complete, ~~the list of outputs~~the biennial status report shall specify ~~the planned year of~~ the target completion year; the responsible Committee shall review the relevant output at the end of the biennium to assess the progress made and make a recommendation on whether to include it in the next ~~list of outputs~~biennial agenda;

.~~6~~5 continuous ~~items~~ outputs are discouraged, but in those cases where they are deemed unavoidable, it is still necessary for them to be given a "SMART" definition so that progress during the biennium can be assessed; and

.~~7~~6 documents submitted to the Committees and their subsidiary bodies shall clearly demonstrate the direct relation between the proposals they contain and the output to be delivered under the relevant agenda item, on the basis of the ~~list of outputs~~biennial agenda.

4.~~34~~36 Reports on the status of outputs included in the ~~list of outputs~~ biennial agenda shall follow format 1 set out in annex 3, and shall be annexed to the reports of each session of the Committees and their subsidiary bodies.[3] Such reports shall identify new outputs accepted for inclusion in the biennial agendas.

4.~~35~~37 In preparing their own biennial status reports, the Committees and their subsidiary bodies shall incorporate all reports they have received since their previous report on the status of outputs.

4.~~36~~38 The Committees shall establish and maintain post-biennial agendas which should follow format 2 set out in annex 3. These shall be annexed to the reports of each session. For planning purposes, the subsidiary bodies shall also maintain a list of the accepted outputs in the Committees' post-biennial agendas for outputs under their purview.

Preparation of the Committee~~'~~s' or subsidiary ~~body's~~ bodies' reports

4.~~37~~39 After consideration of the draft report of the Committee or subsidiary body, the Secretariat should prepare the final draft report for publication on the IMO document website (IMODOCS). Delegations will have five working days from publication of the final draft report to comment by correspondence. Comments should only address editorial corrections and improvements, including finalizing individual statements, and should not reopen discussion on decisions taken during the session.

4.~~38~~40 The Chair, supported by the Secretariat, will facilitate resolution of any comments received, as necessary. After the conclusion of the five-day correspondence period, the Secretariat, in consultation with the Chair, will publish a document on IMODOCS containing the comments received, together with an explanation of how they have been addressed. After the above document has been published, the final report will be prepared in due course for publication on IMODOCS.

Responsibilities

4.~~39~~41 Member States and the Secretariat shall ensure consistency and discipline in the administrative management of the planning and reporting cycle.

4.~~40~~42 Accordingly, the Chairs, Vice-Chairs and secretaries of the Committees and their subsidiary bodies have a specific responsibility for effective management of the planning and reporting cycle and for consistent and rigorous application of this document and the document on *Application of the Strategic Plan of the Organization* (resolution ~~A.1111(30)~~A.1174(33)).

4.~~41~~43 In order to fulfil the function mentioned in paragraph 4.~~38~~42, well-established cooperation and coordination are expected between the Chairs, Vice-Chairs and secretaries of the Committees and their subsidiary bodies by all available means, including face-to-face meetings and teleconferences, as deemed necessary.

[3] Should an associated organ not have been requested to consider an output during a session in the biennium, that organ is not required to include the specific output in its biennial agenda for that session.

Consideration and approval of unified interpretations

4.44 Unified interpretations (UIs) shall not be used as a means to circumvent the development process of mandatory requirements. In this context, when considering proposals for UIs concerning requirements of mandatory instruments, the following safeguards shall be observed:

.1 UIs should not amend mandatory requirements in Conventions and associated instruments;

.2 UIs should not go beyond the interpretation of mandatory requirements; and

.3 UIs should not contradict the mandatory requirements;

4.45 In cases where the development of a UI is not appropriate, submission of a proposal for a new output may be required.

4.46 Consensus is to be applied to the decision-making process of UIs by subsidiary bodies and Committees.

5 WORKING ARRANGEMENTS

Committees and subsidiary bodies

5.1 The subsidiary bodies should, as necessary, operate under the instructions of both MSC and MEPC and should report on specific outputs directly and separately to the Committee that has sought their expert advice, rather than reporting to both Committees.

5.2 The subsidiary bodies should periodically review their terms of reference to ensure that they accurately reflect the work being carried out.

5.3 The Committees should periodically review the necessity for the continued existence of their subsidiary bodies.

5.4 The subsidiary bodies should not recommend the convening of working groups during sessions of a Committee without prior consultation by the Chair of the subsidiary body concerned with the Chair of that Committee.

5.5 A subsidiary body may request a contribution from another body, in which case the latter should be allowed sufficient time to prepare its contribution, taking into account its outputs.

5.6 The Committees should not, as a rule, permit any subsidiary body to commence work on the review or improvement of provisions already approved by it until sufficient experience has been gained from the application of such existing provisions.

5.7 Subsidiary bodies should focus their efforts on carrying out the technical work entrusted to them and should not normally, without good reason, reopen discussions on the need or the compelling need for an output, whether it is on their agenda or not.

5.8 With the aim of facilitating the technical work being carried out effectively and efficiently, the proponent(s) of ~~proposals for~~ new outputs or the expansion of the scope of an output, should ensure that sufficient and relevant information, in line with the need or compelling need as determined by the Committee, is made available to the subsidiary body when embarking on its technical work. This shall include ~~the completed checklist on addressing the human element (see annex 5)~~ relevant information and analysis to ensure that the human element is considered and addressed during the course of the work.

5.9 Subsidiary bodies should not expand the scope of existing outputs ~~unless directed or authorized to do so by a Committee. Subsidiary bodies should not~~ or develop amendments to, or interpretations of, any relevant IMO instrument unless directed or authorized to do so by their parent ~~organ~~ Committee~~without prior authorization from a Committee~~. However, ~~in compliance with paragraph 4.9,~~ when seeking a Committee's direction or authorization to act as provided in the previous ~~two~~ sentence~~s (or when spontaneously proposing an output for the current biennium or a new output to be accepted for inclusion in a Committee's post-biennial agenda)~~, subsidiary bodies should ensure that their request complies with the provisions of paragraphs 4.3, 4.6 and ~~4.15~~annex 8, part 2, as appropriate. As subsidiary bodies may not have sufficient time to develop the required information, given that their biennial agendas are usually only discussed at the end of their sessions, interested delegations ~~should~~may, in consultation with the subsidiary body Chair and the Secretariat, prepare the necessary information after the session, for consideration by the parent Committee~~, which should accompany the proposal, necessary for the Committee to decide whether an output should be included in the subsidiary body's biennial agenda or in a Committee's post-biennial agenda~~. Following consideration of this information and the accompanying proposal, the Committee may decide to provide the subsidiary body with the necessary direction or authorization, as appropriate.

5.10 Subsidiary bodies should not, as a rule, issue circulars, which are supposed to be issued only after approval by the Committees. However, in exceptional cases, subsidiary bodies may issue circulars within their area of competence, subject to endorsement of their action by the Committee or Committees concerned at their first subsequent session.

5.11 Subsidiary bodies should avoid developing unified interpretations of guidelines. In cases where the existing text of guidelines is vague and therefore needs modification, the subsidiary body concerned should amend the guidelines accordingly, in lieu of developing a unified interpretation. Member States or subsidiary bodies may, for this situation, wish to consider a submission of a single session output to the parent committee in order to assign a new output to amend the guidelines.

5.12 When considering their outputs and/or their provisional agendas for the following session, subsidiary bodies should seek the advice of the Committees in the case of outputs, other than continuous outputs, for which no submissions have been received ~~for two consecutive sessions~~at the session allocated to consider the output.

Guidance on the selection of outputs for the provisional agenda

5.13 Subsidiary bodies should select outputs for their provisional agendas in a manner ensuring that proper consideration is given to important and urgent issues, taking into account:

.1 the number of working days of each session; and

.2 the number of working and drafting groups that the subsidiary body intends to establish.

5.14 Outputs should be selected first from the biennial agenda and, where the subsequent session will occur in the coming biennium, from the accepted outputs included in the Committee's post-biennial agenda.

5.15 The total number of selected outputs and the workload of the subsidiary bodies' provisional agendas should be kept at an appropriate and manageable level, ensuring high-quality output. Outputs selected from the Committees' post-biennial agendas should be included in the subsidiary bodies' agendas only when the outputs of the relevant biennial agenda are completed and the capacity of the subsidiary body allows the inclusion of additional outputs.

5.16 The remaining outputs not selected will be kept in abeyance and will be transferred to the provisional agendas of the subsidiary bodies as and when selected by them and endorsed by the Committee concerned, taking into account the overall workload of the subsidiary bodies responsible for the work.

Working, drafting, correspondence, intersessional working and other groups

Working groups

5.17 The Committees and their subsidiary bodies should keep the number of working groups formed during their sessions to a minimum; however, a maximum of three working groups may be established when necessary, bearing in mind the difficulties that small delegations experience in being represented in such groups and the fact that such groups work without interpretation. When a working group has completed its task and has been terminated, no other working group should be convened in its place during the same session. To that end, subsidiary bodies should endeavour to consider, as appropriate, items on their agenda in plenary, rather than establishing groups to deal with them.

5.18 Where more than three working groups are needed to deal with different subjects in one session, the Committees and subsidiary bodies should establish an order of priority for possible subject items and decide accordingly. Where more than three unrelated topics need to be covered by independent working groups over several sessions, arrangements may be made for groups concerned to meet at alternate sessions of the Committee and subsidiary body concerned, within the maximum of three working groups per session.

~~5.19 Working groups may start work on the first morning of a session under draft terms of reference presented by the Chair of the Committee or subsidiary body concerned, pending formal discussion of those terms of reference under the relevant agenda item. However, these measures should be an option and be decided at the meeting with caution. Whenever possible, terms of reference for working groups should be agreed at the previous sessions of the parent Committee or subsidiary bodies. Another option is for the draft terms of reference of working and drafting groups issued at the beginning of a session, in accordance with paragraph 5.36, to identify items on which groups may start working on the first morning of the session, without prior consideration of the related agenda items in plenary.~~

5.~~20~~19 In principle, a working group should not have splinter groups. However, where it is necessary to establish one or more splinter groups to facilitate efficient work, the working group should do so by unanimous agreement and should consider and agree to the outcome of the splinter group's work before incorporating it in its report. Splinter groups, if established, should meet outside normal working hours, unless the working group decides otherwise to improve the efficiency of the work.

5.~~21~~20 Subsidiary bodies' working groups, if circumstances and time constraints so dictate, may submit their reports directly to the Committees if authorized to do so by the parent body, following consultations between the Chair of the group, the Chair of the parent body and the Chairs of the Committees concerned.

5.~~22~~21 When appropriate, working groups should make full use of the five working days of a session in submitting their reports to the next session of their parent body. When working group reports are to be prepared during a session, all efforts should be made to keep them as short as possible.

5.~~23~~22 Permanent working groups should be avoided, however, if there is a need for such a group, a clear justification and appropriate terms of reference should be provided by the subsidiary body concerned.

Drafting groups

5.~~24~~23 In addition to working groups, the Committees and their subsidiary bodies may form drafting groups. In no case should more than five groups (e.g. three working and two drafting groups) meet simultaneously during a session. If additional drafting groups are needed, they should meet outside normal working hours.

Other groups

5.~~25~~24 In addition to working and drafting groups, the Committees and their subsidiary bodies may form other groups, such as technical or review groups~~, as required under relevant conventions~~. Depending on the necessity and urgency of the issue to be considered, such groups may meet in addition to or in lieu of working or drafting groups.

Correspondence groups

5.~~26~~25 To facilitate the consideration of an issue, correspondence groups may be established by the Committees or subsidiary bodies and be instructed to work on a consolidated draft text prepared by a "lead country" or the Secretariat, provided that the Committee or subsidiary bodies, as appropriate, has agreed to consider the issue and has ~~endorsed~~ approved the terms of reference for the group (see also paragraph 5.36). Thus, through consultation between interested delegations by correspondence, the volume of documents submitted and processed can be reduced.

5.~~27~~26 Correspondence groups should utilize modern communication~~s technology~~technologies to undertake their work~~, such as the Internet, as much as possible~~. The correspondence group should have the flexibility to convene virtual meetings using a suitable platform with the purpose strictly limited to clarifying any doubts that might hinder the proceeding of the work of the correspondence group.

5.~~28~~27 The work of a correspondence group (e.g. the receipt and processing of comments and suggestions) should not pre-empt formal consideration of the relevant issue by the parent body concerned or the positions taken by Member States or international organizations participating in the group.

5.~~29~~28 Normally, the Committees and subsidiary bodies should not establish more than three correspondence groups, although this number may be increased where the urgency of the matter under consideration so justifies. Sub-groups within a correspondence group should not be established. No official meetings of members of correspondence groups should be held without the prior approval of the Committee(s).

5.~~30~~29 Participation in correspondence groups is open to all delegations (Member States and organizations) that can provide the necessary expertise on a timely basis or that have a particular interest in the issue under consideration. Any Member State or international organization can join in the work of a correspondence group once the group is established; and the group should accept contributions at any stage of its work.

5.~~31~~30 When establishing a correspondence group, a "lead country", "lead organization" or the Secretariat should be designated to coordinate the group's work. Responsibilities of group coordinators include:

.1 preparation, maintenance and circulation of the list of participants;

.2 establishment of deadlines for the preparation of draft texts and receipt of comments and proposals concerning them;

.3 preparation and circulation of draft texts and comments concerning them;

.4 preparation and submission to the Secretariat of the report of the correspondence group, including any consolidated draft texts (see paragraph 5.~~35~~34); and

.5 introduction of the above-mentioned report and consolidated draft texts to the appropriate Committee or subsidiary body.

5.~~32~~31 Responsibilities of participants include:

.1 active participation in the work of the group;

.2 compliance with the deadlines established for the submission of comments on draft texts, proposals, etc.; and

.3 relaying to other group members copies of comments, proposals, etc. submitted to the group coordinator.

5.~~33~~32 The responsibilities of the Secretariat, in cases where the Secretariat acts as a group coordinator, should be the same as those described in paragraph 5.~~31~~ 30 above. The Secretariat may also be requested to circulate consolidated draft texts, etc. on behalf of the group coordinator.

5.~~34~~33 The results of work carried out by correspondence groups should normally take the form of a consolidated draft text reflecting the information received from members of the group. Such texts should be accompanied by a succinct report summarizing the work and indicating which members have provided input to the process. Where it has not been possible to prepare an agreed consolidated draft document, the texts or issues on which there was disagreement should be clearly indicated in the draft document or the report, as appropriate.

5.~~35~~34 Correspondence groups' reports should be submitted to the first session of the parent body after the conclusion of the groups' work, in time to meet the deadline established for consideration of substantive documents, in accordance with the provisions of paragraph 6.12. Normally the work of correspondence groups should not overlap with sessions of the parent Committee or subsidiary body. If the group has not finalized its work in time to meet the applicable deadline, a progress report should be made to the parent body.

Terms of reference of working, drafting, ~~and~~ correspondence, intersessional working and other groups

~~5.36 When working, drafting and correspondence groups are to be formed, draft terms of reference should be prepared, following consultations between the Chair of the relevant Committee or subsidiary body and the Secretariat, for approval by plenary. In the case of working and drafting groups, these draft terms of reference should be issued by the Secretariat at the beginning of the session for agreement by plenary before the groups in question start their work. Thereafter, the agreed terms of reference should not be modified or extended without the parent body's prior consent.~~

5.35 When working, drafting and other groups are to be established, draft terms of reference should be prepared, following consultations between the Chair of the relevant Committee or subsidiary body and the Secretariat, and issued at the beginning of the session for approval by plenary ~~before such groups start their work (see also paragraph 5.19)~~. Such groups may start work on the first morning of a Committee or subsidiary body session under their draft terms of reference.

5.36 In the case of correspondence or intersessional working groups, their terms of reference should be approved by the parent body at the time of their establishment.

5.37 The agreed terms of reference of working, drafting, correspondence, intersessional working and other groups should not be modified or extended without the parent body's prior consent.

Intersessional working groups

5.~~37~~38 Subject to endorsement by the Council, intersessional meetings of working groups may be convened without interpretation services. Intersessional meetings should be held only if considered to be absolutely essential and after careful consideration of their necessity by the relevant Committee on a case-by-case basis, taking into account the priority and urgency of the specific matter that such meetings will be invited to address. Intersessional meetings of such groups should be held at IMO Headquarters immediately before or after a session of the parent body concerned. Other arrangements may be considered; however, no arrangements should be made in respect of an intersessional meeting until such a meeting has been approved by the parent Committee. ~~Intersessional~~ Meetings of intersessional working groups ~~and~~, which may include technical groups, should not be held at the same time as ~~committee~~ Committee or ~~sub-committee~~subsidiary body meetings.

6 PROCEDURES FOR PREPARATION AND SUBMISSION OF DOCUMENTS

Preparation of documents

6.1 Documents should be prepared in single spacing and be as concise as possible so as to facilitate their timely processing. In order to enhance the clear understanding of documents, the following should be observed:

.1 all documents should be preceded by a brief summary prepared in the form, and containing the information, indicated in the table below. Documents, especially proposals for the inclusion of an output, should demonstrate, where feasible, the linkages to the Strategic Plan by including, in the summary, references to the related strategic direction(s) and output(s):

SUMMARY	
Executive summary:	This description should be brief, outlining the proposed objective (an amendment, an Assembly resolution, a circular, information only, etc.), and include information on whether a proposal will have any financial implications for the shipping industry or for the IMO budget.
Strategic direction, if applicable:	A reference should be made to one or more relevant strategic directions in the Organization's Strategic Plan.
Output:	A reference should be made to one or more corresponding outputs in the biennial's list of outputs. If there is no corresponding output, an appropriate descriptive text should be included.
Action to be taken:	A reference should be made to the paragraph of the document that states the action to be taken by the committee, subsidiary body~~sub-committee~~, etc.
Related documents:	Other key documents should be listed to the extent that they are known to the originator of the document.

.2 substantive documents should conclude with a summary of the action the relevant body is invited to take; and

.3 information documents should conclude with a summary of the information they contain.

6.2 To facilitate processing, meeting documents should be submitted through the Meeting Document Submission Portal, available on the IMODOCS home page (https://docs.imo.org) under the "Submissions" tab. [4] All submissions through the Portal will be confirmed via notification to the submitter and their status can be checked on the Portal. For any queries relating to the Portal, please email the Secretariat at imodocs@imo.org

6.3 A document should not be introduced in the plenary unless the Chair decides that this is essential for the proper consideration of the matter concerned. The submitter(s) of a document may indicate prior to or when the document is considered if they have additional information or context required for the discussions, in order for the Chair to prioritize interventions.

6.4 To indicate the importance of documents containing proposed amendments to IMO instruments related to maritime safety, maritime security and protection of the marine environment which have been approved for adoption by MSC or MEPC, such documents will be identifiable on ~~the IMO document website (~~IMODOCS~~)~~ by background highlighting in pink.

6.5 Documents containing proposed amendments to mandatory instruments should be presented in a format that permits clear identification of the changes being introduced (e.g. use "strikeout" for deleted text and "grey shading" to highlight all modifications and new insertions, including deleted text).

[4] Refer to Circular Letter No.4662 of 16 December 2022.

6.6 Reports of the Committees and their subsidiary bodies should, in general, contain under each section only:

.1 a summary of key documents and a list of other documents submitted by Member States, international organizations or the Secretariat;

.2 a summary of the views expressed during consideration of an item that may have influenced the decision taken by the reporting body (but not allowing the reports to turn into summary records), with statements by delegations included only at their express request during the session; and

.3 a record of the decisions taken.

6.7 In drafting recommendations, codes or guidelines, cross references should, whenever possible, be made to texts and terminology previously developed by IMO or other organizations. This will avoid unnecessary duplication and reduce the need for excessively detailed provisions and for subsequent harmonization.

6.8 The Chairs of subsidiary bodies should **not** introduce their reports to the Committees as these should be taken as read.

6.9 With respect to urgent matters emanating from sessions of subsidiary bodies or IMO bodies other than the Council and the Assembly, which have taken place less than 13 weeks before a session of a Committee, the Committee should consider only such urgent matters as may have been specified by it at a prior session. As a general rule, the Committee should not consider reports or matters emanating from any subsidiary body session which has taken place less than nine weeks prior to the Committee's session. In exceptional cases, a subsidiary body may invite the Committee to take action on a matter that the subsidiary body considers to be urgent and important emanating from a session that took place less than nine weeks prior to the Committee's session. In such cases, the subsidiary body Chair should consult the Committee Chair for approval of the contemplated action.

6.10 All concerned should be continuously aware of the financial and environmental impact of the volume of documentation generated by IMO meetings and should limit, to the greatest possible extent, the number of pages of documents submitted to such meetings. For information, the current arrangements in the Secretariat for the production of working papers during meetings are described in annex 4.

6.11 To encourage the action referred to in paragraph 6.10 above, documents other than information documents and reports from the Committees and subsidiary bodies, working, drafting, correspondence and other reporting groups and the Secretariat which contain more than 20 pages should not be translated in their entirety. They should include, for translation purposes, a summary of the document not longer than four pages, with the remaining content submitted as an annex in the language (e.g. English) that may be needed, for example, by working groups.

Submission of documents

6.12 To ensure that all documents are available ~~at IMO Headquarters~~ on IMODOCS in all three working languages well in time for a session of a Committee or subsidiary body, so as to enable the timely study of documents and promote participation by all Members in the decision-making process of the Committees and their subsidiary bodies, the following provisions apply:

.1 as a general rule, documents, other than information documents and reports of Committees and subsidiary bodies, working, drafting, correspondence and other reporting groups and the Secretariat, should not contain more than 50 pages. In the case of reports from working, drafting, correspondence or other reporting groups and in other exceptional circumstances, this number of pages may be exceeded, provided that the deadline for receipt of the document by the Secretariat, as specified in sub-paragraphs .2 and .3 below, is extended by one week for every 20 pages exceeding 50 pages;

.2 documents containing proposals for inclusion of new outputs should be received by the Secretariat not later than 13 weeks before the opening of the relevant Committee session. They should be ~~made available at IMO Headquarters and on the IMO document website~~published on IMODOCS, in the Organization's three working languages, not later than five weeks before the opening of the session;

.3 documents (including information documents) containing more than six pages of text (bulky documents) should be received by the Secretariat no later than 13 weeks before the opening of the relevant session of a Committee or subsidiary body. However, bulky information documents submitted in electronic format may be accepted by the Secretariat if they are received no later than nine weeks before the session concerned. They should be ~~made available at IMO Headquarters and on the IMO document website~~published on IMODOCS, in the Organization's three working languages, except for information documents (which should not be translated), not later than five weeks before the opening of the session;

.4 non-bulky documents commenting on those referred to in sub-paragraphs .2 and .3 above, or on items already on the agenda, should be received by the Secretariat no later than nine weeks before the opening of the relevant session of a Committee or subsidiary body. They should be ~~made available at IMO Headquarters and on the IMO document website~~published on IMODOCS, in the Organization's three working languages, not later than five weeks before the opening of the session;

.5 notwithstanding the provisions of sub-paragraph .4 above, documents commenting on those referred to in sub-paragraphs .2, .3 and .4 above containing four pages or less should be processed if received by the Secretariat not later than seven weeks before the opening of the relevant session of a Committee or subsidiary body. These documents should start with a paragraph clearly indicating the document on which comments are made and stating that the document is submitted in accordance with the provisions of paragraph 6.12.5 of this document. They should be~~made available at IMO Headquarters and on the IMO document website~~ published on IMODOCS, in the Organization's three working languages, not later than four weeks before the opening of the session;

.6 non-bulky information documents should be received by the Secretariat not later than nine weeks before the opening of the relevant session of a Committee or subsidiary body. They should not be translated and should be ~~made available at IMO Headquarters and on the IMO document website~~published on IMODOCS not later than five weeks before the opening of the session. No action will be taken on the basis of an information document only, other than to take note of it;

.7 in addition and with reference to reports of subsidiary bodies on the basis of which a Committee is normally invited to take action, every possible effort should be made to ensure that such reports are ~~made available at IMO Headquarters and on the IMO document website~~published on IMODOCS, in the Organization's three working languages, not later than five weeks before the opening of the session; and

.8 in the case of basic documents submitted to a Committee reporting on urgent matters emanating from sessions of subsidiary bodies referred to in paragraph 6.9 which met less than 13 weeks before the Committee's session, such basic documents should include as an annex the text (e.g. draft Assembly resolutions, draft MSC circulars) on which the Committee will be invited to take action.

6.13 The Secretariat should make every effort to ensure the timely posting of documents on the IMO document website. Member States and international organizations should also endeavour to submit documents as early as possible and not just by the relevant deadlines.

6.14 The Secretariat should strictly apply the above provisions concerning the submission of documents and not accept late submissions from Member States or international organizations. Any exemption from these provisions should have the prior authorization of the Chair of the Committee concerned, following consultations with the Secretariat. In exceptional circumstances, requiring immediate action by the Committee, a relevant document to that end consisting of no more than four pages should be received by the Secretariat not later than nine weeks before the opening of the session of the body concerned and be ~~made available at IMO Headquarters~~published on IMODOCS, in the Organization's three working languages, not later than five weeks before the opening of the session. The Committee would consider such a document only if it decided to do so at the opening of its session.

6.15 In the exceptional cases referred to in paragraph 6.9, when a subsidiary body invites a Committee to take action on urgent matters emanating from a session that took place less than nine weeks prior to the Committee's session, documents commenting on those urgent matters containing four pages or less should be processed if received by the Secretariat not later than seven weeks before the opening of any session of the Committee concerned. Such documents should start with a paragraph clearly indicating the document on which comments are made and stating that the document is submitted in accordance with the provisions of paragraph 6.15 of this document. They should be published on IMODOCS~~made available at IMO Headquarters~~, in the three working languages, not later than four weeks before the opening of the session.

7 OBSERVANCE OF THE DOCUMENT

This document shall be observed strictly. This will assist delegations in preparing adequately for each meeting and enhance their participation in the debate and decision-making process during meetings. It will also prevent delegations from experiencing difficulties when developing national positions on subjects on the agenda of the two Committees or their subsidiary bodies. In order to promote efficiency in the conduct of work overall, Committee members should ensure that their colleagues attending sessions of other committees are fully informed of the outcome of the meeting that they have attended. Committee members should also ensure that their experts attending meetings of subsidiary bodies and working, drafting or correspondence groups are adequately informed and instructed with regard to any action necessary to give effect to decisions made by the Committees.

ANNEX 1

INFORMATION REQUIRED IN SUBMISSIONS OF PROPOSALS FOR INCLUSION OF AN OUTPUT

1 **IMO's objectives**: Provide evidence whether and how the proposal:

.1 is within the scope of IMO's mission; and

.2 contributes to the implementation of the strategic directions established in the Strategic Plan, if applicable; outputs that are not directly related to the strategic directions can be accepted as "other work".

2 **Need**: Demonstrate and document:

.1 the need for the proposed output in terms of the risks or hazards which are deemed necessary to be addressed; and

.2 the evidence to support the perceived need.

3 **Analysis of the issue**: Provide an analysis of the proposed measure, including an assessment of its practicability, feasibility and proportionality, covering as wide as possible all affected stakeholders including, but not limited to, seafarers, ship owners and operators, equipment manufacturers, shipyards, flag State Administrations, coastal States, recognized organizations and other users of the sea area, as applicable.

4 **Analysis of implications**: Provide an analysis of the implications of the proposal, addressing the cost to the maritime industry as well as the relevant legislative and administrative burdens (including the proposed method(s) of fulfilling any resulting administrative requirement), including capacity-building implications (see annex 2).

5 **Benefits**: Provide evidence that the benefits vis-à-vis enhanced maritime safety, maritime security or protection of the marine environment expected to be derived from the inclusion of the new item justify the proposed action.

6 **Industry standards**: Provide information on whether adequate industry standards exist or are being developed and the intended relationship between such standards and the proposed output.

7 **Output**: Specify the intended output in SMART terms (specific, measurable, achievable, realistic, time-bound) including the instrument(s)[1] to be amended or developed as new and the scope of application. If work on an output is expected to take more than~~go beyond~~ one~~ biennium~~ session of the Committee or its subsidiary body, a road map~~the expected deliverables for each biennium~~ should be provided. ~~detailed~~In such cases, the road map should indicate the anticipated volume of work required to deliver the output by specifying, as a minimum, the IMO organ(s) involved, the number of sessions required and the need for intersessional work.

[1] Submission of a check/monitoring sheet, as defined in MSC.1/Circ.1500, as revised, is required along with a proposal for new output requiring the development of new, or amendments to, mandatory instruments, including SOLAS and other safety-related conventions.

8 **Human element**: Demonstrate that the human element has been sufficiently considered and addressed during the development of the proposal by providing the completed checklist set out in annex 5 to this document.

9 **Urgency**: Provide, with reference to the current Strategic Plan, evidence of:

.1 the urgency of the proposed output including any proposal to include the proposed output on the biennial agenda, specifying, where applicable, whether:~~; and~~

1 there would be any regulatory obligations emanating from the proposed output;

.2 the proposed output would require immediate attention to prevent negative consequences or that it would address current trends, developments and challenges; and

.3 the proposed output would involve collaboration with other international organizations or entities for timely action; and

.2 the date that the proposed output should be completed.

10 **Action required**: Specify the action required by the IMO organ.

11 **Attachments**: Where required, provide the following information along with the proposal:

.1 initial assessment of capacity-building implications (see annex 2, appendix 1);

.2 checklist for considering and addressing the human element (annex 5, appendix);

.3 checklist for identifying administrative requirements (annex 6);

.4 a road map (see item 7 above); and

.5 parts I and II of the check/monitoring sheet for the process of amending the SOLAS Convention and related mandatory instruments (MSC.1/Circ.1500, annex 2, as revised).

ANNEX 2

PROCEDURES FOR ASSESSING THE IMPLICATIONS OF CAPACITY-BUILDING REQUIREMENTS WHEN DEVELOPING NEW, OR AMENDING EXISTING, MANDATORY INSTRUMENTS

1 INTRODUCTION

1.1 Assembly resolution A.998(25) on *Need for capacity-building for the development and implementation of new, and amendments to existing, instruments* cautions that, unless the Council, the Committees and their subsidiary bodies adopt a cradle-to-grave approach in relation to matters concerning capacity-building, technical cooperation and assistance, the chances of success in the ratification and effective implementation of IMO instruments may be reduced by the level of unpreparedness or lack of capacity that Member States, in particular small island developing States (SIDS) and least developed countries (LDCs), experience at the point when implementation of such instruments is urgently required. Therefore, the development of this procedure is in keeping with the provisions of that resolution.

1.2 The assessment of capacity-building implications for the implementation of new, and/or amendments to existing, mandatory instruments is an iterative process that begins with the acceptance of the preliminary proposal and runs in parallel up to the process of its implementation.

1.3 These procedures do not prevent States from taking additional actions in promoting the advancement of the objectives of capacity-building through technical assistance or cooperation.

2 DEFINITIONS

For the purpose of these procedures, the following definitions apply:

2.1 *Capacity-building* means sustainable social, economic or legal measures undertaken through various means for the purposes of a comprehensive transformation of the performance of an Administration or industry player so as to implement and therefore comply with new or amended mandatory instruments.

2.2 *Technical assistance* is a methodology for providing capacity-building through bilateral and/or multilateral exchange of technical knowledge, resources or expertise to a party which has requested such assistance in order to enhance its technical capability to implement existing, new or amended mandatory instruments.

2.3 *Technical cooperation* refers to a methodology for providing capacity-building, through a multilateral effort, to a group of cooperating countries of a particular region in the form of training and exchange of expertise, knowledge and information, in support of their efforts aimed at promoting the implementation of existing, new and/or amended mandatory instruments.

2.4 *Instruments* refers to IMO conventions and other treaties.

3 PURPOSE AND OBJECTIVES

3.1 The purpose of these procedures is to give effect to resolution A.998(25), aimed at enhancing efforts to promote universal implementation of mandatory IMO instruments.

3.2 These procedures are intended to assist in the identification and assessment of capacity-building implications in the following cases:

.1 when a Member State submits a proposal for a new output or the expansion of the scope of an output;

.~~1~~2 when a Committee ~~approved~~ approves or adopts a new mandatory instrument/amendments to existing mandatory instruments;

.~~2~~3 during implementation of new ~~instruments~~ or amended mandatory instruments; and

.~~3~~4 during the scheduling of capacity-building measures or activities.

3.3 These procedures apply to the Committees of the Organization and constitute a specific implementation response to resolution A.998(25).

3.4 These procedures aim at:

.1 promoting universal ratification and compliance with newly adopted IMO instruments;

.2 improving the level and quality of implementation of new and/or amended instruments; and

.3 promoting, as far as possible, a balanced level of implementation of new instruments.

4 PROCEDURE

~~4.1 The Committees should conduct an assessment of capacity-building implications by following the procedure in the flow chart in appendix 1 of these procedures.~~

~~4.2 Assessments of capacity-building implications should be initiated after the approval of a new instrument/amendment to existing instruments.~~

~~Assessment of capacity-building implications~~

~~4.3 In order to facilitate the assessment of capacity-building implications, the Committee should, if necessary, at the adoption stage of the new instruments or amended instruments, instruct the Drafting Group on Amendments to Mandatory Instruments to undertake an assessment of capacity-building implications, using the checklist for assessing the need for capacity-building contained in appendix 1 of these procedures.~~

~~4.4 The Drafting Group should consider comments and any further submissions thereto and, if appropriate, conduct further assessment and present its report and recommendations to the Committee. The outcome of the preliminary assessment should be submitted to the Committee concerned for consideration. This should contain the Drafting Group's appraisal of whether there are or will be capacity-building implications or need for technical assistance; a list of possible implications; and recommendations on the way forward.~~

~~4.5 The Drafting Group may refer a matter through the Committee for further consideration by another organ.~~

~~**Post-assessment of capacity-building implications for implementation of new measures**~~

~~4.6 When new measures have been approved, the Committee may request the Drafting Group to:~~

~~.1 conduct a post-assessment exercise using the criteria and mechanism contained in appendix 2 of these procedures to identify issues that require special focus when implementing technical cooperation and assistance activities; and~~

~~.2 prepare, for the Committee's consideration, a draft circular describing the possible capacity-building implications and recommendations for a course of action, for consideration by the Organization, the membership and/or industry.~~

~~**5 TERMS OF REFERENCE OF THE DRAFTING GROUP**~~

~~In conducting its assessment of capacity-building, the Drafting Group should be guided by the following terms of reference:~~

~~.1 consider a preliminary assessment of capacity-building and technical assistance actions;~~

~~.2 conduct an assessment and, when new measures have been approved, a post-assessment, of the capacity-building actions that may be included in the technical assistance or technical cooperation required by Administrations for the implementation of the instrument;~~

~~.3 in consultation with the industry and non-governmental organizations, conduct an assessment and, on implementing new measures, a post-assessment, of the capacity-building actions that may be required or expected of the shipping industry for the implementation of the instrument; and~~

~~.4 advise the Committee concerned of the implications for capacity-building relating to a new instrument or a proposed amendment to an existing instrument, whichever is being considered.~~

4.1 Proposals for new outputs entailing the development of new, or amendments to, mandatory instruments should include an initial assessment of capacity-building implications using the checklist in appendix 1 of these procedures, which should be supplemented by the form in appendix 2 only if any capacity-building activities are foreseen for the implementation of new measures.

4.2 At the finalization stage of new or amended instruments, a subsidiary body or a working group of a Committee should review and finalize the initial assessment of capacity-building implications, taking into account relevant contributions provided by the industry and non-governmental organizations. In addition, the subsidiary body or a working group of a Committee should also prepare the check/monitoring sheet set out in MSC.1/Circ.1500/Rev.2, annex 2, for the new or amended instruments.

4.3 At the adoption stage of new or amended instruments, the Committee may instruct the Drafting Group on Amendments to Mandatory Instruments to:

.1 consider the assessment of capacity-building implications finalized by the subsidiary body or a working group of a Committee and advise the Committee concerned, with a view to endorsement of the assessment, as appropriate;

.2 if applicable, provide a description of the potential capacity-building implications of new or amended instruments along with recommendations for a course of action, for consideration by the Organization, the membership and/or the industry.

APPENDIX 1

CHECKLIST FOR THE IDENTIFICATION OF CAPACITY-BUILDING IMPLICATIONS

1 For Administrations

☐ Is new legislation required?

☐ Is there a requirement for new equipment and/or systems?

- Does equipment manufacturing capacity exist internationally?
- Do equipment repair/servicing facilities exist internationally?
- Is there capacity to develop new systems?

☐ Will the implementation require additional financial resources?

☐ Is there a need for additional human resources or new skills?

☐ Will there be a need to upgrade current infrastructure?

☐ Is there enough lead time towards implementation?

☐ Will a rapid implementation procedure be adopted?

☐ Is there a substantial modification of existing standards?

☐ Will a guide to implementation be needed?

2 For the industry

☐ Would the industry require new and/or enhancement of existing systems?

- Does capacity exist internationally to develop new systems?

☐ Is there a need for additional training of seafarers?

- Do related and validated training courses exist?
- Are sufficient simulation training courses available internationally?

☐ Will there be a requirement for new equipment?

- Does manufacturing capacity exist internationally?

☐ Is there repair/servicing and/or retrofitting and does maintenance capacity exist internationally?

APPENDIX 2

~~CHECKLIST OF ISSUES REQUIRING SPECIAL FOCUS WHEN DEVELOPING CAPACITY-BUILDING RELATED TO THE IMPLEMENTATION OF NEW MEASURES~~
FORM FOR CAPACITY-BUILDING MEASURES

Capacity-building Measures Form

Instrument ______________________________________

Measure number ______ of ______

Required for
- ☐ Administration
- ☐ Industry

Implementation
- ☐ Prior to adoption
- ☐ Once adopted
- ☐ Prior to entry into force
- ☐ Once ratified
- ☐ Phased in

Description of capacity-building activity needed for the implementation of new measures:

____

____

____

ANNEX 3

FORMAT 1: BIENNIAL STATUS REPORT

[Name of organ]									
Reference to SD, if applicable	**Output number[a]**	**Description**	**Target completion year[b]**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1[c]**	**Status of output for Year 2[c]**	**References[d]**
Notes:									
Notes:									

Notes:

a When individual outputs contain multiple deliverables, the format should report on each individual deliverable.

b The target completion year should be specified as a year, or indicate that the item is ~~annual or~~ continuous. This should not indicate a number of sessions.

c The entries under the "Status of output" columns are to be classified as follows:

- "completed" signifies that the output for the year in question has been duly finalized;
- "in progress" signifies that work on the output has been progressed, and that finalization is expected in the target completion year;
- "ongoing" signifies that the outputs relate to work of the respective IMO organs that is a permanent or continuous task;
- "postponed" signifies that the respective IMO organ has decided to defer the production of relevant outputs to another time (for example, until the receipt of corresponding submissions) and accordingly that the output has been included on the post-biennial agenda;
- "extended" signifies that further work is necessary and that the output will not be finalized as planned; and
- due to the nature of ~~annual~~ continuous outputs, the status can either be "completed" or ~~"postponed"~~ "ongoing".

d References should be made to the relevant part of the organ's report on this item.

FORMAT 2: POST-BIENNIAL AGENDAS OF COMMITTEES

[NAME OF COMMITTEE]								
ACCEPTED POST-BIENNIAL OUTPUTS				Parent organ(s)	Associated organ(s)	Coordinating organ	Timescale	Reference
Number	Biennium[e]	Reference to strategic direction, if applicable	Description					

Notes:
[e] Biennium when the output was placed on the post-biennial agenda**.**

ANNEX 4

CURRENT ARRANGEMENTS IN THE SECRETARIAT FOR THE PRODUCTION OF WORKING PAPERS DURING MEETINGS

1 The details of how to handle the preparation of working papers produced during meetings, which are agreed at a coordination meeting held between the Conference Division and the relevant technical division(s) during the week preceding each meeting, will be conveyed by the Secretary of the IMO body to the Chair of that body, as well as the Chairs of the working and drafting groups.

2 To ensure that all working papers, including the draft report, are available when needed in all three working languages, these documents should be as concise as possible, with a limited number of pages containing new text. The following provisions apply:

.1 Advance text

Whenever possible, for working/drafting group reports, advance text should be provided to the translation sections. This could be whole annexes or documents prior to the meeting, or parts thereof submitted as the work of the groups progresses.

.2 Final text

Final text should be delivered to the translation sections as early as possible in the course of the meeting week as follows:

.1 Working papers – these should be delivered no later than 9 a.m. on the day of the report night, so that they may be processed during the day shift.

.2 Draft report – the night shift is to be dedicated to the processing of the draft report and will end at 1 a.m. on the following day. In order to meet the established deadline, items for the draft report not delivered throughout the week should be sent to the translation sections as early as possible on the report night, with the last remaining item to be delivered no later than 11 p.m.

ANNEX 5

MONITORING AND CONTROLLING CONSIDERATION OF THE HUMAN ELEMENT BY IMO BODIES

1 Introduction

1.1 Resolution A.947(23) on *Human element vision, principles and goals for the Organization* requests the Maritime Safety Committee and the Marine Environment Protection Committee to consider proposals for new or revised instruments or procedures relating to the safety of life at sea, security and the protection of the marine environment, taking into account its annexed human element vision, principles and goals.

1.2 These human element vision, principles and goals state:

"Vision

To significantly enhance maritime safety, security and the quality of the marine environment by addressing human element issues to improve performance.

Principles

a) The human element is a complex multidimensional 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.

b) The Organization, when developing regulations, should honour the seafarer by seeking and respecting the opinions of those that do the work at sea.

c) Effective remedial action following maritime casualties requires a sound understanding of human element involvement in accident causation. This is gained by thorough investigation and systematic analysis of casualties for the contributory factors and the causal chain of events.

d) In the process of developing regulations, it should be recognized that adequate safeguards must be in place to ensure that a single human or organizational error will not cause an accident through the application of these regulations.

e) Rules and regulations which address seafarers directly should be simple, clear and comprehensive.

f) Crew endurance, defined as the ability to maintain performance within safety limits, is a function of many complex and interacting variables including individual capabilities, management policies, cultural factors, experience, training, job skills and work environment.

g) Dissemination of information through effective communication is essential to sound management and operational decisions.

h) Consideration of human element matters should aim at decreasing the possibility of human and organizational error as far as possible.

Goals

a) To have in place a structured approach for the proper consideration of human element issues for use in the development of regulations and guidelines by all committees and sub-committees.

b) To conduct a comprehensive review of selected existing IMO instruments from the human element perspective.

c) To promote and communicate, through human element principles, a maritime safety culture, security consciousness and heightened marine environment awareness.

d) To provide a framework to encourage the development of non-regulatory solutions and their assessment, on the basis of human element principles.

e) To have in place a system for identifying and disseminating maritime interests studies, research and other relevant information on the human element, including the findings of marine and non-marine incident investigations.

f) To provide educational material for seafarers designed to increase their knowledge and awareness of the impact of human element issues on safe ship operations, and help them do the right thing.

g) To provide a framework for understanding the very complex system of interrelated human element factors, incorporating operational objectives, personal endurance concerns, organizational policies and practices, and environmental factors, in order to facilitate the identification and management of risk factors in a holistic and systematic manner."

2 Purpose

2.1 The purpose of this procedure and guidance is to meet goal (a) of resolution A.947(23):

"To have in place a structured approach for the proper consideration of human element issues for use in the development of regulations and guidelines by all committees and sub-committees."

2.2 The scope of this procedure is all outputs from MEPC and MSC and their subsidiary bodies.

3 Procedure

3.1 The relevant bodies shall ensure that human element issues are considered and assessed by following the procedure described below.

Preparation of a proposal for new output

3.2 A proposal for a new output shall involve completion of the checklist set out in the appendix of this procedure and its provision to the relevant Committee as per annex 1 of this document.

3.3 Any human element considerations shall be identified in preparing a proposal for a new output. The means by which they are addressed should be included in the instructions. Where insufficient information is available, an action plan shall be included by which the consideration may be fully addressed.

3.4 Human element or other necessary expertise shall be engaged to ensure satisfactory completion of the checklist.

Assessment of a proposal for new output

3.5 The relevant Committee shall:

.1 review the checklist to ensure that all human element risks have been considered and addressed; and

.2 ensure that terms of reference to subsidiary bodies include clear instructions on addressing the human element considerations identified in the completed checklist.

Work carried out on the output

3.6 Work on the output shall take account of the human element considerations, and the means by which they might be addressed, as identified in the completed checklist.

3.7 The relevant Committee, or subsidiary body, shall ensure that the identified human element considerations are addressed during the work.

3.8 Within the scope of the output, further human element considerations may be identified and addressed during the work.

3.9 The relevant Committee, or subsidiary body, shall ensure that appropriate human element expertise is made available.

Approval of work completed under the output

3.10 At the time of approval, the relevant Committee shall review the output to ensure that human element considerations, as identified in the checklist, were appropriately addressed in the final output.

4 Guidance for completing the checklist

General principles

4.1 Completion of the checklist should take account of both the intended output and its direct effects on the human element, as well as any potential unintended consequences.

4.2 It should also take into account the effects of both the circumstances prior to the implementation date, where modifications may be made, and those once implementation is complete.

4.3 Completion of the checklist should involve seeking input from seafarers or their proxies. Other stakeholders may be consulted, such as shipping companies and regulators.

4.4 The checklist includes references to relevant IMO documents. These may be used to correctly identify the considerations and the means by which they are addressed. The references may be included in the final output. Additional IMO references and other guidance such as those originating with the International Labour Organization and industry organizations may be added. References that are not relevant may be struck out.

4.5 Consideration of hazards should recognize that there may be alternative means by which risks may be addressed. These means may differ in their effectiveness as illustrated by the following well-known Hierarchy of Hazard Controls (originated by the National Institute for Occupational Safety and Health, United States of America).

Hierarchy of controls

4.6 The hierarchy of controls is listed in order of effectiveness as follows:

Elimination – Physically removing the hazard is the most effective control. An example in the shipping industry might be that a requirement for working at height to maintain a piece of equipment could be eliminated by having all critical components at deck level.

Substitution – Involves replacing something that produces a hazard with something that does not produce a hazard. An example in the shipping industry might be the substitution of non-TBT anti-fouling.

Engineering controls – These do not remove hazards, but rather isolate people from hazards. Examples in the shipping industry might be equipment with inherently high noise levels isolated by locating in an acoustic enclosure or the rotating part of equipment fitted with a guard to prevent contact with the operator.

Administrative controls – These are changes in the way people work. Examples may be signage, procedures or training and are generally seen as less effective controls.

Personal protective equipment (PPE) – This control is seen as the least effective due to the problems with ensuring that PPE is properly used and maintained. In addition, some PPEs increase physiological effort to complete a task.

APPENDIX

CHECKLIST FOR CONSIDERING AND ADDRESSING THE HUMAN ELEMENT

This checklist consists of five questions as follows:

.1 questions 1 to 4 are risk-based questions intended to identify risks from the implementation and operation of new outputs; and

.2 question 5 is a list of measures for addressing the human element.

	1 **Question**	2 **Yes/ No**	3 **IMO references**	4 **Considerations**	5 **Instructions**
Workload			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
1	**Does the "output" affect workload?**				
1.1	**On board, especially in the already intensive phases of the voyage and port operations to:**		*Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies* (MSC-MEPC.7/Circ.8) *Guidelines on fatigue* (MSC.1/Circ.1598) *Principles of minimum safe manning* (resolution A.1047(27)) *Guidelines for the investigation of accidents where fatigue may have been an issue* (MSC/Circ.621)		
1.1.1	Operations including navigation, cargo and engineering				
1.1.2	Maintenance of the ships structure and its equipment				
1.1.3	Onboard administration in support of the ships' management systems				

	1 **Question**	2 **Yes/ No**	3 **IMO references**	4 **Considerations**	5 **Instructions**
1.1.4	Onboard administration related to regulation involving flag States, classification societies, port State and other bodies such as charterers and port authorities				
1.1.5	Increased workload or time pressure on personnel if involved in implementation of changes prior to the implementation date				
1.2	**Ashore, in a manner that would affect the ships operation to:**				
1.2.1	Companies' administration				
1.2.2	Flag State, port State and classification societies administration such that certification and other processes are compromised or delayed				

	1 **Question**	2 **Yes/ No**	3 **IMO references**	4 **Considerations**	5 **Instructions**
Decision-making			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
2	**Does the "output" impact decision-making on board the ship?**				
2.1	By confusion with existing requirements and regulations				
2.2	By changing responsibilities as laid out in the ISM Code				
2.3	By creating complexity in its implementation and/or in the safety management systems				
2.4	By requiring increased mental effort, such as the need to find, transform and analyse data or result in the need to make judgements based on incomplete information				
2.5	By limiting the time available to establish situational awareness, decide, communicate (possibly across time zones) or check				
2.6	By increasing reliance on judgement and administrative controls to manage major risks such as oil spills and collisions				

	1 **Question**	2 **Yes/ No**	3 **IMO references**	4 **Considerations**	5 **Instructions**
Living and Working Environment			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
3	**Does the "output" affect the living and working environment?**		*Guidelines on the basic elements of a shipboard occupational health and safety programme* (MSC-MEPC.2/Circ.3) *Guidelines on fatigue* (MSC.1/Circ.1598)		
3.1	By interfering with existing arrangements for abandonment, fire-fighting and other emergency plans or procedures				
3.2	By introducing new materials that could create an explosion, fire, environmental or occupational health risk				
3.3	By introducing new high energy sources such as high-voltage, high-pressure fluids				
3.4	By affecting access or egress and causing lack of ventilation in working spaces				
3.5	By affecting the habitability of accommodation spaces due to noise, vibration, temperatures, dust and other contaminants				

	1 Question	2 Yes/ No	3 IMO references	4 Considerations	5 Instructions
Operation and Maintenance			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
4	**Does the "output" affect the operation and maintenance of the ship, its structure or systems and equipment?**		*Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies* (MSC-MEPC.7/Circ.8) *Guidelines for bridge equipment and systems, their arrangement and integration (BES)* (SN.1/Circ.288) *Principles of minimum safe manning* (Resolution A.1047(27)) *Issues to be considered when introducing new technology on board ships* (MSC/Circ.1091) *Guideline on software quality assurance and human-centred design for e-navigation* (MSC.1/Circ.1512) *Guidelines for the standardization of user interface design for navigation equipment* (MSC.1/Circ.1609)		

	1 **Question**	2 **Yes/ No**	3 **IMO references**	4 **Considerations**	5 **Instructions**
4.1	By introducing equipment that the user may find difficult to operate or maintain or may be unreliable				
4.2	By introducing new and/or novel technology, or technology that changes the role of the person				
4.3	By introducing requirements for new competencies and roles				
4.4	By overloading existing infrastructure such as power generation and ventilation systems				
4.5	By poor integration with existing systems and controls				
4.6	By introducing new and unfamiliar operations/procedures				
4.7	By introducing new and unfamiliar operating interfaces?				
4.8	By introducing risks to the ship during any modifications required prior to the implementation date of the output				

	1 **Question**	2 **Yes/ No**	3 **IMO references**	4 **Considerations**	5 **Instructions**
Measures to address the human element			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
5	**Does the "output" require changes to:**		*Shipboard technical operating and maintenance manuals* (MSC.1/Circ.1253) *Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies* (MSC-MEPC.7/Circ.8)		
5.1	Training				
5.2	Practical skill development and competences				
5.3	Operating, management and/or maintenance procedures				
5.4	Information/manuals for operation and maintenance				
5.5	Spares outfit				
5.6	Occupational safety requirements including guarding and PPE				
5.7	Shore support				

ANNEX 6

CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS

This checklist should be used when preparing the analysis of implications required in submissions of proposals for inclusion of outputs. For the purpose of this analysis, the term "administrative requirement" is defined in accordance with resolution A.1043(27), as an obligation arising from a mandatory IMO instrument to provide or retain information or data.

Instructions:

(A) If the answer to any of the questions below is **YES**, the Member State proposing an output should provide supporting details on whether the requirements are likely to involve start-up and/or ongoing costs. The Member State should also give a brief description of the requirement and, if possible, provide recommendations for further work, e.g. would it be possible to combine the activity with an existing requirement?

(B) If the proposal for the output does not contain such an activity, answer **NR** (Not required).

(C) For any administrative requirement, full consideration should be given to electronic means of fulfilling the requirement in order to alleviate administrative burdens.

1. Notification and reporting? Reporting certain events before or after the event has taken place, e.g. notification of voyage, statistical reporting for IMO Members	NR	Yes □ Start-up □ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		
2. Record-keeping? Keeping statutory documents up to date, e.g. records of accidents, records of cargo, records of inspections, records of education	NR	Yes □ Start-up □ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		
3. Publication and documentation? Producing documents for third parties, e.g. warning signs, registration displays, publication of results of testing	NR	Yes □ Start-up □ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		
4. Permits or applications? Applying for and maintaining permission to operate, e.g. certificates, classification society costs	NR	Yes □ Start-up □ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		
5. Other identified requirements?	NR	Yes □ Start-up □ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		

ANNEX 7

GUIDELINES FOR CONSIDERING AND REVIEWING THE OUTCOMES OF FSA STUDIES

Purpose

1 The purpose of these Guidelines is to assist the committees in considering and reviewing the outcomes (i.e. risk control options (RCOs) or other recommendations) of FSA studies. These Guidelines provide a bridge between the FSA Guidelines (MSC-MEPC.2/Circ.12/Rev.2) and the document on *Application of the Strategic Plan of the Organization* (resolution ~~A.1111(30)~~A.1174(33)).

Background

2 The Revised FSA Guidelines (MSC-MEPC.2/Circ.12/Rev.2) adequately cover the procedures to manage outcomes of an FSA study from initial submission to the committee through to the report of the FSA Experts Group to the committee.

3 The document on *Application of the Strategic Plan of the Organization* contains guidance on how the committees may consider placing new outputs on the biennial agenda of the different bodies.

Guidance for committees

4 Upon receipt of the outcomes of an FSA study the committees should conduct a preliminary assessment, and the committees may decide to:

.1 reject an outcome without any further action; or

.2 review the information submitted with an outcome in order to determine equivalence to the requirements for submitting proposals for outputs.

5 Based on paragraph 4.2 above, the committees may decide to:

.1 accept the information submitted with the outcome as equivalent to a proposal for an output, place the item on the biennial agenda or post-biennial agenda, and forward the outcome to the cognizant sub-committee or other bodies concerned for technical review and advice, and possible implementation; or

.2 request submission of a proposal for an output.

6 To enable the committees to carry out proper use of recommendations contained in FSA studies, the decision flow chart (see figure 1) should be used to guide consistent management of outcomes.

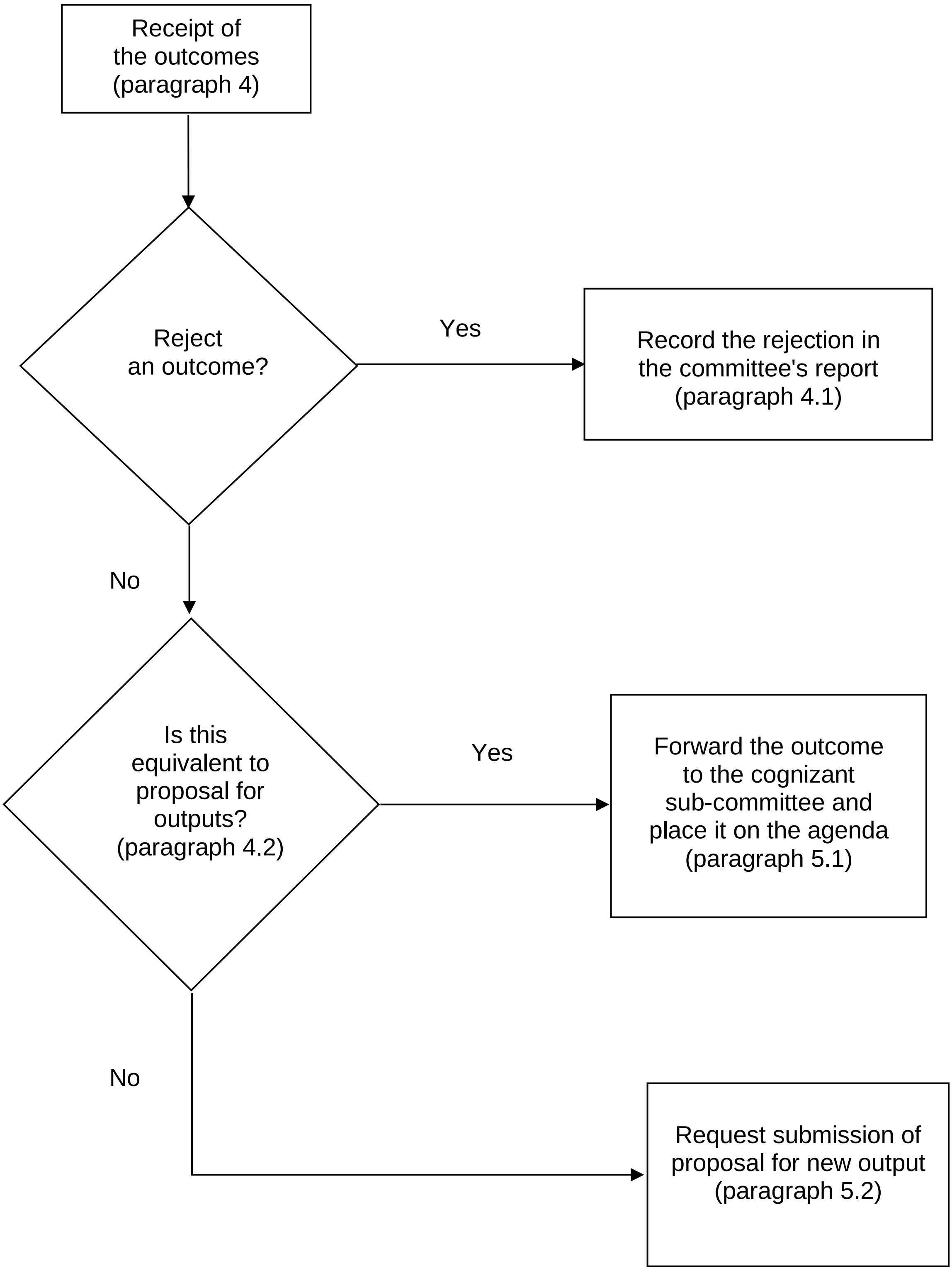

Figure 1 – Flow chart for committees' management of outcomes (i.e. RCOs or other recommendations from an FSA study)

ANNEX 8

FORM FOR PRELIMINARY ASSESSMENT OF PROPOSALS FOR NEW OUTPUTS OR EXPANSION OF THE SCOPE OF AN OUTPUT

Part 1: Proposal

1.1	*Document symbol*	*Document title*
1.2	**Proposal**	*Description of the proposal*

Part 2: Assessment criteria

2.1	Is the subject addressed by the proposal considered to be within the scope of the mission of IMO?	Yes/No
	Additional explanations, if necessary	
2.2	Does the proposal involve the exercise of functions conferred upon a Committee by or under any international convention or related instrument?	Yes/No
	Additional explanations, if necessary	
2.3	Has a need for the output been justified and documented?	Yes/No
	Additional explanations, if necessary	
2.4	Has an analysis been provided that justifies and documents the practicality, feasibility and proportionality of the proposed output?	Yes/No
	Additional explanations, if necessary	
2.5	Has the analysis of the issue sufficiently addressed both the cost to the maritime industry and the relevant legislative and administrative burdens (see annex 6)	Yes/No
	Additional explanations, if necessary	
2.6	Are the benefits (e.g. enhanced maritime safety, maritime security, protection of the marine environment, or facilitation of maritime traffic) that are expected to be derived from the inclusion of the proposed output clearly stated?	Yes/No
	Additional explanations, if necessary	
2.7	Do adequate industry standards exist or are they being developed?	Yes/No
	Additional explanations, if necessary	
2.8	Has the proposed output been properly specified in SMART terms (specific, measurable, achievable, realistic, time-bound) and, for an output to be completed in more than one session, has a road map been provided?	Yes/No
	Additional explanations, if necessary	

2.9	Does the completed checklist for addressing the human element (see annex 5) demonstrate that the human element has been sufficiently considered and addressed?	Yes/No
	Additional explanations, if necessary	
2.10	Has the initial assessment of capacity-building implications related to proposed new, or amendment of existing, mandatory instruments been adequately addressed, using appendices 1 and 2 to annex 2, as appropriate?	Yes/No
	Additional explanations, if necessary	
2.11	If inclusion of the output in the current biennium is proposed, is this action properly justified?	Yes/No
	Additional explanations, if necessary	
2.12	Would a decision to reject or postpone the commencement of the work in relation to the proposal pose an unreasonable risk to the Organization's overall mission?	Yes/No
	Additional explanations, if necessary	

Part 3: Conclusions

3.1	Does the proposal meet the criteria for a new output or the expansion of the scope of an output, as appropriate?	Yes/No
	If the answer is "No", provide justification	
3.2	Does urgency require inclusion in the biennial agenda?	Yes/No
	Additional explanations, if necessary	
3.2	Can the biennial agenda of the Committee and/or the subsidiary body(s) absorb the work?	Yes/No
	Additional explanations, if necessary	

Part 4: Recommendations

4.1	Should the Committee agree to undertake the work?	Yes/No
	If the answer is "No", provide justification	
4.2	Strategic direction	
4.3	Agenda	[Biennial] [Post-biennial]
4.4	Timescale	[Target completion year] [Number of sessions] [Continuous]
4.5	Parent body	
4.6	Coordinating body[1]	
4.7	Associated body	

1 Refer to criteria set out in paragraph 4.25.

4.8	Instrument(s) to be developed or amended, including those may require consequential amendments[2]	
4.9	Application provisions (e.g. new/existing ships, new/existing installations etc.)[6]	
4.10	Entry-into-force date of new, or amendments to existing, instrument(s)[6] (specifying if entry into force is required earlier than the four-year cycle)	

Part 5: Additional remarks for further consideration of the Committee

Provide text, as appropriate

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[2] If applicable.

ANNEX 27

REVISED TERMS OF REFERENCE OF THE CCC AND III SUB-COMMITTEES

The Sub-Committee on Carriage of Cargoes and Containers (CCC)

1 Under the direct instructions of the Maritime Safety Committee and the Marine Environment Protection Committee, the Sub-Committee on Carriage of Cargoes and Containers (CCC) will consider technical and operational matters related to the following subjects, including the development of any necessary amendments to relevant conventions and other mandatory and non-mandatory instruments, as well as the preparation of new mandatory and non-mandatory instruments, guidelines and recommendations, for consideration by the Committees, as appropriate:

.1 effective implementation of the relevant conventions, codes and other instruments, mandatory or recommendatory, as appropriate, dealing with cargo operations, which include packaged dangerous goods, solid bulk cargoes, bulk gas cargoes, and containers;

.2 evaluation of safety and pollution hazards of packaged dangerous goods, solid bulk cargoes and gas cargoes;

.3 survey and certification of ships carrying hazardous cargoes;

.4 further enhancement of the safety and security culture, and environmental consciousness in all cargo and container operations; and

.5 cooperation with other relevant UN bodies, IGOs and NGOs on international standards related to containers and to cargo operations.

2 The conventions and other mandatory instruments (as may be amended from time to time) referred to above include, but are not limited to:

.1 1974 SOLAS Convention (chapters VI and VII and other relevant parts, as appropriate);

.2 MARPOL (Annexes III and V, as appropriate);

.3 International Convention for Safe Containers (CSC), 1972;

.4 International Maritime Dangerous Goods (IMDG) Code and related supplements;

.5 International Maritime Solid Bulk Cargoes (IMSBC) Code and related supplements;

.6 International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk (IGC Code);

.7 International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on board Ships (INF Code);

.8 International Code for the Safe Carriage of Grain in Bulk;

.9 Code of Safe Practice for Cargo Stowage and Securing (CSS Code); and

.10 International Code of Safety for Ships using Gases or Other Low-flashpoint Fuels (IGF Code).

3 The non-mandatory instruments, referred to in paragraph 1, which the Sub-Committee may be called upon to review, include, but are not limited to:

.1 Code of Safe Practice for Solid Bulk Cargoes (BC Code);

.2 Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk (GC Code);

.3 Code of Safe Practice for Ships Carrying Timber Deck Cargoes;

.4 Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code);

.5 Recommendations on the Safe Transport of Dangerous Cargoes and related Activities in Port Areas;

.6 *Guidelines for the Preparation of the Cargo Securing Manual*;

.7 Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide);

.8 Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG);

.9 Reporting procedures, including inspection programmes for cargo transport units carrying dangerous goods; reporting of incidents involving harmful substances and/or marine pollutants; reporting of casualties involving dangerous cargoes;

.10 *IMO/ILO/UNECE Guidelines for Packing of Cargo Transport Units*;

.11 Recommendations on the Safe Use of Pesticides in Ships;

.12 any recommendations and guidelines relevant to the carriage of bulk cargoes; and

.13 any recommendations and guidelines relevant to alternative fuels and related technologies.

4 Any other relevant technical and operational issues referred to it by the Committees or other technical bodies of the Organization.

The Sub-Committee on Implementation of IMO Instruments (III)

1 Under the direct instructions of the Maritime Safety Committee and the Marine Environment Protection Committee, the Sub-Committee on Implementation of IMO Instruments (III), in addressing the effective and consistent global implementation and enforcement of IMO instruments concerning maritime safety and security and the protection of the marine and atmospheric environment, will consider technical and operational matters related to the following subjects, including the development of any necessary amendments to relevant conventions and other mandatory and non-mandatory instruments, as well as the preparation of new mandatory and non-mandatory instruments, guidelines and recommendations, for consideration by the Committees, as appropriate:

.1 comprehensive review of the rights and obligations of States emanating from the IMO treaty instruments;

.2 assessment, monitoring and review of the current level of implementation of IMO instruments by States in their capacity as flag, port and coastal States and countries training and certifying officers and crews, with a view to identifying areas where States may have difficulties in fully implementing them;

.3 identification of the reasons for the difficulties and trends in implementing provisions of relevant IMO instruments, taking into account any relevant information collected through, inter alia, the assessment of performance, IMO Member State Audit Scheme (IMSAS), reports on alleged inadequacy of port reception facilities, the investigation of marine casualties and incidents and port State control (PSC) and through data analysis to maintain an efficient and comprehensive knowledge-based mechanism to support the identification of trends and provide input into the IMO rule-making process, while paying particular attention to the perceived difficulties faced by developing countries;

.4 consideration of proposals to assist States in implementing and complying with IMO instruments by the development of appropriate mandatory and non-mandatory instruments, guidelines, recommendations and unified interpretations as implementation-supporting tools for consideration by the Committees, as appropriate;

.5 analysis of reports of investigation into marine casualties and incidents to draw lessons learned to prevent reoccurrences and to identify safety issues feeding back to the IMO rule-making process;

.6 review of analysis of findings and root causes arising from IMSAS audits to identify difficulties some Member States may face in complying fully with various IMO instruments for improving Member State capabilities and overall performance, including the assessment of the effectiveness and appropriateness of provisions of various IMO instruments identified through recurrent findings from the audits to further inform the IMO rule-making process.

.7 promote and facilitate implementation of IMO standards on maritime safety and security and the protection of the marine and atmospheric environment, in particular those recently adopted/entered into force, to maintain an updated and harmonized guidance on port State control inspection, and on survey and certification;

.8 promotion of global harmonization of PSC activities; and

.9 promotion of safety of fishing vessels, in particular in cooperation with FAO and ILO on IUU and related matters.

2 The conventions and other mandatory instruments (as may be amended from time to time) referred to above include, but are not limited to:

.1 SOLAS (chapters I, IX, XI-1, XIII and appendix and other relevant chapters, as appropriate), Load Lines, Tonnage and COLREG Conventions;

.2 MARPOL, BWM and AFS Conventions and other related environmental instruments, as appropriate;

.3 codes and other provisions made mandatory under SOLAS, Load Lines, MARPOL and BWM Conventions;

.4 International Safety Management (ISM) Code;

.5 Code for Recognized Organizations (RO Code);

.6 IMO Instruments Implementation Code (III Code); and

.7 Casualty Investigation Code.

3 The non-mandatory instruments referred to in paragraph 1, which the Sub-Committee may be called upon to review, include, but are not limited to:

.1 Survey Guidelines under the HSSC;

.2 Procedures for port State control;

.3 Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code); and

.4 fair treatment of seafarers, non-convention ship-related matter, etc.

4 Any other relevant technical and operational issues referred to it by the Committees or other technical bodies of the Organization.

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ANNEX 28

BIENNIAL STATUS REPORTS[1] OF THE SUB-COMMITTEES

2024-2025 BIENNIUM

Sub-Committee on Carriage of Cargoes and Containers (CCC)

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.17	Development of guidelines for the use of ammonia cargo as fuel and provisions for the use of alternative fuels other than cargo on gas carriers	2026	MSC	CCC		Extended		MSC 103/21, para. 18.2; MSC 104/18, para. 15.16; MSC 105/20, para. 18.50; MSC 108/20, para. 14.20 and sec. 18; MSC 109/22, paras. 3.17 to 3.18, 14.5 to 14.10 and 19.38.1; CCC 9/14, sec. 4
Notes	MSC 109 changed the title of output from "Review of IGC Code" and extended its target completion year to 2026								
2	2.3	Amendments to the IGF Code and development of guidelines for alternative fuels and related technologies	Continuous	MSC	HTW / PPR / SDC / SSE	CCC	Ongoing		MSC 94/21, paras. 18.5 and 18.6; MSC 96/25, paras. 10.1 to 10.3; MSC 97/22, para. 19.2; PPR 6/20, para. 3.39; MSC 102/24, para. 21.4; MSC 106/19, para. 16.42, MSC 108/20, secs. 3 and 14; MSC 109/22, paras. 3.19 to 3.20 and 14.2 to 14.3

[1] For details, refer to Organizational Planning module of GISIS.

[2] Strategic directions:
SD 1: Ensure implementation of IMO instruments supported by capacity development
SD 2: Integrate new, emerging and advancing technologies in the regulatory framework
SD 3: Respond to climate change and reduce greenhouse gas emissions from international shipping
SD 4: Continue to engage in ocean governance
SD 5: Enhance global facilitation, supply chain resilience and security of international trade
SD 6: Address the human element
SD 7: Ensure the regulatory effectiveness of international shipping
SD 8: Ensure organizational effectiveness
OW: Other work

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.25	Revision of the Interim recommendations for carriage of liquefied hydrogen in bulk	2026	MSC	CCC		In progress		MSC 105/20, para. 18.28; MSC 108/20, sec. 14, MEPC 82/17, para. 14.12. CCC 8/18, sec. 14; CCC 9/14, sec. 7; CCC 10/16, sec. 14
Notes:	MSC 108 extended the target completion year to 2026.								
3	3.8	Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels	Continuous	MSC	MEPC / III / HTW / CCC / SDC / SSE	MSC	Ongoing		MSC 109/22, sec. 6; CCC 10/16, sec. 10
6	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	No work requested		MSC 89/25, paras. 10.10, 10.16 and 22.39 and annex 21; MEPC 78/17, paras. 10.4 and 13.
6	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	No work requested		MSC 100/20, paras. 10.3 to 10.6 and 17.28; MSC 105/20, sec. 16, MSC 108/20; PPR 9/21, sec. 12; MEPC 79/15, paras. 9.1, 9.14 to 9.15; MEPC 81/16, para. 10.1
6	6.15	Revision of resolution A.1050(27) to ensure the safety of personnel entering enclosed spaces on board ships	2024	MSC	III / HTW / PPR / SDC / SSE	CCC	Complete d		MSC 101/24, para. 21.48; MSC 104/18, para. 15.16; MSC 106/19, para. 16.31; MSC 108/20, para. 14.15; CCC 9/14, sec. 8; CCC 10/16, sec. 8
7	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC / FAL / LEG	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MSC 76/23, para. 20.3; MSC 78/26, para. 22.12; MSC 108/20, para. 18.13, sec. 19, MSC.1/Circ.1456/Rev.1, MSC.1/Circ.1572/Rev.2, MSC.1/Circ.1509/Rev.1, MSC.1/Circ.1511/Rev.1, MSC.1/Circ.1680; MEPC 78/17, sec. 4, and paras. 5.6 and 5.7; MEPC 79/15, paras. 4.8, 4.26, 4.27, 6.26 to 6.29; MEPC 80/17, paras. 4.11 and 5.24; CCC 10/16, sec. 10

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.10	Amendments to the IMDG Code and supplements	Continuous	MSC	CCC		Ongoing		MSC 105/20, paras. 3.59 and 14.4; MSC 108/20, secs. 3 and 14; CCC 10/16, sec. 6
7	7.13	Amendments to the IMSBC Code and supplements	Continuous	MSC	CCC		Ongoing		MSC 105/20, paras. 3.57 and 14.4; MSC 107/20, para. 17.10 and 17.12 CCC 10/16, sec. 5
7	7.15	Development of amendments to SOLAS chapter II-2 and the FSS Code concerning detection and control of fires in cargo holds and on the cargo deck of container ships	2025	MSC	CCC	SSE	In progress		MSC 103/21, para. 18.8; SSE 8/20, sec. 10; MSC 106/19, sec. 9; SSE 9/20, sec. 10; SSE 10/20, sec. 10 CCC 10/16, sec. 15
7	7.20	Develop measures to prevent the loss of containers at sea	2025	MSC	III / HTW / SDC / NCSR	CCC	In progress		MSC 108/20, paras. 3.9 to 3.12 and 3.70, MSC.550(108) CCC 10/16, sec. 11
7	7.28	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Annual	MSC / MEPC	III	CCC	Completed		CCC 7/15, sec. 9; CCC 8/18, sec. 9; CCC 9/14, sec. 9; CCC 10/16, sec. 9
Notes:	MSC 109 agreed to change the type of output from annual to continuous, subject to the concurrence of MEPC.								
7	7.40	Revision of the Revised guidelines for the preparation of the cargo securing manual (MSC.1/Circ.1353/Rev.2) to include a harmonized performance standard for lashing software to permit lashing software as a supplement to the Cargo Securing Manual	2025	MSC	CCC		In progress		MSC 108/20, para. 18.18; CCC 10/16, sec. 7

Sub-Committee on Human Element, Training and Watchkeeping (HTW)

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.11	Measures to harmonize port State control (PSC) activities and procedures worldwide	Continuous	MSC / MEPC	HTW / PPR / NCSR	III	No work requested		MSC 101/24, para. 21.48; MEPC 75/18, paras. 11.10 and 11.11; MSC 104, para. 13.7.1; MSC 108/20, para. 13.7.1; MSC 109/22, para. 15.7; MEPC 78/17, paras. 7.73 and 9.8; MEPC 79/15, paras. 9.5 and 9.6; MEPC 81/16, para. 10.9.1
1	1.26	Revision of MARPOL Annex IV and associated guidelines	2025	MEPC	III / HTW	PPR	No work requested		MEPC 71/17, paras. 14.8 and 14.9; MEPC 72/17, para. 15.10; MEPC 73/19, para. 15.19; PPR 6/20, sec. 14; and MEPC 74/18, para. 14.5; MEPC 78/17, para. 14.11 PPR 9/21, sec. 14; MEPC 78/17, paras. 14.7 to 14.11; MEPC 80/17, para. 9.19; MEPC 81/16, sec. 5
Notes:	MEPC 74 agreed to expand the scope of the existing output 1.26 and amend the title of the output from "Amendments to the 2012 Guidelines on implementation of effluent standards and performance tests for sewage treatment plants (resolution MEPC.227(64)) to address inconsistencies in their application" to read "Revision of MARPOL Annex IV and associated guidelines to introduce provisions for record-keeping and measures to confirm the lifetime performance of sewage treatment plants".								
2	2.3	Amendments to the IGF Code and development of guidelines for alternative fuels and related technologies	Continuous	MSC	HTW / PPR / SDC / SSE	CCC	No work requested		MSC 94/21, paras. 18.5 and 18.6; MSC 96/25, paras. 10.1 to 10.3; MSC 97/22, para. 19.2; PPR 6/20, para. 3.39; MSC 102/24, para. 21.4; MSC 106/19, para. 16.42, MSC 108/20, secs. 3 and 14; MSC 109/22, secs.3 and 14.
3	3.8	Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels	Continuous	MSC	MEPC / III / HTW / CCC / SDC / SSE	MSC	Ongoing		MSC 109/22, sec. 6; MSC 108/20, para. 5.4

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
4	4.3	Follow-up work emanating from the Action Plan to Address Marine Plastic Litter from Ships	2025	MEPC	III / HTW / PPR		No work requested		MEPC 78/17, sec. 8; MEPC 79/15, sec. 8; MEPC 80/17, sec. 8
6	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MSC 89/25, paras. 10.10, 10.16 and 22.39 and annex 21; MEPC 78/17, paras. 10.4 and 13. HTW 10/10, sec. 4
6	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Completed		MSC 100/20, paras. 10.3 to 10.6 and 17.28; MSC 105/20, sec. 16, MSC 108/20 PPR 9/21, sec. 12; MEPC 79/15, paras. 9.1, 9.14 to 9.15; MEPC 81/16, para. 10.1 HTW 10/10, sec. 3
6	6.3	Reports on unlawful practices associated with certificates of competency	Continuous	MSC	HTW		Completed		MSC 83/28, para. 12.2; MSC 109/22, sec. 19; HTW 10/10, sec. 5
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to endorsement by the Council.								
6	6.15	Revision of resolution A.1050(27) to ensure the safety of personnel entering enclosed spaces on board ships	2024	MSC	III / HTW / PPR / SDC / SSE	CCC	No work requested		MSC 101/24, para. 21.48; MSC 104/18, para. 15.16; MSC 106/19, para. 16.31; MSC 108/20, para. 14.15
6	6.17	Comprehensive review of the 1978 STCW Convention and Code	2026	MSC	HTW		In progress		MSC 105/20, para. 18.13; MSC 107/20, para. 17.71; MSC 108/20, para. 16.5 HTW 10/10, sec. 6
7	7.20	Develop measures to prevent the loss of containers at sea	2025	MSC	III / HTW / SDC / NCSR	CCC	No work requested		MSC 108/20, para. 3.9 to 3.12 and 3.70, MSC.550(108)
7	7.42	Revision of the Interim explanatory notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty (MSC.1/Circ.1369) and related circulars	2025	MSC	HTW / SSE	SDC	No work requested		MSC 108/20, para. 15.23.3; MSC 105/20, paras. 15.24.2 and 18.54; MSC 103/21, para. 18.31.
Notes:	MSC 108 extended the target completion year to 2025.								

Sub-Committee on Implementation of IMO Instruments (III)

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.4	Analysis of consolidated audit summary reports	Annual	Assembly	MSC / MEPC / LEG / TCC / III	Council	Completed		MEPC 61/24, para. 11.14.1; MSC 88/26, para. 10.8; C 120/D, para. 7.1 and 7.2; MSC 105/20, para. 13.10; MSC 106/19, paras. 14.11 and 16.37; MSC 108/20, paras. 13.8 and 13.9; MSC 109/22, para. 15.11 MEPC 78/17, paras. 10.7 to 10.11; MEPC 79/15, para. 9.3; MEPC 81/16, para. 10.7 III 8/19, sec. 8; III 9/19, sec. 8; III 10/18, sec. 8
1	1.5	Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code)	Annual	MSC / MEPC	III		In progress		MSC 91/22, para. 10.30; MSC 108/20, para. 13.7.3 MEPC 77/16, paras. 10.8 and 10.9; MEPC 79/15, para. 9.13; MEPC 81/16, para. 10.9.3 III 8/19, sec. 11; III 9/19, sec. 11; III 10/18, sec. 10
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by MEPC and endorsement by the Council.								
1	1.11	Measures to harmonize port State control (PSC) activities and procedures worldwide	Continuous	MSC / MEPC	HTW / PPR / NCSR	III	Ongoing		MSC 101/24, para. 21.48; MEPC 75/18, paras. 11.10 and 11.11; MSC 104, para. 13.7.1; MSC 108/20, para. 13.7.1; MSC 109/22, para. 15.7 MEPC 78/17, paras. 7.73 and 9.8; MEPC 79/15, paras. 9.5 and 9.6; MEPC 81/16, para. 10.9.1 III 8/19, sec. 5; III 9/19, sec. 5; III 10/18, sec. 5
1	1.14	Development of guidance in relation to Mandatory IMO Member State Audit Scheme (IMSAS) to assist in the	2024	MSC / MEPC	III		Completed		MSC 103/21, para. 18.38; MSC 106/19, paras. 14.23 and 14.24; MSC 108/20, paras. 13.10 to 13.13 MEPC 76/15, paras. 10.2 and 12.5;

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
		implementation of the III Code by Member States							MEPC 79/15, para. 9.3; MEPC 81/16, para. 10.8 III 8/19, sec. 9; III 9/19, sec. 9; MSC-MEPC,2/Circ.19
1	1.18	Development of guidance on assessment and applications of remote surveys, ISM Code audits and ISPS Code verifications	2025	MSC / MEPC	III		In progress		MSC 104/18, para. 15.5; MSC 106/19, para. 14.16; MSC 105/20, para. 18.52; MSC 108/20, para. 13.13; MSC 109/22, para. 15.16 MEPC 79/15, para. 9.13; MEPC 81/16, para. 10.1 III 8/19, sec. 12; III 9/19, sec. 12; III 10/18, sec. 11
Notes:	Target completion year extended to 2025, subject to a concurrent decision by MEPC 83.								
1	1.26	Revision of MARPOL Annex IV and associated guidelines	2025	MEPC	III / HTW	PPR	No work requested		MEPC 71/17, paras. 14.8 and 14.9; MEPC 72/17, para. 15.10; MEPC 73/19, para. 15.19; PPR 6/20, sec. 14; and MEPC 74/18, para. 14.5; MEPC 78/17, para. 14.11 PPR 9/21, sec. 14; MEPC 78/17, paras. 14.7 to 14.11; MEPC 80/17, para. 9.19; MEPC 81/16, sec. 5 III 9/19, secs. 5 and 10
Notes:	MEPC 74 agreed to expand the scope of the existing output 1.26 and amend the title of the output from "Amendments to the 2012 Guidelines on implementation of effluent standards and performance tests for sewage treatment plants (resolution MEPC.227(64)) to address inconsistencies in their application" to read "Revision of MARPOL Annex IV and associated guidelines to introduce provisions for record-keeping and measures to confirm the lifetime performance of sewage treatment plants".								
3	3.8	Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels	Continuous	MSC	MEPC / III / HTW / CCC / SDC / SSE	MSC	No work requested		MSC 109/22, sec. 6
4	4.3	Follow-up work emanating from the Action Plan to	2025	MEPC	III / HTW / PPR		In progress		MEPC 78/17, sec. 8; MEPC 79/15, sec. 8; MEPC 80/17, sec. 8 ; III 8/19,

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
		Address Marine Plastic Litter from Ships							sec. 14; III 9/19, sec. 14; III 10, sec. 13
6	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	No work requested		MSC 89/25, paras. 10.10, 10.16 and 22.39 and annex 21; MEPC 78/17, paras. 10.4 and 13.
6	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MSC 100/20, paras. 10.3 to 10.6 and 17.28; MSC 105/20, sec. 16, MSC 108/20 PPR 9/21, sec. 12; MEPC 79/15, paras. 9.1, 9.14 to 9.15; MEPC 81/16, para. 10.1 III 6/15, sec. 4; III 8/19, paras. 5.20 to 5.29; III 9/19, sec. 6; III 10/18, sec. 6
6	6.10	Development of an entrant training manual for PSC personnel	2025	MSC / MEPC	III		Postponed		MSC 103/21, para. 18.36; MSC 106/19, para. 16.46 MEPC 76/15, paras. 10.1, 10.2 and 12.5; MEPC 79/15, para. 9.3; III 9/19, sec. 6
Notes:	It will be developed after the finalization of the IMO Model Course 3.09 on Port State Control, which is expected to be validated by III 11.								
6	6.15	Revision of resolution A.1050(27) to ensure the safety of personnel entering enclosed spaces on board ships	2024	MSC	III / HTW / PPR / SDC / SSE	CCC	No work requested		MSC 101/24, para. 21.48; MSC 104/18, para. 15.16; MSC 106/19, para. 16.31; MSC 108/20, para. 14.15
7	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC / FAL / LEG	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MSC 76/23, para. 20.3; MSC 78/26, para. 22.12; MSC 108/20, para. 18.13, sec. 19, MSC.1/Circ.1456/Rev.1, MSC.1/Circ.1572/Rev.2, MSC.1/Circ.1509/Rev.1, MSC.1/Circ.1511/Rev.1, MSC.1/Circ.1680; MEPC 78/17, sec. 4, and paras. 5.6

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
									and 5.7; MEPC 79/15, paras. 4.8, 4.26, 4.27, 6.26 to 6.29; MEPC 80/17, paras. 4.11 and 5.24 III 8/19, sec. 13; III 9/19, sec. 13; III 10/18, sec. 12
7	7.4	Lessons learned and safety issues identified from the analysis of marine safety investigation reports	Annual	MSC / MEPC	III		Completed		MSC 92/26, para. 22.29; MSC 106/19, paras. 14.2 to 14.6; MSC 108/20, paras. 13.3 to 13.6; MSC 109/22, paras. 15.2 to 15.6 MEPC 79/15, para. 9.3; MEPC 81/16, para. 10.6 III 8/19, sec. 4; III 9/19, sec. 4; III 10/18, sec. 4
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by MEPC and endorsement by the Council.								
7	7.5	Identified issues relating to the implementation of IMO instruments from the analysis of data	Annual	MSC / MEPC	III		Completed		MSC 96/25, para. 23.13 ; MSC 106/19, paras. 14.12 and 16. MSC 108/20, para. 13.4; MSC 109/22, para. 15.3 MEPC 79/15, paras. 12.13 and 12.14; MEPC 81, para. 10.3 III 8/19, sec. 7; III 9/19, sec. 7; III 10/18, sec. 7
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to the concurrent decision by MEPC and endorsement by the Council.								
7	7.7	Consideration and analysis of reports on alleged inadequacy of port reception facilities	Annual	MEPC	III		Completed		MEPC 69/21, para. 19.11; MEPC 73/19, paras. 8.3 and 8.11; MEPC 74/18, paras. 4.33, 4.34 and 8.22 IMEPC 79/15, paras. 9.3 and 9.4; MEPC 81/16, para. 10.2 III 8/19, sec. 3; III 9/19, sec. 3; III 10/18, sec. 3
7	7.20	Develop measures to prevent the loss of containers at sea	2025	MSC	III / HTW / SDC / NCSR	CCC	No work requested		MSC 108/20, para. 3.9 to 3.12 and 3.70, MSC.550(108)

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.27	Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC)	Annual	MSC / MEPC	III		In progress		MSC 79/23, paras. 9.19 and 9.20; MSC 104, para. 13.7.2; MSC 106/19, paras. 14.13 to 14; MSC 108/20, para. 13.7.2; MSC 109/22, para. 15.17. MEPC 68/21, paras. 14.5 and 14.6; MEPC 72/17, paras. 7.4 and 4.24 to 4.33; MEPC 77/16, para. 10.7; MEPC 79/15, paras. 9.7 to 9.9; MEPC 81/16, para. 10.9.2 III 8/19, sec. 10; III 9/19, sec. 10; III 10/18, sec. 9
Notes:	MSC 109 agreed to change the type of output from annual to continuous, subject to the concurrence of MEPC.								
7	7.28	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Annual	MSC / MEPC	III	CCC	No work requested		CCC 7/15, sec. 9; CCC 8/18, sec. 9; CCC 9/14, sec. 9; MSC 109/22, secs.14 and 19
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by MEPC and endorsement by the Council.								
7	7.31	Finalization of a non-mandatory instrument on regulations for non-convention ships	2025	MSC	III		No work requested		MSC 96/25, para. 9.4; MSC 101/24, para. 21.38; MSC 104/18, sec. 5; MSC 105/20, sec. 4; MSC 107/20, paras. 17.83, 19.9 and 19.10, MSC 108/20, sec. 10; MSC 109/22, sec. 17
Notes:	MSC 102, having considered that MSC 101 had included an item on "measures to improve domestic ferry safety", agreed that the III Sub-Committee should not proceed with the development of a model course (as instructed by MSC 96), pending further instructions from the MSC taking into account the outcome of the work on measures to improve domestic ferry safety (MSC 102/24, para. 14.10); MSC 107 extended completion year to 2025, and considered the outcome of TCC 72 (para. 2.19.3 of TCC 72/16), in particular in the context of "Measures to improve domestic ferry safety", the need for development of an explanatory manual for the model regulations on domestic ferry safety and related online training material, and placed the item “Domestic ferry safety” in the provisional agenda of MSC 108.The agenda item” Domestic ferry safety” was also placed on the agenda items of								

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
	MSC 109. MSC 109 requested the Secretariat to provide further updates on the matter at future sessions of MSC, as appropriate, under the agenda item on "Any other business".								
7	7.45	Development of guidance to assist competent authorities in the implementation of the Cape Town Agreement of 2012	2024	MSC	III		Completed		MSC 106/19, paras. 16.17 and 16.46; MSC 108/20, 13.14; MSC 109/22, paras. 15.12 to 15.15 III 9/19, sec. 15; III 10/18, sec. 14; Res.MSC.571(109)

Sub-Committee on Navigation, Communications and Search and Rescue (NCSR)

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.3	Revision of the criteria for the provision of mobile satellite communication services in the Global Maritime Distress and Safety System (GMDSS) (resolution A.1001(25))	2024	MSC	NCSR		Completed		MSC 101/24, para. 21.33; MSC 107/20, para. 17.77.2, MSC 108/20, sec. 12, MSC 109/20, sec. 13; NCSR 9/24, sec. 11; NCSR 10/22, sec. 11; NCSR 11/19, sec. 11 and annex 7; MSC 109/22, para. 13.11 and annex 14
1	1.11	Measures to harmonize port State control (PSC) activities and procedures worldwide	Continuous	MSC / MEPC	HTW / PPR / NCSR	III	No work requested		MSC 101/24, para. 21.48; MEPC 75/18, paras. 11.10 and 11.11; MSC 104, para. 13.7.1; MSC 108/20, para. 13.7.1; MSC 109/22, 15.7 MEPC 78/17, paras. 7.73 and 9.8; MEPC 79/15, paras. 9.5 and 9.6; MEPC 81/16, para. 10.9.1
1	1.34	Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures and amendments to the IAMSAR Manual	Continuous	MSC	NCSR		Ongoing		MSC 108/20, sec. 12; NCSR 11/19, sec. 7 and annexes 3 and 4; SAR.7/Circ.16; MSC 109/22, paras. 13.4 and 13.5 and annex11, MSC.1/Circ.1686
1	1.35	Review of the appropriateness and effectiveness of SOLAS regulation IV/5 (Provision of radiocommunication services)	2025	MSC	NCSR		Completed		MSC 106/19, para. 16.37; MSC 107/20, para. 17.78.3; NCSR 11/19, sec. 10; MSC 109/22, para. 13.10
2	2.1	Response to matters related to the ITU-R Study Groups and ITU World Radiocommunication Conference	Continuous	MSC	NCSR		Ongoing		MSC 106/19, paras. 13.28 to 13.33; MSC 107/20, paras. 15.4 and 15.5 and annex 36; NCSR 11/19, sec 6

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.27	Development of performance standards for a digital navigational data system (NAVDAT)	2024	MSC	NCSR		Completed		MSC 103/21, para. 18.18; MSC 106/19, para. 16.47.1.2, MSC 108/20, para. 12.19, MSC 109/22, para. 13.9 and sec. 19. NCSR 10/22, sec. 8, MSC 108/20, para. 12.19; NCSR 11/19, sec. 8, annexes 5 and 6; MSC 109/22, paras. 13.9 and 19.43; Res. MSC.569 (109) and MSC.509(105)/Rev.1.
2	2.28	Development of amendments to SOLAS chapters IV and V and performance standards and guidelines to introduce VHF Data Exchange System (VDES)	2025	MSC	NCSR		Extended		MSC 103/21, para. 18.12; MSC 106/19, para. 16.47.1.1; NCSR 11/19, sec. 9; MSC 109/22, para. 19.43
Notes:	MSC 109 extended the target completion year of this output to 2025								
2	2.[…]	Development of procedures and requirements for the recognition of augmentation systems in the World-wide radionavigation system	2025	MSC	NCSR		In progress		MSC 109/22, para. 19.43
Notes:	MSC 109 agreed to include this post-biennial output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								
2	2.[…]	Development of guidelines for software maintenance of shipboard navigation and communication equipment and systems	2026	MSC	NCSR		In progress		MSC 109/22, para. 19.43
Notes:	MSC 109 agreed to include this post-biennial output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.[…]	Development of guidelines for EPIRB which implement the two-way communication service via the SAR/Galileo Return Link service as a complement to EPIRB performance standards (resolution MSC.471(101))	2026	MSC	NCSR		In progress		MSC 109/22, para. 19.43
Notes:	MSC 109 agreed to include this post-biennial output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								
2	2.[…]	Revision of the Performance Standards for Shipborne BeiDou Satellite Navigation System (BDS) Receiver Equipment (resolution MSC.379(93))	2025	MSC	NCSR		In progress		MSC 109/22, para. 19.43
Notes:	MSC 109 agreed to include this post-biennial output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								
2	2.[…]	Development of guidance to establish a framework for data distribution and global IP-based connectivity between shore-based facilities and ships for ECDIS S-100 products	2026	MSC	NCSR		In progress		MSC 109/22, para. 19.34
Notes:	MSC 109 agreed to include this new output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								
4	4.1	Identification and protection of Special Areas, Emission Control Areas and PSSAs and associated protective measures	Continuous	MEPC	NCSR		No work requested		MEPC 79/15, para. 10.10 MEPC 78/17, sec. 11; MEPC 79/15, sec. 10; MEPC 80/17, sec. 11
6	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	No work requested		MSC 89/25, paras. 10.10, 10.16 and 22.39 and annex 21; MEPC 78/17, paras. 10.4 and 13.

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
6	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MSC 100/20, paras. 10.3 to 10.6 and 17.28; MSC 105/20, sec. 16, MSC 108/20; PPR 9/21, sec. 12; MEPC 79/15, paras. 9.1, 9.14 to 9.15; MEPC 81/16, para. 10.1
7	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC / FAL / LEG	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MSC 76/23, para. 20.3; MSC 78/26, para. 22.12; MSC 108/20, para. 18.13, sec. 19, MSC.1/Circ.1456/Rev.1, MSC.1/Circ.1572/Rev.2, MSC.1/Circ.1509/Rev.1, MSC.1/Circ.1511/Rev.1, MSC.1/Circ.1680; MEPC 78/17, sec. 4, and paras. 5.6 and 5.7; MEPC 79/15, paras. 4.8, 4.26, 4.27, 6.26 to 6.29; MEPC 80/17, paras. 4.11 and 5.24
7	7.2	Developments in GMDSS services, including guidelines on maritime safety information (MSI)	Continuous	MSC	NCSR		Ongoing		MSC 108/20, sec. 12, MSC.1/Circ.1310/Rev.2, NCSR 11/19, sec. 5
7	7.20	Develop measures to prevent the loss of containers at sea	2025	MSC	III / HTW / SDC / NCSR	CCC	No work requested		MSC 108/20, para. 3.9 to 3.12 and 3.70, MSC.550(108)
7	7.22	Routeing measures and ship reporting systems	Continuous	MSC	NCSR		Ongoing		MSC 108/20, para. 12.4, SN.1/Circ.343; NCSR 11/19, sec. 3 and annexes 1 and 2; MSC 109/22, para. 13.3, COLREG.2/Circ.81, SN.1/Circ.344
7	7.23	Updates to the LRIT system	Continuous	MSC	NCSR		Ongoing		NCSR 11/19, sec. 4

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.44	Revision of SOLAS regulation V/23 and associated instruments to improve the safety of pilot transfer arrangements	2024	MSC	NCSR		Completed		MSC 106/19, paras. 16.12 to .14; MSC 109/22, paras. 13.12 to .19; NCSR 11/19, sec. 13 and annexes 8 to 13; MSC 109/22, paras. 13.14 to 13.19 and annexes 15 to 22
7	7.47	Review of the 2009 Code on Alerts and Indicators	2026	MSC	SSE / NCSR	SDC	No work requested		MSC 108/20, para. 18.24.2
7	7.49	Development of guidelines for the use of electronic nautical publications (ENP)	2025	MSC	NCSR		In progress		MSC 104/15/4, MSC 105/20, para. 18.11; NCSR 11/19, sec. 12
7	7.50	Identification of measures to improve the security and integrity aspects of AIS	2025	MSC	NCSR		Completed		MSC 107/20, para. 17.77; NCSR 11/19, sec. 14 and annex 14; MSC 109/22, para. 13.20; Res.MSC.570(109)

Sub-Committee on Ship Design and Construction (SDC)

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.16	Experience-building phase for the reduction of underwater radiated noise from shipping	2026	MEPC	SDC		Completed		MSC 105/20, para. 15.23; MSC 107/20, para. 12.24; MSC 108/20, para. 18.24; MEPC 78/17 para. 10.3; MEPC 81/16, paras. 10.11-10.16 ; SDC 8/18, para. 14.23 and annex 11 SDC 9/16, sec. 5; SDC 10/17, para. 5.21;
Notes:	SDC 10 completed the work on the output. MEPC 82 retitled the output and included in the provisional agendas of SDC 11 and SDC 12, and extended its target completion year to 2026.								
2	2.3	Amendments to the IGF Code and development of guidelines for alternative fuels and related technologies	Continuous	MSC	HTW / PPR / SDC / SSE	CCC	No work requested		MSC 94/21, paras. 18.5 and 18.6; MSC 96/25, paras. 10.1 to 10.3; MSC 97/22, para. 19.2; PPR 6/20, para. 3.39; MSC 102/24, para. 21.4; MSC 106/19, para 16.42, MSC 108/20, paras. 3.73, 3.74, 3.97.1, 5.30 to 5.33, and 14.5; MSC.551(108), MSC.1/Circ.1677; MSC 109/22, paras. 3.19 and 3.20and annexes 2 and 4; MSC.567(109); MSC.1/Circ.1481
2	2.4	Further development of the IP Code and associated guidance	2025	MSC	SDC		In progress		MSC 104/18, par. 11.5; MSC 105/20, sec. 15, MSC 106/19, sec. 3; MSC.521(106) MSC.527(106) ; MSC 108/20,para. 15.10 ; MSC.1/Circ.1680 ;
2	2.5	Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapter II-1	2024	MSC	SSE	SDC	Completed		MSC 82/24, para. 3.92; MSC 98/23, annex 38; MSC 102/24, para. 19.16. MSC 105/20, para. 15.13 and 18.54, MSC 108/20, para. 15.8, MSC.1/Circ.1212/Rev.2 SDC 10/17, para. 7.11

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.6	Guidelines for use of Fibre-Reinforced Plastics (FRP) within ship structures	2025	MSC	SDC		In progress		MSC 98/23, par. 10.22; MSC 107/20, par. 17.89
2	2.9	Revision of SOLAS chapters II-1 (part C) and V, and related instruments regarding steering and propulsion requirements, to address both traditional and non-traditional propulsion and steering systems	2025	MSC	SSE	SDC	In progress		MSC 105/20, par. 18.23; MSC 107/20, par. 12.4
2	2.20	Development of Guidelines for emergency towing arrangements for ships other than tanker and revision of appendices A and B of MSC.1/Circ.1175/Rev.1	2025	MSC	SDC		In progress		MSC 107/20, para. 12.12, MSC 108/20, paras. 15.2 to .4 SDC 8/18, sec. 12; SDC 9/16, paras. 9.15 and 9.16
Notes:	MSC 108 expanded this output to absorb post-biennial output 214 on the "Revision of appendices A and B of the Revised guidance on shipboard towing and mooring equipment (MSC.1/Circ.1175/Rev.1)".								
3	3.8	Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels	Continuous	MSC	MEPC / III / HTW / CCC / SDC / SSE	MSC	No work requested		MSC 109/22, paras. 6.24, 6.25, 6.26 and 6.27 MSC.1/Circ.1481
6	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Completed		MSC 89/25, paras. 10.10, 10.16 and 22.39 and annex 21; MEPC 78/17, paras. 10.4 and 13.
6	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	No work requested		MSC 100/20, paras. 10.3 to 10.6 and 17.28; MSC 105/20, sec. 16, MSC 108/20 PPR 9/21, sec. 12; MEPC 79/15, paras. 9.1, 9.14 to 9.15; MEPC 81/16, para. 10.1

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
6	6.15	Revision of resolution A.1050(27) to ensure the safety of personnel entering enclosed spaces on board ships	2024	MSC	III / HTW / PPR / SDC / SSE	CCC	No work requested		MSC 101/24, para. 21.48; MSC 104/18, para. 15.16; MSC 106/19, para. 16.31; MSC 108/20, para. 14.15
7	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC / FAL / LEG	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MSC 76/23, para. 20.3; MSC 78/26, para. 22.12; MSC 108/20, para. 18.13, sec. 19, MSC.1/Circ.1456/Rev.1, MSC.1/Circ.1572/Rev.2, MSC.1/Circ.1509/Rev.1, MSC.1/Circ.1511/Rev.1, MSC.1/Circ.1680; MEPC 78/17, sec. 4, and paras. 5.6 and 5.7; MEPC 79/15, paras. 4.8, 4.26, 4.27, 6.26 to 6.29; MEPC 80/17, paras. 4.11 and 5.24
7	7.20	Develop measures to prevent the loss of containers at sea	2025	MSC	III / HTW / SDC / NCSR	CCC	No work requested		MSC 108/20, para. 3.9 to 3.12 and 3.70, MSC.550(108)
7	7.21	Amendments to the 2011 ESP Code	Continuous	MSC	SDC		Ongoing		MSC 92/26, para. 13.31; MSC 107/20, par. 12.2; MSC 108/20, sec. 3 and par.15.5, MSC.553(108)
7	7.25	Amendment to regulation 25 of the of the 1988 Load Line Protocol regarding the requirement for setting of guard rails on the deck structure	2025	MSC	SDC		Extended		MSC 108/20, para. 15.23.1
7	7.35	Amendments to the Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation (MSC.1/Circ.1331) concerning the rigging of safety netting on accommodation ladders and gangways	2025	MSC	SSE	SDC	Extended		MSC 106/19, par.16.28; MSC 108/20, par.15.23.1
Notes:	MSC 108 extended the target completion year to 2025								

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.42	Revision of the Interim explanatory notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty (MSC.1/Circ.1369) and related circulars	2025	MSC	HTW / SSE	SDC	Extended		MSC 108/20, par. 15.23.3; MSC 105/20, paras. 15.24.2 and 18.54; MSC 103/21, para. 18.31.
Notes:	MSC 108 extended the target completion year to 2025								
7	7.47	Review of the 2009 Code on Alerts and Indicators	2026	MSC	SSE / NCSR	SDC	No work requested		MSC 108/20, para. 18.24.2

Sub-Committee on Ship Systems and Equipment (SSE)

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.3	Amendments to the IGF Code and development of guidelines for alternative fuels and related technologies	Continuous	MSC	HTW / PPR / SDC / SSE	CCC	No work requested		MSC 94/21, paras. 18.5 and 18.6; MSC 96/25, paras. 10.1 to 10.3; MSC 97/22, para. 19.2; PPR 6/20, para. 3.39; MSC 102/24, para. 21.4; MSC 106/19, para. 16.42, MSC 108/20, paras. 3.73, 3.74, 3.97.1, 5.30 to 5.33, and 14.5; MSC.551(108), MSC.1/Circ.1677; MSC 109/22, paras. 3.19 and 3.20and annexes 2 and 4; MSC.567(109); MSC.1/Circ.1481
2	2.5	Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapter II-1	2024	MSC	SSE	SDC	No work requested		MSC 82/24, para. 3.92; MSC 98/23, annex 38; MSC 102/24, para. 19.16; MSC 105/20, para. 15.13 and 18.54; MSC 108/20, para. 15.8; MSC.1/Circ.1212/Rev.2
2	2.9	Revision of SOLAS chapters II-1 (part C) and V, and related instruments regarding steering and propulsion requirements, to address both traditional and non-traditional propulsion and steering systems	2025	MSC	SSE	SDC	No work requested		MSC 105/20, par. 18.23; MSC 107/20, par. 12.4
2	2.16	Revision of SOLAS chapter III and the International Life-Saving Appliance (LSA) Code	2027	MSC	SSE		Extended		MSC 108/20, para. 18.25 SSE 7/21, sec. 5; SSE 8/20, sec. 5; SSE 9/20, sec. 5; SSE 10/20, sec. 5; MSC 109/22, paras. 3.27, 12.4 to 12.8 and 21.2
Notes:	To remove gaps, inconsistencies and ambiguities based on the safety objectives, functional requirements and expected performance for SOLAS chapter III. MSC 109 extended the target completion year to 2027.								

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
3	3.8	Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels	Continuous	MSC	MEPC / III / HTW / CCC / SDC / SSE	MSC	No work requested		MSC 109/22, paras. 6.24 and 6.25, and MSC.1/Circ.1481
5	5.11	Review and update of the Code of practice for atmospheric oil mist detectors (MSC.1/Circ.1086)	2026	MSC	SSE		In progress		MSC 107/20, para. 17.39
6	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	No work requested		MSC 89/25, paras. 10.10, 10.16 and 22.39 and annex 21; MEPC 78/17, paras. 10.4 and 13.
6	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MSC 100/20, paras. 10.3 to 10.6 and 17.28; MSC 105/20, sec. 16, MSC 108/20 PPR 9/21, sec. 12; MEPC 79/15, paras. 9.1, 9.14 to 9.15; MEPC 81/16, para. 10.1; MSC 109/22, paras. 12.15 and 12.16
6	6.15	Revision of resolution A.1050(27) to ensure the safety of personnel entering enclosed spaces on board ships	2024	MSC	III / HTW / PPR / SDC / SSE	CCC	No work requested		MSC 101/24, para. 21.48; MSC 104/18, para. 15.16; MSC 106/19, para. 16.31; MSC 108/20, para. 14.15
7	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC / FAL / LEG	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MSC 76/23, para. 20.3; MSC 78/26, para. 22.12; MSC 108/20, para. 18.13, sec. 19, MSC.1/Circ.1456/Rev.1, MSC.1/Circ.1572/Rev.2, MSC.1/Circ.1509/Rev.1, MSC.1/Circ.1511/Rev.1, MSC.1/Circ.1680; MEPC 78/17, sec. 4, and paras. 5.6 and 5.7; MEPC 79/15, paras. 4.8, 4.26, 4.27, 6.26 to 6.29; MEPC 80/17, paras. 4.11

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
									and 5.24; SSE 10/20, paras. 12.9, 12.18, 12.25 and 12.34; MSC 109/22, paras. 12.17, 12.18, 12.19, 12.20 and 12.21; MSC.1/Circ.1682, MSC.1/Circ.1683, MSC.1/Circ.1684, MSC.1/Circ.1276/Rev.2,and MSC.1/Circ.1685
7	7.14	Revision of the provisions for helicopter facilities in SOLAS and the MODU Code	2024	MSC	SSE		Completed		MSC 109/22, para. 12.11
Notes:	MSC 109 decided that the item had been completed.								
7	7.15	Development of amendments to SOLAS chapter II-2 and the FSS Code concerning detection and control of fires in cargo holds and on the cargo deck of container ships	2025	MSC	CCC	SSE	In progress		MSC 103/21, para. 18.8; SSE 8/20, paras. 6.24 and 10.6 ; SSE 9/20, paras. 6.10, 10.4 and 11.10 and annex 6 ; MSC.1/Circ.1456/Rev.1; MSC 109/22, para. 12.13
7	7.19	Amendments to the LSA Code for thermal performance of immersion suits	2025	MSC	SSE		Extended		MSC 92/26, para. 13.34; SSE 9/20, paras. 7.15, 7.16 and annexes 1;, and 8; MSC 107/20, paras. 3.57, 3.61, 3.86, 14.11.4, 14.19, 14.20, 14.22 and 14.24; MSC.1/Circ.1628/Rev.1; SSE 10/20, paras. 15.6 and 15.7; MSC 108/20, paras. 3.59.2 and 3.97.2; MSC.1/Circ.1628/Rev.2; MSC 109/22, para. 12.28; MSC.1/Circ.1628/Rev.2
Notes:	MSC 109 extended the target completion year to 2025.								
7	7.29	Comprehensive review of the Requirements for maintenance, thorough examination, operational testing, overhaul and	2025	MSC	SSE		In progress		MSC.402(96); SSE 10/20, paras. 4.13, 12.9 annex MSC 109/22, para. 12.17; MSC.1/Circ.1682

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
		repair of lifeboats and rescue boats, launching appliances and release gear (resolution MSC.402(96)) to address challenges with their implementation							
7	7.30	Amendments to SOLAS chapter III and chapter IV of the LSA Code to require the carriage of self-righting or canopied reversible liferafts for new ships	2025	MSC	SSE		In progress		MSC 109/22, para. 12.8
7	7.32	Development of amendments to paragraph 8.3.5 and annex 1 of the 1994 and 2000 HSC Codes	2024	MSC	SSE		Completed		MSC 109/22, para. 12.9 and annexes 7 and 8
7	7.33	Development of design and prototype test requirements for the arrangements used in the operational testing of free-fall lifeboat release systems without launching the lifeboat	2025	MSC	SSE		In progress		SSE 10/20, paras. 20.3.2 and 20.3.4; MSC 109/22, paras. 12.4 and 19.48.1
7	7.34	Revision of the 2010 FTP Code to allow for new fire protection systems and materials	2026	MSC	SSE		Ongoing		SSE 10/20, paras. 8.4 and 17.9; MSC 109/22, para. 12.10
7	7.35	Amendments to the Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation (MSC.1/Circ.1331) concerning the rigging of safety netting on accommodation ladders and gangways	2025	MSC	SSE	SDC	No work requested		MSC 106/19, par.16.28; MSC 108/20, par.15.23.1
Notes:	MSC 108 extended the target completion year to 2025								

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.36	New requirements for ventilation of survival craft	2025	MSC	SSE		Extended		MSC 97/22, para. 19.22; SSE 8/20, sec. 3; MSC 106/19, sec. 11; MSC 107/20, para. 3.61.1 and 14.1 to 14.5; MSC.1/Circ.1630/Rev.2; SSE 10/20, para. 3.7.2; MSC 108/20, para. 18.25. MSC 109/22, para. 12.2
Notes:	MSC 109 agreed with SSE 10's request for an extension of the target completion year to 2025 for further discussion on the compelling need.								
7	7.37	Evaluation of adequacy of fire protection, detection and extinction arrangements in vehicle, special category and ro-ro spaces in order to reduce the fire risk of ships carrying new energy vehicles	2027	MSC	SSE		In progress		SSE 10/20, sec. 16; MSC 109/22, para. 12.26
7	7.41	Development of provisions to consider prohibiting the use of fire-fighting foams containing fluorinated substances, in addition to PFOS for fire-fighting on board ships	2025	MSC	SSE		In progress		MSC 101/24, para. 21.27; MSC 102/24, paras. 19.31 and 21.19; SSE 8/20, sec. 12; MSC 106/19, sec. 11; SSE 9/20, sec. 15; MSC 107/20, sec. 14; SSE 10/20, sec. 13; MSC 109/22, para. 12.22
7	7.42	Revision of the Interim explanatory notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty (MSC.1/Circ.1369) and related circulars	2025	MSC	HTW / SSE	SDC	No work requested		MSC 108/20, par. 15.23.3; MSC 105/20, paras. 15.24.2 and 18.54; MSC 103/21, para. 18.31.
Notes:	MSC 108 extended the target completion year to 2025								
7	7.47	Review of the 2009 Code on Alerts and Indicators	2026	MSC	SSE / NCSR	SDC	No work requested		MSC 108/20, para. 18.24.2

Reference to SD	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.48	Review and update SOLAS regulation II-2/9 on containment of fire to incorporate existing guidance and clarify requirements	2026	MSC	SSE		In progress		MSC 104/15/2; MSC 105/20, paras. 18.8 and 18.9; MSC 109/22, para. 12.10

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ANNEX 29

PROVISIONAL AGENDAS FOR THE FORTHCOMING SESSIONS OF THE SUB-COMMITTEES

PROVISIONAL AGENDA FOR CCC 11[12]

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Amendments to the IGF Code and development of guidelines for alternative fuels and related technologies (2.3)

4 Development of guidelines for the use of ammonia cargo as fuel (1.17)

5 Amendments to the IMSBC Code and supplements (7.13)

6 Amendments to the IMDG Code and supplements (7.10)

7 Revision of the Revised guidelines for the preparation of the Cargo Securing Manual (MSC.1/Circ.1353/Rev.2) to include a harmonized performance standard for lashing software to permit lashing software as a supplement to the Cargo Securing Manual (7.40)

8 Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas (7.28)

9 Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions (7.1)

10 Development of measures to prevent the loss of containers at sea (7.20)

11 Revision of the Interim recommendations for carriage of liquefied hydrogen in bulk (2.25)

12 Biennial status report and provisional agenda for CCC 12

13 Election of the Chair and Vice-Chair for 2026

14 Any other business

15 Report to the Committees

12 CCC 10 formally reports to MSC 110; however, for the purpose of this annex, MSC 109 approved the provisional agenda for CCC 11.

PROVISIONAL AGENDA FOR HTW 11

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Validated model training courses (6.2)

4 Role of the human element (6.1)

5 Reports on unlawful practices associated with certificates of competency (6.3)

6 Comprehensive review of the 1978 STCW Convention and Code (6.17)

7 Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels (3.8)

8 Biennial status report and provisional agenda for HTW 12

9 Election of Chair and Vice-Chair for 2026

10 Any other business

11 Report to the Maritime Safety Committee

PROVISIONAL AGENDA FOR III 11

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Consideration and analysis of reports on alleged inadequacy of port reception facilities (7.7)

4 Lessons learned and safety issues identified from the analysis of marine safety investigation reports (7.4)

5 Measures to harmonize port State control (PSC) activities and procedures worldwide (1.11)

6 Validated model training courses (6.2)

7 Identified issues relating to the implementation of IMO instruments from the analysis of data (7.5)

8 Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC) (7.27)

9 Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code) (1.5)

10 Development of guidance on assessments and applications of remote surveys, ISM Code audits and ISPS Code verifications (1.18)

11 Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions (7.1)

12 Follow-up work emanating from the Action Plan to Address Marine Plastic Litter from Ships (4.3)

13 Biennial agenda and provisional agenda for III 12

14 Election of Chair and Vice-Chair for 2026

15 Any other business

16 Report to the Committees

PROVISIONAL AGENDA FOR NCSR 12

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Routeing measures and ship reporting systems (7.22)

4 Updates to the LRIT system (7.23)

5 Developments in GMDSS services, including guidelines on maritime safety information (MSI) (7.2)

6 Response to matters related to the ITU-R Study Groups and ITU World Radiocommunication Conference (2.1)

7 Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures and amendments to the IAMSAR Manual (1.34)

8 Development of procedures and requirements for the recognition of augmentation systems in the Worldwide Radionavigation System (2.[…])

9 Development of amendments to SOLAS chapters IV and V and performance standards and guidelines to introduce VHF Data Exchange System (VDES) (2.28)

10 Development of guidelines for software maintenance of shipboard navigation and communication equipment and systems (2.[…])

11 Development of guidelines for EPIRB which implement the two-way communication service via the SAR/Galileo Return Link service as a complement to EPIRB performance standards (resolution MSC.471(101)) (2.[…])

12 Development of guidelines for the use of electronic nautical publications (ENP) (7.49)

13 Revision of the Performance Standards for Shipborne BeiDou Satellite Navigation System (BDS) Receiver Equipment (resolution MSC.379(93)) (2.[…])

14 Development of guidance to establish a framework for data distribution and global IP-based connectivity between shore-based facilities and ships for ECDIS S-100 products (2.[…])

15 Validated model training courses (6.2)

16 Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions (7.1)

17 Biennial status report and provisional agenda for NCSR 13

18 Election of Chair and Vice-Chair for 2026

19 Any other business

20 Report to the Maritime Safety Committee

PROVISIONAL AGENDA FOR SDC 11

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Development of Guidelines for emergency towing arrangements for ships other than tankers (2.20)[13]

4 Further development of the IP Code and associated guidance (2.4)

5 Revision of the Interim explanatory notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty (MSC.1/Circ.1369) and related circulars (7.42)

6 Amendments to the 2011 ESP Code (7.21)

7 Amendments to the Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation (MSC.1/Circ.1331) concerning the rigging of safety netting on accommodation ladders and gangways (7.35)

8 Revision of SOLAS chapters II-1 (part C) and V, and related instruments regarding steering and propulsion requirements, to address both traditional and non-traditional propulsion and steering systems (2.9)

9 Amendment to regulation 25 of the 1988 Load Line Protocol regarding the requirement for setting of guard rails on the deck structure (7.25)

10 Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions (7.1)

11 Guidelines for use of Fibre-Reinforced Plastics (FRP) within ship structures (2.6)

12 Review of the 2009 Code on Alerts and Indicators (7.47)[14]

13 Biennial status report and provisional agenda for SDC 12

14 Election of Chair and Vice-Chair for 2026

15 Experience-building phase for the reduction of underwater radiated noise from shipping (1.16)[15]

16 Any other business

17 Report to the Maritime Safety Committee

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[13] MSC 108 agreed to the expansion of output 2.20 by moving the output on the "Revision of appendices A and B of the Revised guidance on shipboard towing and mooring equipment (MSC.1/Circ.1175/Rev.1)" from the Committee's post-biennial agenda and including it under existing output 2.20, i.e. to incorporate draft amendments to MSC.1/Circ.1175/Rev.1 deriving from the update of IACS UR A2 and Recommendation No.10.

[14] MSC 108 agreed to move the output from the post-biennial agenda to the provisional agenda of SDC 11, with work to be undertaken, based on the annex to document SSE 10/17 (IACS) containing the draft amendments to the Code.

[15] MEPC 82 decided to introduce the new agenda item on "Experience-building phase for the reduction of underwater radiated noise from shipping" in the provisional agendas of SDC 11 and SDC 12, to accommodate submission of all technical documents concerning the experience-building phase and other technical action items in the URN Action Plan to those two sessions of SDC. The same agenda item will remain in the provisional agendas of MEPC 83, MEPC 84 and MEPC 85 to accommodate potential proposals from Member States, international organizations or the SDC Sub-Committee requiring high-level direction or policy decisions (MEPC 82/WP.1, paragraph 9.17).

PROVISIONAL AGENDA FOR SSE 11

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 New requirements for ventilation of survival craft (7.36)

4 Development of design and prototype test requirements for the arrangements used in the operational testing of free-fall lifeboat release systems without launching the lifeboat (7.33)

5 Revision of SOLAS chapter III and the LSA Code (2.16)

6 Amendments to SOLAS chapter III and chapter IV of the LSA Code to require the carriage of self-righting or canopied reversible liferafts for new ships (7.30)

7 Review and update of the Code of practice for atmospheric oil mist detectors (MSC.1/Circ.1086) (5.11)

8 Revision of the 2010 FTP Code to allow for new fire protection systems and materials (7.34)

9 Review and update SOLAS regulation II-2/9 on containment of fire to incorporate existing guidance and clarify requirements[1]

10 Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions (7.1)

11 Validated model training courses (6.2)

12 Development of amendments to SOLAS chapter II-2 and the FSS Code concerning detection and control of fires in cargo holds and on the cargo deck of containerships (7.15)

13 Development of provisions to consider prohibiting the use of fire-fighting foams containing fluorinated substances, in addition to PFOS, for fire-fighting on board ships (7.41)

14 Comprehensive review of the Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear (resolution MSC.402(96)) to address challenges with their implementation (7.29)

15 Amendments to the LSA Code for thermal performance of immersion suits (OW 14)

16 Evaluation of adequacy of fire protection, detection and extinction arrangements in vehicle, special category and ro-ro spaces in order to reduce the fire risk of ships carrying new energy vehicles (7.37)

17 Biennial status report and provisional agenda for SSE 12

18 Election of Chair and Vice-Chair for 2026

19 Any other business

20 Report to the Maritime Safety Committee

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ANNEX 30

BIENNIAL STATUS REPORT[1] OF THE MARITIME SAFETY COMMITTEE

Maritime Safety Committee (MSC)

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.2	Input on identifying emerging needs of developing countries, in particular SIDS and LDCs to be included in the ITCP	Continuous	TCC	MSC / MEPC / FAL / LEG		No work requested		MEPC 78/17, sec. 12; MEPC 79/15, sec. 7; MEPC 80/17, sec. 12
1	1.3	Revision of the criteria for the provision of mobile satellite communication services in the Global Maritime Distress and Safety System (GMDSS) (resolution A.1001(25))	2024	MSC	NCSR		Completed		MSC 101/24, para. 21.33; MSC 107/20, para. 17.77.2, MSC 108/20, sec. 12, MSC 109/22, para. 13.11 and annex 14

[1] For details, refer to Organizational Planning module of GISIS.

[2] Strategic directions:
SD 1: Ensure implementation of IMO instruments supported by capacity development
SD 2: Integrate new, emerging and advancing technologies in the regulatory framework
SD 3: Respond to climate change and reduce greenhouse gas emissions from international shipping
SD 4: Continue to engage in ocean governance
SD 5: Enhance global facilitation, supply chain resilience and security of international trade
SD 6: Address the human element
SD 7: Ensure the regulatory effectiveness of international shipping
SD 8: Ensure organizational effectiveness
OW: Other work

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.4	Analysis of consolidated audit summary reports	Annual	Assembly	MSC / MEPC / LEG / TCC / III	Council	Completed		MEPC 61/24, para. 11.14.1; MSC 88/26, para. 10.8; C 120/D, para. 7.1 and 7.2; MSC 105/20, para. 13.10; MSC 106/19, paras. 14.11 and 16.37; MSC 108/20, paras. 13.8 and 13.9; MSC 109/22, para. 15.11 MEPC 78/17, paras. 10.7 to 10.11; MEPC 79/15, para. 9.3; MEPC 81/16, para. 10.7 MSC 105/20, para. 13.10; MSC 106/19, paras. 14.11 and 16.37; MSC 108/20, paras. 13.8 and 13.9; MSC 109/22, para. 15.11
1	1.5	Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code)	Annual	MSC / MEPC	III		In progress		MSC 91/22, para. 10.30; MSC 108/20, para. 13.7.3 MEPC 77/16, paras. 10.8 and 10.9; MEPC 79/15, para. 9.13; MEPC 81/16, para. 10.9.3
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by MEPC and endorsement by the Council.								
1	1.7	Identify thematic priorities within the area of maritime safety and security, marine environmental protection, facilitation of maritime traffic and maritime legislation	Annual	TCC	MSC / MEPC / FAL / LEG		Completed		MEPC 78/17, sec. 12; MEPC 80/17, sec. 12, MSC 108/20, paras. 19.18 to 19.20. MSC 108/20, paras. 19.18 to 19.20

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.11	Measures to harmonize port State control (PSC) activities and procedures worldwide	Continuous	MSC / MEPC	HTW / PPR / NCSR	III	Completed		MSC 101/24, para. 21.48; MEPC 75/18, paras. 11.10 and 11.11; MSC 104, para. 13.7.1; MSC 108/20, para. 13.7.1; MSC 109/22, para. 15.7 MEPC 78/17, paras. 7.73 and 9.8; MEPC 79/15, paras. 9.5 and 9.6; MEPC 81/16, para. 10.9.1
1	1.14	Development of guidance in relation to Mandatory IMO Member State Audit Scheme (IMSAS) to assist in the implementation of the III Code by Member States	2024	MSC / MEPC	III		Completed		MSC 103/21, para. 18.38; MSC 106/19, paras. 14.23 and 14.24; MSC 108/20, paras. 13.10 to 13.13 MEPC 76/15, paras. 10.2 and 12.5; MEPC 79/15, para. 9.3; MEPC 81/16, para. 10.8; MSC-MEPC.2/Circ.19
1	1.17	Development of guidelines for the use of ammonia cargo as fuel and provisions for the use of alternative fuels other than cargo on gas carriers	2026	MSC	CCC		Extended		MSC 103/21, para. 18.2; MSC 104/18, para. 15.16; MSC 105/20, para. 18.50; MSC 108/20, para. 14.20 and sec. 18; MSC 109/22, paras. 14.5 to 14.10 and 19.38.1
Note	MSC 109 changed the title of the output "Review of IGC Code" and extended its target completion year to 2026								
1	1.18	Development of guidance on assessment and applications of remote surveys, ISM Code audits and ISPS Code verifications	2025	MSC / MEPC	III		Extended		MSC 104/18, para. 15.5; MSC 106/19, para. 14.16; MSC 105/20, para. 18.52; MSC 108/20, para. 13.13; MSC 109/22, para. 15.16 MEPC 79/15, para. 9.13; MEPC 81/16, para. 10.1
Notes:	Target completion year extended to 2025, subject to a concurrent decision by MEPC 83.								

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
1	1.34	Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures and amendments to the IAMSAR Manual	Continuous	MSC	NCSR		Ongoing		MSC 108/20, sec. 12; MSC 109/22, paras. 13.4 and 13.5 and annex 11, MSC.1/Circ.1686
1	1.35	Review of the appropriateness and effectiveness of SOLAS regulation IV/5 (Provision of radiocommunication services)	2025	MSC	NCSR		Completed		MSC 106/19, para. 16.37; MSC 107/20, para. 17.78.3; MSC 109/22, para. 13.10
2	2.1	Response to matters related to the ITU-R Study Groups and ITU World Radiocommunication Conference	Continuous	MSC	NCSR		Ongoing		MSC 106/19, paras. 13.28 to 13.33; MSC 107/20, paras. 15.4 and 15.5 and annex 36
2	2.3	Amendments to the IGF Code and development of guidelines for alternative fuels and related technologies	Continuous	MSC	HTW / PPR / SDC / SSE	CCC	Ongoing		MSC 94/21, paras. 18.5 and 18.6; MSC 96/25, paras. 10.1 to 10.3; MSC 97/22, para. 19.2; PPR 6/20, para. 3.39; MSC 102/24, para. 21.4; MSC 106/19, para. 16.42, MSC 108/20, secs.3 and 14; MSC 109/22, secs.3 and 14, Res. MSC.567(109).
2	2.4	Further development of the IP Code and associated guidance	2025	MSC	SDC		In progress		MSC 104/18, para. 11.5; MSC 105/20, sec. 15, MSC 106/19, sec. 3; Res MSC.521(106) & MSC.527(106), MSC 108/20, sec. 15.
Notes:	MSC 105 renamed the output from “Mandatory instrument and/or provisions addressing safety standards for the carriage of more than 12 industrial personnel on board vessels engaged on international voyages”; MSC 107 extended the target completion year to 2025 (MSC 107/20, proposed biennial agenda 2024-25)								

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.5	Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapter II-1	2024	MSC	SSE	SDC	Completed		MSC 82/24, para. 3.92; MSC 98/23, annex 38; MSC 102/24, para. 19.16. MSC 105/20, para. 15.13 and 18.54, MSC 108/20, para. 15.8, MSC.1/Circ.1212/Rev.2
2	2.6	Guidelines for use of Fibre-Reinforced Plastics (FRP) within ship structures	2025	MSC	SDC		In progress		MSC 98/23, para. 10.22; MSC 107/20, para. 17.89
2	2.7	Development of joint FAL-LEG-MEPC-MSC guidelines on electronic certificates	2026	FAL	MSC		No work requested		FAL 48/20, para. 2.12, MSC 108/20, para. 2.8.2
Notes:	FAL 48 invited LEG, MSC and MEPC Committees to become associated organs.								
2	2.8	Revision of the Guidelines on Maritime Cyber Risk Management (MSC-FAL.1/Circ.3/Rev.2) and identification of next steps to enhance maritime cybersecurity	2026	MSC	FAL	MSC	In progress		MSC-FAL.1/Circ.3/Rev.3, subject to FAL's concurrent approval; MSC 109/22, para. 7.7
Notes:	FAL 48/20, para. 17.13, MSC 108/20, sec. 6, MSC 109 extended the target completion year to 2026.								
2	2.9	Revision of SOLAS chapters II-1 (part C) and V, and related instruments regarding steering and propulsion requirements, to address both traditional and non-traditional propulsion and steering systems	2025	MSC	SSE	SDC	In progress		MSC 105/20, para. 18.23; MSC 107/20, para. 12.4

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.11	Development of a comprehensive strategy on maritime digitalization	2027	FAL	MSC		No work requested		FAL 48/20, paras. 17.3 and 20.5.13; MSC 109/20, para. 19.24
Notes:	MSC 109 agreed to become an associated organ at the invitation of FAL 48.								
2	2.16	Revision of SOLAS chapter III and the International Life-Saving Appliance (LSA) Code	2027	MSC	SSE		Extended		MSC 108/20, para. 18.25; MSC 109/22, paras. 3.27, 12.4 to 12.8 and 21.2
Notes:	To remove gaps, inconsistencies and ambiguities based on the safety objectives, functional requirements and expected performance for SOLAS chapter III. MSC 109 extended the target completion year to 2027.								
2	2.20	Development of Guidelines for emergency towing arrangements for ships other than tanker and revision of appendices A and B of MSC.1/Circ.1175/Rev.1	2025	MSC	SDC		In progress		MSC 107/20, para. 12.12, MSC 108/20, paras. 15.2 to .4
Notes:	MSC 108 expanded this output to absorb post-biennial output 214 on the "Revision of appendices A and B of the Revised guidance on shipboard towing and mooring equipment (MSC.1/Circ.1175/Rev.1)".								
2	2.21	Review of Formal Safety Assessment (FSA) studies by the FSA Experts' Group	Continuous	MSC			Ongoing		MSC 105/20, sec. 11; MSC 106/19, sec. 9; MSC 107/20, sec. 10, MSC 108/20, sec. 11; MSC 109/22, sec. 11.
2	2.23	Development of a goal-based instrument for maritime autonomous surface ships (MASS)	2026	MSC			Extended		MSC 104/18, para15.9.2; MSC 105/20, sec. 7; MSC 106/19, sec. 5; MSC 107/20, sec. 5, MSC 108/20, sec. 4; MSC 109/22, sec. 5.
Notes:	MSC 109 extended the target completion year to 2026.								

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.25	Revision of the Interim recommendations for carriage of liquefied hydrogen in bulk	2026	MSC	CCC		In progress		MSC 105/20, para. 18.28; MSC 108/20, sec. 14, MEPC 82/17, para. 14.12.
Notes:	MSC 108 extended the target completion year to 2026.								
2	2.27	Development of performance standards for a digital navigational data system (NAVDAT)	2024	MSC	NCSR		Completed		MSC 103/21, para. 18.18; MSC 106/19, para. 16.47.1.2, MSC 108/20, para. 12.19, MSC 109/22, paras. 13.9 and 19.43; Res. MSC.569 (109) and MSC.509(105)/Rev.1.
2	2.28	Development of amendments to SOLAS chapters IV and V and performance standards and guidelines to introduce VHF Data Exchange System (VDES)	2025	MSC	NCSR		Extended		MSC 103/21, para. 18.12; MSC 106/19, para. 16.47.1.1; MSC 109/22, para. 19.43.
Notes:	MSC 109 extended the target completion year of this output to 2025.								
2	2.[…]	Development of procedures and requirements for the recognition of augmentation systems in the Worldwide Radionavigation System	2025	MSC	NCSR				MSC 109/22, para. 19.43
Notes:	MSC 109 agreed to include this post-biennial output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								
2	2.[…]	Development of guidelines for software maintenance of shipboard navigation and communication equipment and systems	2026	MSC	NCSR				MSC 109/22, para. 19.43
Notes:	MSC 109 agreed to include this post-biennial output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
2	2.[…]	Development of guidelines for EPIRB which implement the two-way communication service via the SAR/Galileo Return Link service as a complement to EPIRB performance standards (resolution MSC.471(101))	2026	MSC	NCSR				MSC 109/22, para. 19.43
Notes:	MSC 109 agreed to include this post-biennial output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								
2	2.[…]	Revision of the Performance Standards for Shipborne BeiDou Satellite Navigation System (BDS) Receiver Equipment (resolution MSC.379(93))	2025	MSC	NCSR				MSC 109/22, para. 19.43
Notes:	MSC 109 agreed to include this post-biennial output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								
2	2.[…][3]	Development of guidance to establish a framework for data distribution and global IP-based connectivity between shore-based facilities and ships for ECDIS S-100 products	2026	MSC	NCSR		No work requested		MSC 109/22, para. 19.34
Notes:	MSC 109 agreed to include this new output in the biennial agenda for 2024-2025 and the provisional agenda for NCSR 12.								
3	3.8	Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels	Continuous	MSC	MEPC / III / HTW / CCC / SDC / SSE	MSC	Ongoing		MSC 109/22, sec. 6

[3] Output number to be allocated after the Council's endorsement.

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
4	4.2	Input to the ITCP on emerging issues relating to sustainable development and achievement of the SDGs	Continuous	TCC	MSC / MEPC / FAL / LEG		No work requested		MEPC 72/17, sec. 12; MEPC 73/19, sec. 13; MEPC 74/18, sec. 12 MEPC 78/17, sec. 12; MEPC 80/17, sec. 12
5	5.2	Guidelines and guidance on the implementation and interpretation of SOLAS chapter XI-2 and the ISPS Code	Annual	MSC			Completed		
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to endorsement by the Council.								
5	5.3	Consideration and analysis of reports on piracy and armed robbery against ships	Annual	MSC			Completed		MSC 105/20, para. 9.1; MSC 106/19, sec. 7; MSC 107/20, sec. 7, MSC 108/20, sec. 8; MSC 109/22, secs. 9 and 19.
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to endorsement by the Council.								
5	5.4	Revised guidance relating to the prevention of piracy and armed robbery to reflect emerging trends and behaviour patterns	Annual	MSC	LEG		Completed		MSC 105/20, para. 9.1; MSC 106/19, para. 7.7; MSC 107/20, sec. 7; MSC 108/20, sec. 8, MSC 109/22, secs. 9 and 19.
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to endorsement by the Council.								
5	5.9	Development of amendments to the Revised guidelines for the prevention and suppression of the smuggling of drugs, psychotropic substances and precursor chemicals on ships engaged in	2027	FAL	MSC		No work requested		FAL 48/20 para. 17.7, MSC 108/20, para. 2.16

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
		international maritime traffic (resolutions FAL.9(34) and MSC.228(82))							
5	5.11	Review and update of the Code of practice for atmospheric oil mist detectors (MSC.1/Circ.1086)	2026	MSC	SSE		In progress		MSC 107/20, para. 17.39
5	5.13	IMO's contribution to addressing unsafe mixed migration by sea	2025	MSC / FAL / LEG			In progress		FAL 41/17, para. 7.15; MSC 98/23, para. 16.14; FAL 43, para. 10.7; MSC 101/24, para. 19.8; MSC 104/18, para. 9.5; MSC 105/20, sec. 10; FAL 46/24, para. 11.4, MSC106/19, sec. 8; Res. MSC.528 (106); MSC 107/20, sec. 9, MSC 108/20, sec. 9; MSC 109/22, sec. 10
6	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MSC 89/25, paras. 10.10, 10.16 and 22.39 and annex 21; MEPC 78/17, paras. 10.4 and 13.
6	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MSC 100/20, paras. 10.3 to 10.6 and 17.28; MSC 105/20, sec. 16, MSC 108/20 PPR 9/21, sec. 12; MEPC 79/15, paras. 9.1, 9.14 to 9.15; MEPC 81/16, para. 10.1
6	6.3	Reports on unlawful practices associated with certificates of competency	Annual	MSC	HTW		Completed		MSC 83/28, para. 12.2; MSC 109/22, para. 19.16
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to endorsement by the Council.								

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
6	6.10	Development of an entrant training manual for PSC personnel	2025	MSC / MEPC	III		Postponed		MSC 103/21, para. 18.36; MSC 106/19, para. 16.46 MEPC 76/15, paras. 10.1, 10.2 and 12.5; MEPC 79/15, para. 9.3
Notes:	It will be developed after the finalization of the IMO Model Course 3.09 on Port State Control, which is expected to be validated by III 11.								
6	6.15	Revision of resolution A.1050(27) to ensure the safety of personnel entering enclosed spaces on board ships	2024	MSC	III / HTW / PPR / SDC / SSE	CCC	Extended		MSC 101/24, para. 21.48; MSC 104/18, para. 15.16; MSC 106/19, para. 16.31; MSC 108/20, para. 14.15
6	6.17	Comprehensive review of the 1978 STCW Convention and Code	2026	MSC	HTW		In progress		MSC 105/20, para. 18.13; MSC 107/20, para. 17.71; MSC 108/20, para. 16.5
7	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC / FAL / LEG	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MSC 76/23, para. 20.3; MSC 78/26, para. 22.12; MSC 108/20, para. 18.13, sec. 19, MSC.1/Circ.1456/Rev.1, MSC.1/Circ.1572/Rev.2, MSC.1/Circ.1509/Rev.1, MSC.1/Circ.1511/Rev.1, MSC.1/Circ.1680; MEPC 78/17, sec. 4, and paras. 5.6 and 5.7; MEPC 79/15, paras. 4.8, 4.26, 4.27, 6.26 to 6.29; MEPC 80/17, paras. 4.11 and 5.24
7	7.2	Developments in GMDSS services, including guidelines on maritime safety information (MSI)	Continuous	MSC	NCSR		Ongoing		MSC 108/20, sec. 12, MSC.1/Circ.1310/Rev.2,

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.4	Lessons learned and safety issues identified from the analysis of marine safety investigation reports	Annual	MSC / MEPC	III		Completed		MSC 92/26, para. 22.29; MSC 106/19, paras. 14.2 to 14.6; MSC 108/20, paras. 13.3 to 13.6; MSC 109/22, paras. 15.2 to 15.6 MEPC 79/15, para. 9.3; MEPC 81/16, para. 10.6
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by MEPC and endorsement by the Council.								
7	7.5	Identified issues relating to the implementation of IMO instruments from the analysis of data	Annual	MSC / MEPC	III		Completed		MSC 96/25, para. 23.13 ; MSC 106/19, paras. 14.12 and 16. MSC 108/20, para. 13.4; MSC 109/22, para. 15.3 MEPC 79/15, paras. 12.13 and 12.14; MEPC 81, para. 10.3
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by MEPC and endorsement by the Council.								
7	7.6	Consideration and analysis of reports and information on persons rescued at sea and stowaways	Annual	MSC / FAL			Postponed		
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by FAL and endorsement by the Council.								
7	7.10	Amendments to the IMDG Code and supplements	Continuous	MSC	CCC		Ongoing		MSC 105/20, para. 3.59 and 14.4; MSC 108/20, secs. 3 and 14
7	7.13	Amendments to the IMSBC Code and supplements	Continuous	MSC	CCC		Ongoing		MSC 105/20, para. 14.4 and para. 3.57; MSC 107/20, paras. 17.10 and 17.12
7	7.14	Revision of the provisions for helicopter facilities in SOLAS and the MODU Code	2024	MSC	SSE		Completed		MSC 109/22, para. 12.11
Notes:	MSC 109 decided that the item had been completed.								

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.15	Development of amendments to SOLAS chapter II-2 and the FSS Code concerning detection and control of fires in cargo holds and on the cargo deck of containerships	2025	MSC	CCC	SSE	In progress		MSC 103/21, para. 18.8; SSE 8/20, sec. 10; MSC 106/19, sec. 9; SSE 9/20, sec. 10; SSE 10/20, sec. 10; MSC 109/22, para. 12.13
7	7.19	Amendments to the LSA Code for thermal performance of immersion suits	2025	MSC	SSE		Extended		MSC 92/26, para. 13.34; SSE 9/20, sec. 7; SSE 10/20, sec. 15; MSC 109/22, para. 12.28; MSC.1/Circ.1628/Rev.2
Notes:	MSC 109 extended the target completion year to 2025.								
7	7.20	Develop measures to prevent the loss of containers at sea	2025	MSC	III / HTW / SDC / NCSR	CCC	In progress		MSC 108/20, paras. 3.9 to 3.12 and 3.70, MSC.550(108)
7	7.21	Amendments to the 2011 ESP Code	Continuous	MSC	SDC		Ongoing		MSC 92/26, para. 13.31; MSC 107/20, para. 12.2; MSC 108/20, sec. 3 and para. 15.5, MSC.553(108)
7	7.22	Routeing measures and ship reporting systems	Continuous	MSC	NCSR		Ongoing		MSC 108/20, para. 12.4, SN.1/Circ.343; MSC 109/22,para. 13.3, COLREG.2/Circ.81, SN.1/Circ.344
7	7.23	Updates to the LRIT system	Continuous	MSC	NCSR		Ongoing		
7	7.24	Verified goal-based new ship construction standards for tankers and bulk carriers	Continuous	MSC			Ongoing		MSC 106/19, sec. 4; MSC 107/20, sec. 4, MSC 109/22, sec. 4
7	7.25	Amendment to regulation 25 of the of the 1988 Load Line Protocol regarding the requirement for setting of guard rails on the deck structure	2025	MSC	SDC		Extended		MSC 108/20, para. 15.23.1

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.26	Reports to the MSC on information communicated by STCW Parties	Continuous	MSC			Completed		MSC 109/22, secs.19 and 21, MSC.1/Circ.1164/Rev.29
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to endorsement by the Council.								
7	7.27	Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC)	Annual	MSC / MEPC	III		In progress		MSC 79/23, paras. 9.19 and 9.20;MSC 104, para. 13.7.2; MSC 106/19, paras. 14.13 to 14; MSC 108/20, para. 13.7.2; MSC 109/22, para. 15.17 MEPC 68/21, paras. 14.5 and 14.6; MEPC 72/17, paras. 7.4 and 4.24 to 4.33; MEPC 77/16, para. 10.7; MEPC 79/15, paras. 9.7 to 9.9; MEPC 81/16, para. 10.9.2
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by MEPC and endorsement by the Council.								
7	7.28	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Annual	MSC / MEPC	III	CCC	Completed		CCC 7/15, sec. 9; CCC 8/18, sec. 9; CCC 9/14, sec. 9; MSC 109/22, secs. 14 and 19
Notes:	MSC 109 agreed to change the type of output from "annual" to "continuous", subject to a concurrent decision by MEPC and endorsement by the Council.								
7	7.29	Comprehensive review of the Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances	2025	MSC	SSE		In progress		MSC.402(96); SSE 10/20, paras. 4.13, 12.9 annex MSC 109/22, para. 12.17; MSC.1/Circ.1682

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
		and release gear (resolution MSC.402(96)) to address challenges with their implementation							
7	7.30	Amendments to SOLAS chapter III and chapter IV of the LSA Code to require the carriage of self-righting or canopied reversible liferafts for new ships	2025	MSC	SSE		In progress		MSC 109/22, para. 12.8
7	7.31	Finalization of a non-mandatory instrument on regulations for non-convention ships	2025	MSC	III		Completed		MSC 96/25, para. 9.4; MSC 101/24, para. 21.38; MSC 104/18, sec. 5; MSC 105/20, sec. 4; MSC 107/20, paras. 17.83, 19.9 and 19.10, MSC 108/20, sec. 10; MSC 109/22, sec. 17
Notes:	MSC 102, having considered that MSC 101 had included an item on "measures to improve domestic ferry safety", agreed that the III Sub-Committee should not proceed with the development of a model course (as instructed by MSC 96), pending further instructions from the MSC taking into account the outcome of the work on measures to improve domestic ferry safety (MSC 102/24, para. 14.10); MSC 107 extended completion year to 2025, and considered the outcome of TCC 72 (para. 2.19.3 of TCC 72/16), in particular in the context of "Measures to improve domestic ferry safety", the need for development of an explanatory manual for the model regulations on domestic ferry safety and related online training material, and placed the item "Domestic ferry safety" in the provisional agenda of MSC 108. The agenda item "Domestic ferry safety" was also placed on the agenda of MSC 109. MSC 109 requested the Secretariat to provide further updates on the matter at future sessions of MSC, as appropriate, under the agenda item on "Any other business".								
7	7.32	Development of amendments to paragraph 8.3.5 and annex 1 of the 1994 and 2000 HSC Codes	2024	MSC	SSE		Completed		MSC 109/22, para. 12.9 and annexes 7 and 8

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.33	Development of design and prototype test requirements for the arrangements used in the operational testing of free-fall lifeboat release systems without launching the lifeboat	2025	MSC	SSE		In progress		SSE 10/20, paras. 20.3.2 and 20.3.4; MSC 109/22, paras. 12.4 and 19.48.1
7	7.34	Revision of the 2010 FTP Code to allow for new fire protection systems and materials	2026	MSC	SSE		Ongoing		SSE 10/20, paras. 8.4 and 17.9; MSC 109/22, para. 12.10
7	7.35	Amendments to the Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation (MSC.1/Circ.1331) concerning the rigging of safety netting on accommodation ladders and gangways	2025	MSC	SSE	SDC	Extended		MSC 106/19, para. 16.28; MSC 108/20, para. 15.23.1
Notes:	MSC 108 extended the target completion year to 2025								
7	7.36	New requirements for ventilation of survival craft	2025	MSC	SSE		In progress		MSC 97/22, para. 19.22; SSE 8/20, sec. 3; MSC 106/19, sec. 11; MSC 107/20, sec. 14; SSE 10/20, sec. 3; MSC 108/20, para. 18.25. MSC 109/22, para. 12.2
Notes:	MSC 109 agreed with SSE 10's request for an extension of target completion year to 2025 for further discussion on the compelling need.								
7	7.37	Evaluation of adequacy of fire protection, detection and	2027	MSC	SSE		In progress		SSE 10/20, sec. 1 6; MSC 109/22, para. 12.26

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
		extinction arrangements in vehicle, special category and ro-ro spaces in order to reduce the fire risk of ships carrying new energy vehicles							
7	7.40	Revision of the Revised guidelines for the preparation of the cargo securing manual (MSC.1/Circ.1353/Rev.2) to include a harmonized performance standard for lashing software to permit lashing software as a supplement to the Cargo Securing Manual	2025	MSC	CCC		In progress		MSC 108/20, para. 18.18
7	7.41	Development of provisions to consider prohibiting the use of fire-fighting foams containing fluorinated substances, in addition to PFOS for fire-fighting on board ships	2025	MSC	SSE		In progress		MSC 101/24, para. 21.27; MSC 102/24, paras. 19.31 and 21.19; SSE 8/20, sec. 12; MSC 106/19, sec. 11; SSE 9/20, sec. 15; MSC 107/20, sec. 14; SSE 10/20, sec. 13; MSC 109/22, para. 12.22
7	7.42	Revision of the Interim explanatory notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty (MSC.1/Circ.1369) and related circulars	2025	MSC	HTW / SSE	SDC	In progress		MSC 108/20, para. 15.23.3; MSC 105/20, paras. 15.24.2 and 18.54; MSC 103/21, para. 18.31
Notes:	MSC 108 extended the target completion year to 2025.								

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
7	7.44	Revision of SOLAS regulation V/23 and associated instruments to improve the safety of pilot transfer arrangements	2024	MSC	NCSR		Completed		MSC 106/19, paras. 16.12 to .14; MSC 109/22, paras. 13.14 to 13.19 and annexes 15 to 22
7	7.45	Development of guidance to assist competent authorities in the implementation of the Cape Town Agreement of 2012	2024	MSC	III		Completed		MSC 106/19, paras. 16.17 and 16.46; MSC 108/20, 13.14; MSC 109/22, paras. 15.12 to 15.15; Res.MSC.571(109)
7	7.47	Review of the 2009 Code on Alerts and Indicators	2026	MSC	SSE / NCSR	SDC	Extended		MSC 108/20, para. 18.24.2
7	7.48	Review and update SOLAS regulation II-2/9 on containment of fire to incorporate existing guidance and clarify requirements	2026	MSC	SSE		In progress		MSC 104/15/2; MSC 105/20, paras. 18.8 and 18.9; MSC 109/22, para. 12.10
7	7.49	Development of guidelines for the use of electronic nautical publications (ENP)	2025	MSC	NCSR		In progress		MSC 104/15/4, MSC 105/20, para. 18.11
7	7.50	Identification of measures to improve the security and integrity aspects of AIS	2025	MSC	NCSR		Completed		MSC 107/20, para. 17.77; MSC 109/22, para. 13.20; Res. MSC.570(109)
8	8.1	Endorsed proposals for the development, maintenance and enhancement of information systems and related guidance (GISIS, websites, etc.)	Continuous	Council	MSC / MEPC / FAL / LEG / TCC		Ongoing		MEPC 78/17, para. 4.45; MEPC 79/15, paras. 6.1 to 6.5 and 9.4; MEPC 80/17, paras. 6.11 to 6.13

Reference to SD[2]	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Year 2	References
8	8.9	Revised documents on organization and method of work, as appropriate	Annual	Council	MSC / MEPC / FAL / LEG / TCC		Completed		MSC-MEPC.1/Circ.5/Rev.6, subject to concurrence of MEPC 83; MSC 109/22, secs. 18 and 19; MEPC 78/17, sec. 13; MEPC 79/15, sec. 11; MEPC 80/17, sec. 13 FAL Circ.3/Circ.217/Rev.2, FAL 48/20, para. 16.8
8	8.12	Consideration for the enhancement and improvement of multilingualism and the language services at IMO	Continuous	Council	MSC / MEPC / FAL / LEG / TCC		No work requested		
OW	OW 3	Endorsed proposals for new outputs for the 2024-2025 biennium as accepted by the Committees	Annual	Council	MSC / MEPC / FAL / LEG / TCC		Completed		MEPC 78/17, sec. 14; MEPC 79/15, sec. 12; MEPC 80/17, sec. 14; MSC 109/22, sec. 19
OW	OW 8	Cooperate with the United Nations on matters of mutual interest, as well as provide relevant input/guidance	Continuous	Assembly	MSC / MEPC / FAL / LEG / TCC	Council	Ongoing		C 120/D, paras. 17(a).1-17(a).5 MEPC 78/17, para. 7.6 and sec. 8; MEPC 79/15, paras. 7.3 to 7.5; MEPC 80/17, paras. 7.2 to 7.4
OW	OW 9	Cooperate with other international bodies on matters of mutual interest, as well as provide relevant input/guidance	Continuous	Assembly	MSC / MEPC / FAL / LEG / TCC	Council	Ongoing		C 120/D, paras. 17(a).1-17(a).5 MEPC 78/17, secs. 7 and 8; MEPC 79/15, secs. 7 and 8; MEPC 80/17, secs. 7 and 8

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ANNEX 31

POST-BIENNIAL AGENDA[1] OF THE MARITIME SAFETY COMMITTEE

Number	Biennium (when the output was placed)	Reference to strategic direction, if applicable	Description	Parent organ(s)	Associated organs(s)	Coordinating organ(s)	Timescale (sessions)	References
185	2022-2023	1	Development of amendments to chapter 6 of the 2009 MODU Code regarding electrical equipment capable of operation after shutdown	MSC	SSE		1	MSC 105/20, para. 18.3
194	2022-2023	1	Development of measures to ensure the safe operation of elevators on board ships	MSC	SSE		4	MSC 106/19, paras. 16.25 and .26
200	2022-2023	1	Development of amendments to paragraph 2.1.2.5 of chapter 5 of the FSS Code on construction requirement for gaskets	MSC	SSE		1	MSC 107/20, para. 17.16
201	2022-2023	2	Consideration of descriptions of Maritime Services in the context of e-navigation	MSC	FAL / NCSR		1	MSC 107/20, para. 17.77.1. MSC.1/Circ.1610/Rev.1
202	2022-2023	2	Development of generic performance standards for shipborne satellite navigation system receiver equipment	MSC	NCSR		1	MSC 107/20, para. 17.76

[1] For details, refer to Organizational Planning module of GISIS.

Number	Biennium (when the output was placed)	Reference to strategic direction, if applicable	Description	Parent organ(s)	Associated organs(s)	Coordinating organ(s)	Timescale (sessions)	References
204	2022-2023	2	Development of performance standards for dual frequency multi-constellation satellite-based augmentation systems (DFMC SBAS) and advanced receiver autonomous integrity monitoring (ARAIM) in shipborne radionavigation receivers	MSC	NCSR		2	MSC 107/20, para. 17.58.2
207	2022-2023	2	Revision of the Performance standards for gyro-compasses (resolution A.424(XI)) and Guidance for navigation and communication equipment intended for use on ships operating in polar waters (MSC.1/Circ.1612)	MSC	NCSR		2	MSC 107/20, para. 17.47
[..][2]	2024-2025	2	Development of a transition scheme for the introduction of digital technology for Very High Frequency (VHF) voice communications	MSC	NCSR		2	MSC 109/22, para. 19.26
Note	MSC 109 agreed to include in the biennial agenda of the NCSR Sub-Committee for the 2026-2027 biennium and the provisional agenda for NCSR 13, with a target completion year of 2027.							

2 To be allocated once the Council endorses.

Number	Biennium (when the output was placed)	Reference to strategic direction, if applicable	Description	Parent organ(s)	Associated organs(s)	Coordinating organ(s)	Timescale (sessions)	References
[..][2]	2024-2025	2	Development of operational guidance for route exchange	MSC	NCSR		1	MSC 109/22, para. 19.44
Note	MSC 109 agreed with the recommendation of NCSR 11 as consequential work emanating from the adoption of resolution MSC.530(106)/Rev.1 on *Performance standards for electronic chart display and information systems (ECDIS)* at MSC 108.							
191	2022-2023	6	Scoping exercise and enhancement of the effectiveness of provisions on fatigue and seafarers' hours of work and rest	MSC	III	HTW	2	MSC 105/20, para. 18.31
210	2022-2023	6	Development of guidance to address time pressure and related organizational factors	MSC	III	HTW	1	MSC 107/20, para. 17.23
211	2022-2023	6	Revision of the IMO Standard Marine Communication Phrases (resolution A.918(22))	MSC	HTW	NCSR	2	MSC 107/20, para. 17.53
186	2022-2023	7	Development of amendments to chapter 15 of the FSS Code on enclosed spaces containing a nitrogen receiver or a buffer tank of nitrogen generator systems	MSC	SSE		2	MSC 105/20, paras. 18.5 and 18.6

Number	Biennium (when the output was placed)	Reference to strategic direction, if applicable	Description	Parent organ(s)	Associated organs(s)	Coordinating organ(s)	Timescale (sessions)	References
192	2022-2023	7	Revision of the Guidelines for the application of plastic pipes on ships (resolution A.753(18))	MSC	SSE		1	MSC 105/20, para. 18.40
213	2022-2023	7	Development of guidelines for harmonizing the date format of various certificates issued under IMO instruments	MSC / FAL	III		2	MSC 107/20, para. 17.41
215	2022-2023	7	Revision of the Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems (MSC.1/Circ.1318/Rev.1) to clarify the testing and inspection provisions for CO_2 cylinders	MSC	SSE		1	MSC 107/20, para. 17.60
216	2022-2023	7	Development of amendments to the LSA Code and resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets	MSC	SSE		2	MSC 101/24, para. 21.6; SSE 9/20, para. 8.19; MSC 101/24, para. 21.9 MSC 107/20, para. 14.24
217	2022-2023	7	Safety measures for non-SOLAS ships operating in polar waters	MSC	SDC		2	MSC 107/12, para. 3, MSC 107/20, para. 17.80 and annex 38

Number	Biennium (when the output was placed)	Reference to strategic direction, if applicable	Description	Parent organ(s)	Associated organs(s)	Coordinating organ(s)	Timescale (sessions)	References
[...]	2024-2025	7	Finalization of a non-mandatory instrument on regulations for non-convention ships	MSC	III		1	MSC 109/22, para. 17.3
Note	MSC 109 completed the output and requested the Secretariat to provide further updates on the matter at future sessions of the Committee, as appropriate, under the agenda item on "Any other business".							

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ANNEX 32

SUBSTANTIVE ITEMS FOR INCLUSION IN THE AGENDAS FOR MSC 110 AND MSC 111

110th session of the Committee (18 to 27 June 2025)

Decisions of other IMO bodies

Amendments to mandatory instruments

Goal-based new ship construction standards

Development of a goal-based instrument for maritime autonomous surface ships (MASS)

Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels

Revision of the *Guidelines on maritime cyber risk management* (MSC-FAL.1/Circ.3/Rev.2) and identification of next steps to enhance maritime cybersecurity

Measures to enhance maritime security

Piracy and armed robbery against ships

Unsafe mixed migration by sea

Ship design and construction (Report of the eleventh session of the Sub-Committee)

Human element, training and watchkeeping (Report of the eleventh session of the Sub-Committee)

Ship systems and equipment (Report of the eleventh session of the Sub-Committee)

Carriage of cargoes and containers (Report of the tenth session of the Sub-Committee)

Navigation, communications and search and rescue (Urgent matters emanating from the twelfth session of the Sub-Committee)

Pollution Prevention and Response (Report of the twelfth session of the Sub-Committee)

Application of the Committees' method of work

Work programme

Election of Chair and Vice-Chair for 2026

Any other business

111th session of the Committee (May/June 2026)

Decisions of other IMO bodies

Amendments to mandatory instruments

Goal-based new ship construction standards

Development of a goal-based instrument for maritime autonomous surface ships (MASS)

Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels

Measures to enhance maritime security

Piracy and armed robbery against ships

Ship design and construction (Report of the twelfth session of the Sub-Committee)

Human element, training and watchkeeping (Report of the twelfth session of the Sub-Committee)

Navigation, communications and search and rescue (Report of the twelfth session of the Sub-Committee)

Implementation of IMO instruments (Report of the eleventh session of the Sub-Committee)

Carriage of cargoes and containers (Report of the eleventh session of the Sub-Committee)

Application of the Committees' method of work

Work programme

Any other business

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ANNEX 33

STATEMENTS BY DELEGATIONS AND OBSERVERS*

AGENDA ITEM 2

Statement by the delegation of Australia

Black Sea
Like others, Australia condemns Russia's illegal and immoral invasion of Ukraine, which violates international law, including the UN Charter. Russia's aggression has resulted in damage to civilian shipping, maritime training institutions, and the marine environment in the Black Sea and Sea of Azov. Russia's actions against civilian shipping infrastructure run directly counter the mission of the IMO. In addition to causing terrible damage and loss of life in Ukraine, Russia's war is compounding human suffering and propelling the global crisis in food and energy security. Australia requests that a copy of this statement be appended to the report of this Committee.

Red Sea
Australia – like Bahamas, Japan, and others, has grave concerns over the number of incidents that are still occurring in the Red Sea and the Gulf of Aden. The implications of these attacks relate directly to the work and interests of the IMO. Seafarers have died and environmental damage has been wrought because of this violence. Iran's support to the Houthis directly contributes to this. We ask all states with influence on the belligerents to use this influence to stop attacks on civilian shipping. We welcome the continued excellent efforts of the Secretary General, including his recent travel to the region. Australia draws the attention of member states to United Nations Security Council resolutions 22-16, 27-22 and 27-39. All member states should adhere to their obligations under the targeted UN arms embargo and take the necessary measures to prevent the direct or indirect supply of arms and related materiel of all types to the Houthis. Australia requests that a copy of this statement be appended to the report of this Committee.

Statement by the delegation of Canada

Please find below Canada's statement on the Red Sea, to be appended to the final report of the committee.

Canada statement on Red Sea:

- Thank you, Chair. And we join others in thanking Indonesia for coffee this morning.

- Canada would like to thank the Secretary General for his ongoing leadership regarding the situation in the Red Sea and to the attention he continues to draw to the impact this is having on seafarers.

- The continued attacks by the Houthis' on merchant vessels transiting in this region continue to pose a direct threat to the safety of navigation in one of the world's most critical waterways and are causing major disruptions to

* Statements have been included in this annex in the order in which they are listed in the report, sorted by agenda items, and in the language of submission (including translation into any other language if such translation was provided).

regional and global trade and threatening the safety and security of innocent seafarers.

- These attacks are unacceptable and must stop. In this regard, we specifically call on Iran, as a member of this organization, to stop providing support to the Houthis, which enables these very attacks and violates the principles of this organization.

- In short, Canada aligns with the statement of the Bahamas, Japan, Philippines, Spain on behalf of the EU Member States, the US, and others and condemns these attacks. We also repeat our call on the Houthis to immediately and unconditionally release all hostages.
- We ask that our statement be attached to the final report. Thank you chair

Canada Statement on Ukraine:

- Canada reiterates its solidarity with Ukraine and continues to strongly condemn Russia's illegal war of aggression against Ukraine. The ongoing threats this war poses to maritime safety, seafarer safety, and the protection of the marine environment is unacceptable and a clear violation of international law and the rules and principles of this organization.

- To be brief, Canada wishes to align with the statement by Spain on behalf of the EU Member States, the US, UK and Australia.

- We ask that our statement be attached to the final report. Thank you chair.

Statement by the delegation of Iran

Madam. Chair,
Distinguished Delegations
Secretary-General

As a long-standing member of the International Maritime Organization, the Islamic Republic of Iran reaffirms its principled position on promoting all matters related to maritime safety and maritime security that fall within IMO's mandates.

The Islamic Republic of Iran has consistently made efforts to reach rule-based maritime order for securing maritime rights and interests for all as well as ensuring that maritime activities are undertaken smoothly, including based on international law. Our contribution to combat piracy at sea in the region and beyond, in cooperation with other States, emanates from the same sentiment and understanding.

It is regrettable that, once again, the representative of the United States, the United Kingdom, Canada and Australia have abused the IMO platform to further its political agenda, by disseminating falsehoods and deliberate disinformation, and leveling unfounded accusations against the Islamic Republic of Iran regarding the current situation in the Region. It is important to comment based on the facts and avoid making political accusations without evidence.

The Government established in Yemen and the people of this country act independently based on their interests, discretion, and policies. Their measures attributed to themselves, not to another State. This is a fundamental rule of International Responsibility of States.

The Islamic Republic of Iran is committed to Resolutions 2140 and 2216 of the Security Council and has never taken any measures in violation thereof, such as sales or transfer of arms. Moreover, my country always endorses a peaceful resolution of the crisis in Yemen through diplomatic channels and highlights its dedication to ensuring and promoting maritime security and freedom of navigation.
However, we should always pay attention to the roots in crises. It is clear to all States that the root causes of the current situation in the Red Sea are genocide that took place by the Israeli regime and fully supported by the U.S. against the innocent Palestinian people.

The purpose of the US and its allies to make such baseless accusations is clear: to divert international attention away from the root causes of the current situation in the Red Sea, namely the ongoing genocide. The United States and its allies cannot deny or cover up the incontestable reality that recent incidents in the Red Sea are directly related to their measures.

Iran asks these countries to act more responsibly, and refrain from labeling and making political accusations against other States without reason.

I would be grateful if you would annex these comments to the final report.
Thank you, Madam. Chair.

Statement by the delegation of Israel

Madam Chair, Secretary-General, distinguished representatives,

Since October 7th 2023, Israel has been fighting terrorist groups on seven different fronts, faced thousands of drones, rockets and precise missiles from multiple directions, and continues to work to bring home the 101 hostages who are still held captive by terrorist organizations in Gaza. The common thread running through all these challenges is the Islamic Republic of Iran, and specifically its ambitions to destabilize the entire region.

Iranian-backed attacks have been ongoing continuously for more than one year. This is an unacceptable situation. On October 1st, two months ago, Iran launched approximately 180 missiles from its territory towards the State of Israel, following another attack on Israel that occurred on April 14th. This is in continuation of the unlawful activity on April 13, when Iran’s Islamic Revolutionary Guard Corps Navy, seized the MSC Aries, a vessel sailing under the flag of Portugal. The takeover included the kidnapping of 25 crew members, including citizens of India, the Philippines, Russia, Pakistan, and Estonia.

The ongoing Iranian-backed Houthi attacks have also continued at pace to disrupt and destabilize one of the world’s most important maritime shipping routes, which had accounted for 12% of global trade before the attacks began. According to the US Energy Information Administration, the amount of crude oil and oil products passing through the Red Sea decreased by more than 50% in the first eight months of 2024. Iran, a member of this organization, is wholly responsible for this situation. Its role includes supplying weapons, intelligence, and training to the Houthis. The evidence of Iran’s involvement is laid out clearly and comprehensively in a report, dated 11 October, by the UN SC Panel of Experts on Yemen, under Resolution 2140.
The untenable situation today impacts international shipping routes, freedom of navigation, maritime pollution, and most importantly, the lives of seafarers. Upholding the safety of these elements is a key role of the IMO.

Here are some points from the UN Security council report:

.1 Iranian assistance constitutes a blatant violation of Resolution 2140. This violation is based on the interception of arms shipments sent from Iran to Yemen, mainly via Djibouti. Iran has also provided the Houthis with significant military and financial support, including advanced weaponry such as ballistic missiles, drones, and anti-ship missiles.

.2 The Houthis and Iranians avoid UN inspections through various smuggling routes.

.3 The transfer of advanced weapons to the Houthis from Iran allows the group to pose a significant threat to shipping lanes and neighboring countries.

.4 The Houthis do not have independent capabilities to identify targets outside of visual range and rely on Iranian technological assistance for the identification and tracking of vessels.

.5 Finally, the Houthis' budget relies on illegal transit fees for safe maritime passage in the Red Sea and Gulf of Aden – approximately $180 million per month is earned from this illegal activity.

Distinguished delegates, the IMO and the Maritime Safety Committee must play a more active role in holding member states responsible for their commitments and duties according to the laws of the sea, IMO conventions, and the universal values of safety, freedom, and security. Those who flagrantly disregard these responsibilities and commit dangerous and illegal acts must also be held to account.

Recalling the purposes of the IMO as set forth in Article 1 of the Convention, and the mission in the IMO's Strategic Plan to promote safe, secure, environmentally sound, efficient, and sustainable shipping through cooperation, we urge all those who continue to respect the sanctity of the IMO and the rule-based order to condemn, in the strongest possible terms, Iran's ongoing violations of international law and the basic values of the IMO, as well as to call for the immediate release of all ships and crew members held by them and other terrorist organizations under their influence.

If Iran refuses to stop its blatant and dangerous activities, the IMO must take serious and concrete steps to stop technical cooperation with the country until this body has the confidence that Iran has ceased all its illegal activity.

Please can this statement to attached to the final report.
Thank you.

Statement by the delegation of Italy

Italy firmly condemns all the attacks performed by the Houthis against commercial ships. These actions violate the IMO Convention and the international law, and constitute a threat to maritime security and peace in the region being detrimental to the logistic chains in the Red Sea and the Gulf of Aden.

In this regard, we would like to convey our deepest condolences to the families of those seafarers who have lost their lives in the Red Sea since the beginning of this crisis.
Italy echoes Spain and its intervention as Presidency on behalf of EU Member States and reiterates the call for the immediate release of the "**Galaxy Leader**" vessel and its 25-member crew, illegally seized and held hostage for over 11 months.

We welcome the adoption of the Resolutions 2722 and 2739 of the UN Security Council condemning the Houthi's attacks on Red Sea shipping, and we demand that these attacks cease immediately.

Finally, Italy, as part of the defensive operation EUNAVFOR ASPIDES since the beginning, actively contributes with both naval and air assets of the Italian Navy, currently for instance with Italian Navy Ship Caio Duilio, with the aim to restore maritime security and freedom of navigation in a strategic maritime corridor, as well as to protect the seafarers and the safeguarding of freedom of navigation.

We would be grateful if this statement may be appended in the final report of the Committee

On Ukraine

Thank you Chair.

Italy would like to fully echo the statement just made by Spain on behalf of the Member States of the European Union and the European Commission strongly condemning the illegal, unprovoked, and unjustified aggression of Russia against Ukraine. These actions continue to threaten peace and security in Europe and worldwide and have severe global consequences including in the form of increased food insecurity and rising energy prices.

To this date, all key bodies of the IMO condemned Russia's illegal actions. Furthermore, the IMO Assembly at its 33rd session equally condemned Russia's aggression in Resolution A.1183 (33).

Italy welcomes all the efforts made by Ukraine to preserve the safety of navigation in the North Western part of the Black Sea and to fight illegal actions of grain smuggling.
We request that this statement be appended to the final report of the Committee.

Statement by the delegation of Spain

Thank you Chair.

Spain, on behalf of the Member States of the European Union and the Commission, strongly condemns the Houthis attacks on commercial ships, which are unacceptable violations of international law, the IMO Convention and present a threat to maritime security and peace in the region.

Such attacks which endanger the lives of innocent seafarers while disrupting the global trade as well as have significant consequences for the climate and the marine environment must immediately cease.

We continue calling for the immediate and unconditional release of the Galaxy Leader and its crew, who have been held hostage for one year and offer our sincere condolences to the families of the seafarers who lost their life as a result of the brutal attacks in the region.

Spain thanks the IMO Secretary-General for visiting the Red Sea recently and his efforts to continue engaging with all IMO Member States, UN agencies and stakeholders to ensure the re-establishment of the principle of freedom of navigation and the protection of the seafarers.

We welcome the adoption on the 27 June 2024 of the United Nations Security Council resolution 2739 (2024) which reiterates its demand that the Houthis immediately cease all attacks against merchant and commercial vessels and immediately release the MV Galaxy Leader and its crew, as well as the adoption of the resolution MSC.564(108) on Security situation in the Red Sea and Gulf of Aden resulting from Houthi attacks on commercial ships and seafarers.

Spain also echoes the UN Security Council demand that these attacks, which impede global commerce and undermine navigational rights as well as regional peace and security, cease immediately.

Upholding freedom of navigation in the Red Sea is vital to the free flow of global commerce and regional security. As recalled by UNSC resolution 2722 (2024), States have the right to defend their vessels against these attacks in accordance with international law.

We urge restraint by the Houthis to avoid further escalation in the Red Sea and the broader region. In this context, we recall the obligation of all States to respect the arms embargo under the UN Security Council resolution 2216 (2015).

On 19th of February the defensive operation EUNAVFOR ASPIDES was initiated responding swiftly to the necessity to restore maritime security and freedom of navigation in a highly strategic maritime corridor. The operation plays a key role in safeguarding commercial and security interests, not only for the sake of the EU Member States and the wider international community, but also for protecting the seafarers and safeguarding the freedom of navigation.

In this regard, we invite all delegations to attend the presentation which will be made by the Commender of the ASPIDES operation this evening at 17.40 pm- in this main hall.

We request this statement to be included in the annex to the committee's report.

On Ukraine

Thank you chair.
Spain on behalf of the Member States of the European Union and the European Commission wishes to express the EU’s and its MS’ full solidarity with Ukraine and the Ukrainian people and condemns in the strongest possible terms the illegal, unprovoked, and unjustified aggression of Russia against Ukraine.

The IMO Assembly in its 33rd session strongly condemned with resolution A33/Res.1183 the Russia Federation’s violation of the territorial integrity and the sovereignty of Ukraine, while highlighting that the actions of the Russian Federation are inconsistent with the principles and purposes of IMO as set forth in Article 1 of the Convention.

Russia’s war of aggression against Ukraine continues to threaten peace and security in Europe and worldwide and has had severe global consequences including in the form of increased food insecurity and rising energy prices.

Russia, its political leadership, and all those involved in the violations of international law and international humanitarian law in Ukraine should be held accountable. The EU and its Member States will never recognise the territories temporarily under Russian military control as anything but a part of Ukraine and will continue to support Ukraine’s effort to restore its territorial integrity within its internationally recognised borders for as long as necessary.

Russia should act in accordance with international law without delay, in particular the UN Convention on the Law of the Sea (UNCLOS) and avoid destabilizing actions that threaten freedom of navigation and overflight in the Black and Azov Seas, which endanger shipping and seafarers’ safety as well.

Spain condemns the recent escalation of attacks by the Russian Federation on commercial ships operating in the territorial waters of Ukraine and in the broader area of the Black Sea.

Such attacks to ships flying the flags of third countries which are not parties to the military conflict constitutes a violation of the international law, the IMO Convention and have led to the loss of lives of innocent seafarers working on board these vessels.

As a result, Spain condemns the recent Russian attacks on commercial ships operating in the Black Sea in the strongest possible terms and urges the Russian Federation to cease these attacks immediately since they are leading to the loss of seafarer's lives while they violate the IMO Convention, and they are against the IMO Assembly Resolution A.1183(33).

We request this statement to be included in the annex to the committee's report.

Thank you.

Statement by the delegation of Ukraine

Statement made as a right of reply by the delegation of Ukraine

Thank you.

In exercising our right of reply we would like to state the following.

Madam Chair,

No longer surprising Russia's manipulative acts and practices under the auspices of this Organization. To speak of the politization of the issue before us is more than absurd. Just suffice it to recall decisions taken since 35th extraordinary session of the IMO Councill till 33rd Assembly session, as well as relevant decisions of IMO bodies from 2022 to 2024. It is a clear demonstration that IMO is acting within its mandate, according to the rules and norms of international law and on the basis of the obtained evidence. Ukraine unreservedly subscribes to the same principles.

We could certainly mention such cases as issuing by the International Criminal Court an arrest warrant for criminal Putin, using chemical weapons by that terrorist state in Ukraine and many, many others. But Ukraine had no and do not have any intention to follow Russia's erratic behavior and brazen duplicity showcased during the 48th FAL session, previous MSC session, current session and numerous other.

Equally revealing were the results of the last elections to the IMO Council. It is worth mentioning that Russia, being red lantern, failed even to receive required number of votes needed for to the Council. Spectacular result.

Taking this opportunity, we call on all member states to disregard any Russia's presentations in this hall, including the one announced during ongoing session.
I thank you, Madam Chair, and kindly ask that this statement is reflected in the Report and be annexed to the Final Report.

Black Sea

Chair,

The situation remains extremely challenging as the Russian Federation's aggression against Ukraine continues with renewed intensity.

On November 21, the Russian Federation escalated its aggression against Ukraine by launching an intercontinental ballistic missile. Such actions endanger the safety and security of the Ukrainian people and pose a grave threat to global stability. This reckless behaviour, coupled with its implications for maritime safety, undermines international maritime law and heightens the risks in an already fragile region.

Ukraine calls on the international maritime community, including IMO Member States, to remain vigilant and resolute. Collective action is essential to uphold the rule of law, protect maritime operations, and prevent further escalation that threatens regional and global peace.
Chair,

Ukraine urges IMO Member States to take decisive measures against the Russian Federation, which continues to violate the IMO Convention and other fundamental maritime instruments. To address these violations, we call on all countries to decisively implement the following measures:

.1 Prohibit access to seaports for:

  .1 Ships flying the Russian flag;

  .2 Ships owned, operated, or ultimately controlled by Russian nationals or entities registered in Russia;

  .3 Ships transporting goods to or from Ukrainian ports located in temporarily occupied territories or Russian ports.

.2 Revoke recognition of the Russian Maritime Register of Shipping as a recognized organization authorized to issue statutory certificates on behalf of flag States.

.3 Enhance monitoring of illegal activities in Ukraine's closed ports, especially the systematic and large-scale theft of Ukrainian grain and its illegal transport through occupied territories.

Additionally, the so-called "shadow fleet," comprising vessels engaged in illicit activities such as sanctions evasion, unauthorized goods transportation, and smuggling, poses a severe threat to global maritime safety, security, and trade integrity. These operations undermine international maritime law and endanger navigational safety through unregulated and hazardous practices.
We extend our profound gratitude to all Member States and international partners tirelessly working to identify, monitor, and disrupt the operations of these fleets. Your efforts are essential for preserving transparency, accountability, and stability within the global maritime domain.

Chair,

Despite the ongoing challenges posed by the war, Ukraine's maritime sector continues to demonstrate remarkable resilience. In October 2024, Ukrainian seaports handled 8 million tons of cargo, marking a 60% increase compared to the same period last year.

These achievements underscore the vital role of Ukraine's special maritime corridor, which alone accounted for 6.8 million tons of cargo in October, including 4.5 million tons of grain. Overall, from January to October 2024, Ukrainian ports handled 82.3 million tons of cargo—nearly double the volume processed in the same period of 2023.

These milestones highlight Ukraine's steadfast commitment to maintaining maritime operations under the most challenging circumstances, contributing to both the global economy and food security.

On this occasion, we would like to extend our gratitude to those countries that have already announced their commitment to supporting Ukraine's special maritime corridor, particularly France, the United Kingdom, and the European Union. We are also grateful to the Technical Cooperation and Implementation Division of the IMO for their invaluable support and willingness to assist in addressing these urgent needs.

Recognizing the complexity of the challenges, Ukraine has prepared and shared with the IMO and its partners a comprehensive list of urgent needs. This list outlines essential equipment requirements and includes requests for the establishment of a missions led by IMO experts to assess and support Ukraine's maritime infrastructure and operations.

We continue to encourage all other Member States to contribute to the ITCP fund in support of Ukraine.
In conclusion, Ukraine urges all Member States to reinforce their commitment to maritime security, uphold international law, and take decisive action to ensure the safety of navigation. Russian aggression against Ukraine represents a critical threat, and it is imperative that we unite in our efforts to protect global peace and security.

Thank you, Chair and we would appreciate it if this statement is reflected in the Committee's report and appended as its annex.

Red Sea

Chair,

The Delegation of Ukraine aligns itself with the statements recently made by the esteemed delegations of _____________________ and others, in condemning the interference by the Houthis with navigational rights and freedoms in the waters of the Red Sea. This unacceptable behaviour poses a significant threat to maritime safety and security, endangers the safety of innocent sailors, and is a direct violation of international law.

We would like to express our appreciation to the Secretary-General of the IMO for his focused attention on this critical issue and for his continued efforts to safeguard the safety and security of global shipping.

Ukraine stresses the vital importance of ensuring safe navigation in this region and calls on the international community to take coordinated action against maritime terrorism.

We strongly condemn the attack on the Galaxy Leader vessel and the illegal detention of its crew, which includes Ukrainian nationals, by the Houthi forces. This constitutes a clear breach of international law, undermining the fundamental principles of freedom of navigation and maritime safety.

We call for the swift and unconditional release of all crew members of the Galaxy Leader vessel.
I thank you, Chair, and kindly ask you that this statement be included in the Final Report of the Committee.

AGENDA ITEM 7

Statement by the delegation of BIMCO

We thank the cosponsors for their work. BIMCO in principle supports this submission, however, we would like to highlight one often overlooked aspect of maritime cyber security. Currently, ships hardly ever experience cybersecurity incidents impacting operational onboard systems. BIMCO is not aware of any cyber attack in recent years on a ship with significant safety impact to that ship. For the same reason, individual ships are currently omitted from the scope of for example the EU's cybersecurity regulation also known as the NIS2 Directive. We believe the NIS2 Directive's focus on entities, the failure of which will have disruptive implications to operators of critical infrastructure and essential services, is the right focus. We hope that the Committee keep this in mind when discussing developing further cybersecurity measures for ships and ports. We kindly ask this statement be appended to the final report.

Statement by the delegation of Malaysia

Thank you, Mr. Chair.

Malaysia expresses the importance for the revision of guidelines as proposed in MSC 109/7, recognising their importance in enhancing maritime operations and ensuring regulatory consistency across the industry. The revision reflects a proactive approach to addressing emerging challenges and aligning with evolving international maritime standards.

Nevertheless, Malaysia emphasises the need to safeguard all shared information during the development of these guidelines. To prevent potential misuse or manipulation, Malaysia firmly supports the principle that such information be used solely for this specific purpose and not shared with unauthorised third parties. Ensuring data integrity is critical to maintaining trust among stakeholders and protecting the maritime industry's interests.

Thank you. Mr. Chair.

AGENDA ITEM 9

Statement by the delegation of Malaysia

Thank you, Mr. Chair.

Malaysia expresses its appreciation to the Secretariat for the thorough preparation of this paper. The effort put into compiling and presenting the data is highly valued, as it contributes significantly to the ongoing improvement of maritime safety and operations worldwide.

Malaysia, through the Malaysia Maritime Enforcement Agency (MMEA), is pleased to report that no maritime incidents were registered within its jurisdiction for the year 2023-2024 at Staits of Malacca. This reflects the country's commitment to upholding the highest safety standards and ensuring the security of its maritime domain.

Malaysia strongly appreciates the practice of sharing incident reports and encourages continued communication of such reports to the country. This vital information allows Malaysia to accurately record and analyse incidents, facilitating targeted improvements in safety of navigation. It also supports the enhancement of Malaysia's maritime safety policies, ensuring that lessons learned are applied proactively to reduce the risk of future incidents.

Malaysia takes proactive and comprehensive steps to maintain the safety of its waters include Regular Enforcement, Prompt Response to Maritime Assistance Requests and Timely Execution of Response Actions.

Thank you. Mr. Chair.

Statement by the delegation of ReCAAP ISC

Thank you, Madam Chair for giving me the floor. A good day to all delegates.

There has been decease in incidents of piracy and armed robbery in Asia and more so in the Straits of Malacca and Singapore (SOMS) for the last eleven months of this year, in comparison with the same period in 2023. The decrease in incidents in SOMS is due to several arrests of perpetrators by the coastal States - Malaysia, Indonesia, and Singapore as also the heightened vigilance and implementation of stringent preventive measures by ship.

No abduction of crew for ransom in Sulu-Celebes Seas reported for the fourth consecutive year, since last reported in 2020. The coordinated efforts of the Philippines, Malaysia and Indonesia, have significantly contributed to an incident-free passage for seafarers transiting the Sulu-Celebes Seas.

The ReCAAP ISC in its endeavour to enhance Regional Cooperation and to better serve the maritime community, continues to produce useful and relevant publications, and launched various e-initiatives in preventing piracy and armed robbery against ships in Asia. These includes poster on Contact Details of MRCC and ReCAAP Focal Points in Asia to facilitate reporting to nearest coastal States, poster with Guidelines & Reporting of Incident by vessels transiting the SOMS to report directly to the law enforcement agencies for timely response and arrest of perpetrators, interactive dashboard Re-VAMP that allows users to gather key insight and correlation of past and present information on incidents to conduct risk assessment and institute preventive measures prior entering area of concern, and ReCAAP mobile application- a user-friendly one-stop incident reporting at anytime and anywhere in Asia to the nearest coastal State and for information sharing and access to the products of ReCAAP ISC.

Dealing with PAR against ships is a shared responsibility of all stakeholders, which requires a concerted effort of the coastal States, shipping community and all maritime stakeholders at sea and on land, to ensure safety of seafarers and secure seas for maritime trade and commerce, bringing in the economic prosperity of all nations in Asian region.

May I request this statement be recorded. Thank you, Madam Chair.

AGENDA ITEM 10

Statement by the delegation of BIMCO

BIMCO thanks the cosponsors for their work to develop these draft guidelines, which we support. We would like to propose a subtle change to the draft guidelines' paragraph 2.1.2 which currently stipulate "An RCC reserves its right not to recommend recovery of the deceased depending on the circumstance and information provided." For the Master it is difficult to act on the basis of an absence of recommendations. It would be more clear if it stated "An RCC reserves its right to recommend to not recover the deceased depending on the circumstance and information provided." Such a clear recommendation from the RCC will actually help the Master in this difficult situation. I kindly ask that a copy of this statement is appended to the final report.

AGENDA ITEM 17

Statement by the delegation of INTERFERRY

Chair,

Interferry has been in Partnership with the IMO for a long time, promoting enhancement of domestic ferry services and we are very pleased to see the great momentum on this issue, in particular the increased attention to the African continent.

We all know that SOLAS works exceedingly well for the protection of Convention ships, but we also know that more affordable solutions are needed to ensure quick uptake of safety enhancing measures for non-Convention ships. To that end, we believe that the Model Regulations on Domestic Ferry Safety offer a very strong platform.

As a reminder to the relevance and importance of this issue, the latest in a long series of severe accidents claimed more than 50 lives on the River Niger only last week. We believe that more efforts should be made to collect and collate accident information for the benefit of our future deliberations and future Formal Safety Assessments.

Finally, Interferry firmly believes that the safety of a passenger should never be dependant on where the ferry operates.

Thank you Chair
AGENDA ITEM 19

Statement by ICS

ICS thanks the Secretariat for document MSC 109/19/7 to streamline the discussions and also for the Study on the effectiveness and effective implementation of the ISM Code contained in document MSC 109/INF.3.

As ICS has highlighted previously and contained within the study, the concerns experienced with regards to the ISM Code, relate to the correct implementation of the Code and not the Code itself.

Therefore, ICS are in support of Recommendations 1 and 2 which could go some way to alleviating these concerns.

ICS can also support recommendations 5 and 6 regarding training guidance for non-technical skills and capacity building enhancement.

Regarding recommendation 4, ICS believe Minimum safe manning is outside the scope of this study as it is a SOLAS requirement rather an ISM requirement.

However, ICS cannot support recommendation 3 regarding the definition of "Company". This recommendation contains a number of points highlighted which can already be incorporated under the existing ISM Code framework, due to its flexibility and goal-based nature.

Finally, ICS remains supportive of a review of the guidelines on the implementation of the ISM Code as we believe this is where the main concerns lie.

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