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# REPORT OF THE MARITIME SAFETY COMMITTEE ON ITS 102ND SESSION

Attached are annexes 1 to 3 and 5 to 30 to the report of the Maritime Safety Committee on its 102nd session (MSC 102/24).

**(See document MSC 102/24/Add.2 for annex 4)**

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* *Reissued on 05/02/2021: HTW table added to Annex 25.*
*Reissued on 24/01/2022: Statement by IACS added to annex 30, agenda item 7 (GBS)*

**LIST OF ANNEXES**

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**ANNEX 1**

**RESOLUTION MSC.474(102)**
**(adopted on 11 November 2020)**

**AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

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 102nd 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 2023, 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 2024 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 REQUESTS ALSO 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 CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

**CHAPTER II-1**
**CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS**

**Part A**
**General**

**Regulation 1 – Application**

1 The existing paragraph 1.3 is replaced by the following:

"1.3 For the purpose of this chapter:

.1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;

.2 the expression *ships constructed on or after 1 January 2024* means ships:

.1 for which the building contract is placed on or after 1 January 2024; or

.2 in the absence of a building contract, the keel of which is laid or which are at a similar stage of construction on or after 1 July 2024; or

.3 the delivery of which is on or after 1 January 2028.

.3 the expression *all ships* means ships constructed before, on or after 1 January 2009;

.4 a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences."

**Part A-1**
**Structure of ships**

**Regulation II-1/3-8 – Towing and mooring equipment**

2 Regulation 3-8 is replaced by the following:

"1 Paragraphs 4 to 6 of this regulation apply to ships constructed on or after 1 January 2007.

2 Paragraphs 7 and 8 of this regulation only apply to ships:

.1 for which the building contract is placed on or after 1 January 2024; or

.2 in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2024; or

.3 the delivery of which is on or after 1 January 2027.

3 This regulation does not apply to towing arrangements provided in accordance with regulation 3-4.

4 Ships shall be provided with arrangements, equipment and fittings of sufficient safe working load to enable the safe conduct of all towing and mooring operations associated with the normal operation of the ship.

5 Arrangements, equipment and fittings provided in accordance with paragraph 4 above shall meet the appropriate requirements of the Administration or an organization recognized by the Administration under regulation I/6.*

* Refer to the *Guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175) for ships constructed on or after 1 January 2007 but before 1 January 2024 and the *Guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175/Rev.1) for ships constructed on or after 1 January 2024.

6 Each fitting or item of equipment provided under this regulation shall be clearly marked with any limitations associated with its safe operation, taking into account the strength of the supporting ship's structure and its attachment to it.

7 For ships of 3,000 gross tonnage and above, the mooring arrangement shall be designed, and the mooring equipment including lines shall be selected, in order to ensure occupational safety and safe mooring of the ship, based on the guidelines developed by the Organization.† Ship-specific information shall be provided and kept on board.‡

† Refer to the *Guidelines on the design of mooring arrangements and the selection of appropriate mooring equipment and fittings for safe mooring* (MSC.1/Circ.1619).

‡ Refer to towing and mooring arrangement plan in the *Guidelines on the design of mooring arrangements and the selection of appropriate mooring equipment and fittings for safe mooring (*MSC.1/Circ.1619).

8 Ships of less than 3,000 gross tonnage should comply with the requirement in paragraph 7 above as far as reasonably practicable, or with applicable national standards of the Administration.

9 For all ships, mooring equipment, including lines, shall be inspected and maintained in a suitable condition for their intended purposes.§

§ Refer to the *Guidelines for inspection and maintenance of mooring equipment including lines* (MSC.1/Circ.1620.

## Part B-1
## Stability

### Regulation 7-2 – Calculation of the factor $s_i$

3 Paragraphs 5.2, 5.3 and 5.5 are replaced by the following:

"5.2 The factor $s_i$ is to be taken as zero in those cases where the final waterline, taking into account sinkage, heel and trim, immerses:

.1 for cargo ships, the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor $s_i$. Such openings shall include air pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers;

.2 any part of the bulkhead deck in passenger ships considered a horizontal evacuation route for compliance with chapter II-2; and

.3 for passenger ships subject to the provisions of regulation 1.1.1.1 and constructed before 1 January 2024, the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor $s_i$. Such openings shall include air pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers.

5.3 The factor $s_i$ is to be taken as zero if, taking into account sinkage, heel and trim, any of the following occur in any intermediate stage or in the final stage of flooding:

.1 immersion of any vertical escape hatch in the bulkhead deck of passenger ships and the freeboard deck of cargo ships intended for compliance with chapter II-2;

.2 any controls intended for the operation of watertight doors, equalization devices, valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships become inaccessible or inoperable;

.3 immersion of any part of piping or ventilation ducts located within the assumed extent of damage and carried through a watertight boundary if this can lead to the progressive flooding of compartments not assumed as flooded; and

.4 for passenger ships constructed on or after 1 January 2024, immersion of the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor $s_i$. Such openings shall include air pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers.

5.5 Except as provided in paragraph 5.3.1, openings closed by means of watertight manhole covers and flush scuttles, remotely operated sliding watertight

doors, side scuttles of the non-opening type as well as watertight access doors and watertight hatch covers required to be kept closed during navigation in accordance with regulations 22 to 24 need not be considered."

## Part B-2
## Subdivision, watertight and weathertight integrity

**Regulation 12 – Peak and machinery space bulkheads, shaft tunnels, etc.**

4 At the beginning of paragraph 6.1, the text "For ships subject to the provisions of regulation 1.1.1.1 and constructed before 1 January 2024," is added; the word "Except" is replaced by "except"; and the reference to "paragraph 6.2" is replaced by "paragraph 6.3".

5 A new paragraph 6.2 is inserted after existing paragraph 6.1 and the subsequent paragraph is renumbered accordingly:

"6.2 For ships constructed on or after 1 January 2024, except as provided in paragraph 6.3, the collision bulkhead may be pierced below the bulkhead deck of passenger ships and the freeboard deck of cargo ships by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a remotely controlled valve capable of being operated from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. The valve shall be normally closed. If the remote control system should fail during operation of the valve, the valve shall close automatically or be capable of being closed manually from a position above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. The valve shall be located at the collision bulkhead on either the forward or aft side, provided the space on the aft side is not a cargo space. The valve shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable."

**Regulation 13 – Openings in watertight bulkheads below the bulkhead deck in passenger ships**

6 Regulation 13, including its title, is replaced by the following:

**"Regulation 13 – Openings in watertight boundaries below the bulkhead deck in passenger ships**

1 The number of openings in watertight boundaries shall be reduced to the minimum compatible with the design and proper working of the ship; satisfactory means shall be provided for closing these openings.

2.1 Where pipes, scuppers, electric cables, etc., are carried through watertight boundaries, arrangements shall be made to ensure the watertight integrity of the boundaries.

2.2 Valves not forming part of a piping system shall not be permitted in watertight boundaries.

2.3 Lead or other heat sensitive materials shall not be used in systems which penetrate watertight boundaries, where deterioration of such systems in the event of fire would impair the watertight integrity of the boundaries.

3 No doors, manholes or access openings are permitted in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space, except as provided in paragraph 8.1 and in regulation 14.

4 Subject to paragraph 9, not more than one door, apart from the doors to shaft tunnels, may be fitted in each watertight bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion. Where two or more shafts are fitted, the tunnels shall be connected by an intercommunicating passage. There shall be only one door between the machinery space and the tunnel spaces where two shafts are fitted and only two doors where there are more than two shafts. All these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable. The hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery.

5.1 Watertight doors, except as provided in paragraph 8.1 or regulation 14, shall be power-operated sliding doors complying with the requirements of paragraph 6.

5.2 The means of operation whether by power or by hand of any power-operated sliding watertight door shall be capable of closing the door with the ship listed to 15° either way. Consideration shall also be given to the forces which may act on either side of the door as may be experienced when water is flowing through the opening applying a static head equivalent to a water height of at least 1 m above the sill on the centreline of the door.

5.3 Watertight door controls, including hydraulic piping and electric cables, shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimize the likelihood of them being involved in any damage which the ship may sustain. The positioning of watertight doors and their controls shall be such that if the ship sustains damage within one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught, the operation of the watertight doors clear of the damaged portion of the ship is not impaired.

6.1 Each power-operated sliding watertight door:

.1 shall have a vertical or horizontal motion;

.2 shall, subject to paragraph 9, be normally limited to a maximum clear opening width of 1.2 m. The Administration may permit larger doors only to the extent considered necessary for the effective operation of the ship provided that other safety measures, including the following, are taken into consideration:

.1 special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages; and

.2 the door shall be located inboard the damage zone *B*/5;

.3 shall be fitted with the necessary equipment to open and close the door using electric power, hydraulic power or any other form of power that is acceptable to the Administration;

.4 shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an

accessible position above the bulkhead deck with an all-round crank motion or some other movement providing the same degree of safety acceptable to the Administration. Direction of rotation or other movement is to be clearly indicated at all operating positions. The time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 s with the ship in the upright position. Visual indicators to show whether the door is open or closed shall be provided at the accessible position above the bulkhead deck;

.5 shall be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console(s) required by paragraph 7.1;

.6 shall be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever the door is closed remotely by power and which shall sound for at least 5 s but no more than 10 s before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote hand operation it is sufficient for the audible alarm to sound only when the door is moving. Additionally, in passenger areas and areas of high ambient noise the Administration may require the audible alarm to be supplemented by an intermittent visual signal at the door; and

.7 shall have an approximately uniform rate of closure under power. The closure time, from the time the door begins to move to the time it reaches the completely closed position, shall in no case be less than 20 s or more than 40 s with the ship in the upright position.

6.2 The electrical power required for power-operated sliding watertight doors shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck. The associated control, indication and alarm circuits shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck and be capable of being automatically supplied by the transitional source of emergency electrical power required by regulation 42.3.1.3 in the event of failure of either the main or emergency source of electrical power.

6.3 Power-operated sliding watertight doors shall have either:

.1 a centralized hydraulic system with two independent power sources each consisting of a motor and pump capable of simultaneously closing all doors. In addition, there shall be for the whole installation hydraulic accumulators of sufficient capacity to operate all the doors at least three times, i.e. closed-open-closed, against an adverse list of 15º. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. The power-operating system shall be designed to minimize the possibility of having a single failure in the hydraulic piping adversely affect the operation of more than one door. The hydraulic system shall be provided with a low-level alarm for hydraulic fluid reservoirs serving

the power-operated system and a low gas pressure alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators. These alarms are to be audible and visual and shall be situated on the central operating console(s) required by paragraph 7.1; or

.2 an independent hydraulic system for each door with each power source consisting of a motor and pump capable of opening and closing the door. In addition, there shall be a hydraulic accumulator of sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. A low gas pressure group alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators shall be provided at the central operating console(s) required by paragraph 7.1. Loss of stored energy indication at each local operating position shall also be provided; or

.3 an independent electrical system and motor for each door with each power source consisting of a motor capable of opening and closing the door. The power source shall be capable of being automatically supplied by the transitional source of emergency electrical power as required by regulation 42.4.2 - in the event of failure of either the main or emergency source of electrical power and with sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°.

For the systems specified in paragraphs 6.3.1, 6.3.2 and 6.3.3, provision should be made as follows: Power systems for power-operated sliding watertight doors shall be separate from any other power system. A single failure in the electric or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.

6.4 Control handles shall be provided at each side of the bulkhead at a minimum height of 1.6 m above the floor and shall be so arranged as to enable persons passing through the doorway to hold both handles in the open position without being able to set the power closing mechanism in operation accidentally. The direction of movement of the handles in opening and closing the door shall be in the direction of door movement and shall be clearly indicated.

6.5 As far as practicable, electrical equipment and components for watertight doors shall be situated above the bulkhead deck and outside hazardous areas and spaces.

6.6 The enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water.*

* Refer to the following publication IEC 60529:2003:

.1 electrical motors, associated circuits and control components; protected to IPX 7 standard;

.2 door position indicators and associated circuit components; protected to IPX 8 standard; and

.3 door movement warning signals; protected to IPX 6 standard.

Other arrangements for the enclosures of electrical components may be fitted provided the Administration is satisfied that an equivalent protection is achieved. The water pressure IPX 8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 h.

6.7 Electric power, control, indication and alarm circuits shall be protected against fault in such a way that a failure in one door circuit will not cause a failure in any other door circuit. Short circuits or other faults in the alarm or indicator circuits of a door shall not result in a loss of power operation of that door. Arrangements shall be such that leakage of water into the electrical equipment located below the bulkhead deck will not cause the door to open.

6.8 A single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening. Availability of the power supply should be continuously monitored at a point in the electrical circuit as near as practicable to each of the motors required by paragraph 6.3. Loss of any such power supply should activate an audible and visual alarm at the central operating console(s) required by paragraph 7.1.

7.1 A central operating console for all power-operated sliding watertight doors shall be located in the safety centre in accordance with regulation II-2/23. If the safety centre is located in a separate space adjacent to the navigation bridge, a central operating console shall also be located on the navigation bridge. The central operating console(s) shall have a "master mode" switch with two modes of control: a "local control" mode, which shall allow any door to be locally opened and locally closed after use without automatic closure, and a "doors closed" mode, which shall automatically close any door that is open in not more than 60 s with the ship in an upright position. The "doors closed" mode shall permit doors to be opened locally and shall automatically re-close the doors upon release of the local control mechanism. The "master mode" switch shall normally be in the "local control" mode. The "doors closed" mode shall only be used in an emergency or for testing purposes.

7.2 For ships subject to the provisions of regulation 1.1.1.1 and constructed before 1 January 2024, the central operating console at the navigation bridge shall be provided with a diagram showing the location of each door, with visual indicators to show whether each door is open or closed. A red light shall indicate a door is fully open and a green light shall indicate a door is fully closed. When the door is closed remotely the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door.

7.3 For ships constructed on or after 1 January 2024, the central operating console(s) shall be provided with a diagram showing the location of each power-operated sliding watertight door, with visual indicators to show whether each door is open or closed. A red light shall indicate a door is fully open and a green light shall indicate a door is fully closed. When the door is closed remotely the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door. Indication shall also be provided to the onboard stability computer, if installed in accordance with regulation II-1/8-1.3.1.

7.4 It shall not be possible to remotely open any door from the central operating console.

8.1 If the Administration is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads dividing cargo spaces on 'tween decks. Such doors may be hinged, rolling or sliding doors but shall not be remotely controlled. They shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught.

8.2 Should any such doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Administration.

9 Portable plates on bulkheads shall not be permitted except in machinery spaces. The Administration may permit not more than one power-operated sliding watertight door larger than those specified in paragraph 6.1.2 to be substituted for these portable plates in each watertight bulkhead, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of paragraph 6.1.4 regarding complete closure by hand-operated gear in 90 s.

10.1 Where trunkways or tunnels for access from crew accommodation to the machinery spaces, for piping, or for any other purpose are carried through watertight bulkheads, they shall be watertight and in accordance with the requirements of regulation 16-1. The access to at least one end of each such tunnel or trunkway, if used as a passage at sea, shall be through a trunk extending watertight to a height sufficient to permit access above the bulkhead deck. The access to the other end of the trunkway or tunnel may be through a watertight door. Such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead.

10.2 Where it is proposed to fit tunnels piercing watertight bulkheads, these shall receive the special consideration of the Administration.

10.3 Where trunkways in connection with refrigerated cargo and ventilation or forced draught trunks are carried through more than one watertight bulkhead, the means of closure at such openings shall be operated by power and be capable of being closed from a central position situated above the bulkhead deck."

**Regulation 15 – Openings in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships**

7 Paragraph 9 is replaced by the following:

"9 For ships subject to the provisions of regulation 1.1.1.1 and constructed before 1 January 2024, gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be watertight and in no case be so fitted as to have their lowest point below the deepest subdivision draught."

8 The following new paragraph 10 is inserted after new paragraph 9 and existing paragraphs 10.1 and 10.2 are deleted.

"10 For ships constructed on or after 1 January 2024, cargo ports and other similar openings (e.g. gangway and fuelling ports) in the side of ships below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be fitted with doors so designed as to ensure the same watertightness and structural integrity as the surrounding shell plating. Unless otherwise granted by the Administration, these openings shall open outwards. The number of such openings shall be the minimum compatible with the design and proper working of the ship. In no case shall these openings be so fitted as to have their lowest point below the deepest subdivision draught."

**Regulation 16 – Construction and initial tests of watertight closures**

9 Paragraph 1.1 is replaced by the following:

"1.1 The design, materials and construction of all watertight closures such as doors, hatches, sidescuttles, gangway and cargo ports, valves and pipes referred to in these regulations shall be to the satisfaction of the Administration."

**Regulation 17 – Internal watertight integrity of passenger ships above the bulkhead deck**

10 Paragraph 1 is replaced by the following:

"1 For passenger ships subject to the provisions of regulation 1.1.1.1 and constructed before 1 January 2024, the Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of watertight bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck between shall be made effectively watertight. Where openings, pipes, scuppers, electric cables, etc. are carried through the partial watertight bulkheads or decks within the immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck.*"

* Refer to the *Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships for proper application of regulations II-1/8 and 20, paragraph 1, of SOLAS 1974, as amended* (MSC/Circ.541, as may be amended).

11 The following new paragraphs 2 and 3 are inserted after new paragraph 1 and the subsequent paragraphs are renumbered accordingly:

"2 For ships constructed on or after 1 January 2024, the internal watertight subdivision arrangements to limit the entry and spread of water above the bulkhead deck shall be in accordance with the design arrangements necessary for compliance with the stability requirements in parts B-1, and B-2 if applicable. Where pipes, scuppers, electric cables, etc. are carried through internal watertight boundaries that are immersed at any intermediate or final stage of flooding in damage cases that contribute to the attained subdivision index *A*, arrangements shall be made to ensure their watertight integrity.

3 For ships constructed on or after 1 January 2024, doors in internal watertight subdivision arrangements above the bulkhead deck, and also above the worst intermediate or final stage of flooding waterlines, shall be capable of preventing the passage of water when immersed in the required range of positive stability for any damage cases contributing to the attained subdivision index *A*. These doors may remain open provided they can be remotely closed from the navigation bridge. They shall always be ready to be immediately closed."

**Regulation 17-1 – Integrity of the hull and superstructure, damage prevention and control on ro-ro passenger ships**

12 Paragraphs 1.1 to 1.3 are replaced by the following:

"1.1 All access from the ro-ro deck that leads to spaces below the bulkhead deck shall have a lowest point which is not less than 2.5 m above the bulkhead deck, unless the access is covered by the provisions of paragraphs 1.2 or 1.3.

1.2 Where vehicle ramps are installed to give access to spaces below the bulkhead deck, their openings shall be able to be closed weathertight to prevent ingress of water below and fitted with alarms and open/close indicators on the navigation bridge. The means of closure shall be watertight if the deck is intended as a watertight horizontal boundary under regulation 7-2.6.

1.3 Subject to regulations 23.3 and 23.6, the Administration may permit the fitting of particular accesses to spaces below the bulkhead deck provided they are necessary for the essential working of the ship, e.g. the movement of machinery and stores, and subject to such accesses being made watertight, fitted with alarms and open/close indicators on the navigation bridge."

**Part B-4**
**Stability management**

**Regulation 19 – Damage control information***

* Refer to the *Guidelines for damage control plans and information to the master* (MSC.1/Circ.1245), as amended by MSC.1/Circ.1570 and to the *Guidelines for verification of damage stability requirements for tankers* (MSC.1/Circ.1461).

13 The following new paragraph 5 is inserted after existing paragraph 4:

"5 For passenger ships constructed on or after 1 January 2024, and to which regulation 8-1.3 applies, the damage control information shall include a reference to activation of damage stability support from the onboard stability computer, if installed, and to shore-based support when provided."

**Regulation 21 – Periodical operation and inspection of watertight doors, etc., in passenger ships**

14 Paragraph 1 is replaced by the following:

"1 Operational tests of watertight doors, sidescuttles, valves and closing mechanisms of scuppers shall take place weekly. In ships in which the voyage exceeds one week in duration, a complete set of operational tests shall be held before the voyage commences, and others thereafter at least once a week during the voyage."

**Regulation 22 – Prevention and control of water ingress, etc.**

15 In paragraphs 1 and 4, existing reference to "regulation 13.10" is replaced by the reference to "regulation 13.9".

16 Paragraphs 5 and 6 are replaced by the following:

"5 Watertight doors fitted in watertight bulkheads dividing cargo spaces on tween decks in accordance with regulation 13.8.1 shall be closed before the voyage commences and shall be kept closed during navigation. The time at which such doors are opened or closed shall be recorded in such logbook as may be prescribed by the Administration.

6 For ships subject to the provisions of regulation 1.1.1.1 and constructed before 1 January 2024, gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be effectively closed and secured watertight before the voyage commences, and shall be kept closed during navigation."

17 A new paragraph 7 is inserted after existing paragraph 6 and the subsequent paragraphs are renumbered accordingly:

"7 For ships constructed on or after 1 January 2024, gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships and all watertight hatches shall be effectively closed and secured watertight before the voyage commences, and shall be kept closed during navigation. However, the master may permit a watertight hatch to be opened during navigation for a limited period of time sufficient to permit passage or for access. It shall then be closed."

18 In the renumbered paragraph 8.2, existing reference to "paragraph 7.1" is replaced by reference to "paragraph 8.1".

19 In the renumbered paragraph 8.4, existing text "paragraphs 7.1 to 7.3 " is replaced by "paragraphs 8.1 to 8.3".

20 In the renumbered paragraph 10, existing text "paragraphs 7.1 and 7.4" is replaced by "paragraphs 8.1 and 8.4".

21 In the renumbered paragraph 11, existing reference to "paragraph 7" is replaced by reference to "paragraph 8".

22 In the renumbered paragraph 12, existing reference to "paragraph 12" is replaced by reference to "paragraph 13" and the existing reference to "paragraph 13" is replaced by reference to "paragraph 14".

23 Renumbered paragraph 14.2 is replaced by:

".2 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 14 would apply when it was floating at its deepest subdivision draught, the Administration may indicate the limiting mean draught at which these sidescuttles will have their sills above the line drawn parallel to the bulkhead deck at side of passenger ships and the freeboard deck at side of cargo ships, and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the waterline corresponding to the limiting mean draught, and at which it will therefore be permissible for the voyage to commence without them being closed and locked and to be opened during navigation on the responsibility of the master. In tropical zones as defined in the International Convention on Load Lines, 1966 in force, this limiting draught may be increased by 0.3 m."

24 Renumbered paragraph 17 is deleted.

**Regulation 23 – Special requirements for ro-ro passenger ships**

25 In paragraph 5, existing reference to "regulation 22.12" is replaced by reference to "regulation 22.13".

**Part D**
**Electrical installations**

**Regulation 42 – Emergency source of electrical power in passenger ships**

26 In paragraph 4.2, existing reference to "regulation 13.7.3.3" is replaced by reference to "regulation 13.6.3.3" and existing reference to "regulation 13.7.2" is replaced by reference to "regulation 13.6.2".

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**ANNEX 2**

**RESOLUTION MSC.475(102)**
**(adopted on 11 November 2020)**

**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,

RECALLING ALSO resolution MSC.391(95), by which it adopted the International Code of Safety for Ships Using Gases or Other Low-flashpoint Fuels ("the IGF Code"), which has become mandatory under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

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

HAVING CONSIDERED, at its 102nd 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 amendments shall be deemed to have been accepted on 1 July 2023 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 note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2024 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 REQUESTS ALSO 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 CODE OF SAFETY FOR SHIPS USING GASES OR OTHER LOW-FLASHPOINT FUELS (IGF CODE)

## PART A-1
## SPECIFIC REQUIREMENTS FOR SHIPS USING NATURAL GAS AS FUEL

### 6 – FUEL CONTAINMENT SYSTEM

**6.7 Regulation for pressure relief system**

1 Regulation 6.7.1.1 is replaced by the following:

"All fuel storage tanks shall be provided with a pressure relief system appropriate to the design of the fuel containment system and the fuel being carried. Fuel storage hold spaces, interbarrier spaces and tank connection 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 6.9 shall be independent of the pressure relief systems."

### 11 – FIRE SAFETY

2 The following new regulation 11.8 is added after existing regulation 11.7:

"**11.8 Regulation for fuel preparation room fire-extinguishing systems**

For ships constructed on or after 1 January 2024, fuel preparation rooms containing pumps, compressors or other potential ignition sources shall be provided with a fixed fire-extinguishing system complying with the provisions of SOLAS regulation II-2/10.4.1.1 and taking into account the necessary concentrations/application rate required for extinguishing gas fires."

## PART B-1

### 16 – MANUFACTURE, WORKMANSHIP AND TESTING

**16.3 Welding of metallic materials and non-destructive testing for the fuel containment system**

3 Regulation 16.3.3.5.1 is replaced by the following:

".1 tensile tests: cross-weld tensile strength is not to be less than the specified minimum tensile strength for the appropriate parent materials. For materials such as aluminium alloys, reference shall be made to 6.4.12.1.1.3 with regard to the regulations for weld metal strength of under-matched welds (where the weld metal has a lower tensile strength than the parent metal). In every case, the position of fracture shall be recorded for information;"

***

**ANNEX 3**

**RESOLUTION MSC.476(102)**
**(adopted on 11 November 2020)**

**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 function 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 102nd 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 amendments shall be deemed to have been accepted on 1 July 2023 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 note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2024 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 REQUESTS ALSO 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 CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)**

## CHAPTER 6
## Materials of construction and quality control

### 6.5 Welding of metallic materials and non-destructive testing

### 6.5.3 Welding procedure tests for cargo tanks and process pressure vessels

1 Paragraph 6.5.3.5.1 is replaced by the following:

".1 tensile tests: cross-weld tensile strength shall not be less than the specified minimum tensile strength for the appropriate parent materials. For materials such as aluminium alloys, reference shall be made to 4.18.1.3 with regard to the requirements for weld metal strength of under-matched welds (where the weld metal has a lower tensile strength than the parent metal). In every case, the position of fracture shall be recorded for information;"

***

# ANNEX 5

# DRAFT AMENDMENTS TO THE IMO/WHO/ILO MEDICAL FIRST AID GUIDE FOR USE IN ACCIDENTS INVOLVING DANGEROUS GOODS (MFAG) (MSC/CIRC.857)

## TABLES

## TABLE 2
## CPR (CARDIO-PULMONARY RESUSCITATION)

**Treatment**

The following sentence is added as the new fifth bullet point, under the bullet point on "Once a clear and open airway is established, insert Guedel airway: see appendix 3." and under the corresponding picture:

"• If the casualty is very breathless, give 50 mg furosemide (frusemide) by intramuscular injection to increase the urine output."

## TABLE 19
## METHANOL (METHYL ALCOHOL) AND ETHYLENE GLYCOL

**INGESTION**

The second, third and fourth bullet points under the heading "Treatment" are amended to read as follows:

"• Give 70 mL of ethyl alcohol 99.5% in 350 to 500 mL water or soft drink.

• This is a **MEDICAL EMERGENCY**. The casualty should be transferred to a shore hospital as soon as possible.

• Continue to give 10 mL of ethyl alcohol 99.5 % in 50 mL or more water or soft drink every hour until the casualty can be evacuated."

**FOLLOW-UP**

The first bullet point is amended to read as follows:

"• If the casualty cannot be evacuated, and if medically advised, continue treatment with alcohol (ethyl alcohol) up to maximum 15 hours."

## Appendices

## Appendix 2

## CPR (CARDIO-PULMONARY RESUSCITATION)

### Breathing and heart have stopped

The first sentence under the heading "Terminating heart compression" is amended to read as follows:

> "With deep unconsciousness, the absence of spontaneous respiration and fixed, dilated pupils having persisted for 30 min, further efforts to restore circulation and breathing are usually futile and might be stopped, unless a case of hypothermia or intoxication is suspected."

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**ANNEX 6**

**RESOLUTION MSC.478(102)**
**(adopted on 5 November 2020)**

**AMENDMENTS TO PART B OF THE SEAFARERS' TRAINING, CERTIFICATION AND WATCHKEEPING CODE (STCW CODE)**

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO regulation I/1.2.4 of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (the 1978 STCW Convention), regarding the procedure for amendments to part B (recommendatory part) of the Seafarers' Training, Certification and Watchkeeping Code (STCW Code),

NOTING THAT the List of certificates or documentary evidence required under the 1978 STCW Convention, as set out in table B-I/2 of the STCW Code, should provide updated and clear guidance for STCW Parties, Administrations, PSC authorities, recognized organizations and other relevant parties,

HAVING CONSIDERED, at its 102nd session, amendments to part B of the STCW Code proposed by the Sub-Committee on Human Element, Training and Watchkeeping at its sixth session,

1 ADOPTS amendments to part B of the STCW Code, the text of which is set out in the annex to the present resolution;

2 RECOMMENDS that Parties use the amendments to part B of the STCW Code as recommended guidance for the implementation, application and enforcement of measures to give the Convention full and complete effect in a uniform manner;

3 DETERMINES that said amendments should become effective on 1 January 2021.

ANNEX

**AMENDMENTS TO PART B OF THE SEAFARERS' TRAINING, CERTIFICATION AND WATCHKEEPING CODE (STCW CODE)**

## CHAPTER I – Guidance regarding general provisions

1 "Table B-I/2" in section B-I/2 is replaced by the following:

"**Table B-I/2**

*List of certificates or documentary evidence required under the STCW Convention*

The list below identifies all certificates or documentary evidence described in the Convention which authorize the holder to serve in certain capacities, perform certain duties or functions or be assigned certain responsibilities on board ships. The certificates are subject to the requirements of regulation I/2 regarding language and their availability in original form.

The list also references the relevant regulations and the requirements for endorsement, registration and revalidation.

| **Regulations** | **Type of certificate or documentary evidence and brief description** | **Seafarers required to hold the certificate or documentary evidence** | **Endorsement attesting recognition of a certificate required[1]** | **Registration required[2]** | **Revalidation of a certificate or maintenance of the required standard of competence[3]** |
|---|---|---|---|---|---|
| II/1, II/2, II/3, III/1, III/2, III/3, III/6, IV/2, VII/2 | Certificate of Competency[4] | Masters, officers and GMDSS radio operators | Yes | Yes | Yes[5] |
| II/4, II/5, III/4, III/5, III/7, VII/2 | Certificate of Proficiency | Ratings forming part of a navigational or engine-room watch (other than those under training or whose duties are of an unskilled nature), and ratings serving as able seafarer deck, able seafarer engine or electro-technical rating | No | Yes | No |

| | | | | | |
|---|---|---|---|---|---|
| V/1-1, V/1-2 | Certificate of Proficiency or endorsement to a Certificate of Competency – Basic training for oil and chemical or liquefied gas tanker cargo operations | Officers assigned specific duties and responsibilities related to cargo or cargo equipment on board tankers | Yes | Yes | Yes[5] |
| V/1-1, V/1-2 | Certificate of Proficiency or endorsement to a Certificate of Competency – Advanced training for oil, chemical or liquefied gas tanker cargo operations | Masters, chief engineer officers, chief mates, second engineer officers and any officer with immediate responsibility for loading, discharging, care in transit, handling of cargo, tank cleaning or other cargo-related operations on board tankers | Yes | Yes | Yes[5] |
| V/1-1, V/1-2 | Certificate of Proficiency or endorsement to an existing Certificate of Proficiency – Basic training for oil and chemical or liquefied gas tanker cargo operations | Ratings assigned specific duties and responsibilities related to cargo or cargo equipment on board tankers | No | Yes | No |
| V/1-1, V/1-2 | Certificate of Proficiency or endorsement to an existing Certificate of Proficiency – Advanced training for oil, chemical or liquefied gas tanker cargo operations | Any person, other than masters and officers, with immediate responsibility for loading, discharging, care in transit, handling of cargo, tank cleaning or other cargo-related operations on board tankers | No | Yes | No |
| V/2 | Documentary evidence – Safety training | Personnel providing direct service to passengers in passenger spaces on board passenger ships | No | No | No |

| | | | | | |
|---|---|---|---|---|---|
| V/2 | Documentary evidence – Passenger ship crowd management training | Masters, officers, ratings qualified in accordance with chapters II, III and VII and other personnel designated on the muster list to assist passengers in emergency situations on board passenger ships | No | No | Yes[6] |
| V/2 | Documentary evidence – Crisis management and human behaviour training | Masters, chief engineer officers, chief mates, second engineer officers and any person designated on the muster list of having responsibility for the safety of passengers in emergency situations on board passenger ships | No | No | Yes[6] |
| V/2 | Documentary evidence – Passenger safety, cargo safety and hull integrity training | Masters, chief engineer officers, chief mates, second engineer officers and every person assigned immediate responsibility for embarking and disembarking passengers, for loading, discharging or securing cargo, or for closing hull openings on board ro-ro passenger ships | No | No | Yes[6] |
| V/3 | Certificate of Proficiency – Basic training for service on ships subject to the IGF Code | Seafarers responsible for designated safety duties associated with the care, use or in emergency response to the fuel on board ships subject to the IGF Code | No | Yes | Yes[6] |
| V/3 | Certificate of Proficiency – Advanced training for service on ships subject to the IGF Code | Masters, engineer officers and all personnel with immediate responsibility for the care and use of fuels and fuel systems on ships subject to the IGF Code | No | Yes | Yes[6] |

| | | | | | |
|---|---|---|---|---|---|
| V/4 | Certificate of Proficiency – Basic training for ships operating in polar waters | Masters, chief mates and officers in charge of a navigational watch on ships operating in polar waters, as required by the Polar Code | No | Yes | Yes[5] |
| V/4 | Certificate of Proficiency – Advanced training for ships operating in polar waters | Masters and chief mates on ships operating in polar waters, as required by the Polar Code | No | Yes | Yes[5] |
| VI/1 | Certificate of Proficiency[7] – Basic training | Seafarers employed or engaged in any capacity on board ship on the business of that ship as part of the ship's complement with designated safety or pollution-prevention duties in the operation of the ship | No | Yes | Yes[8] |
| VI/2 | Certificate of Proficiency[7] – Survival craft and rescue boats other than fast rescue boats | Seafarers designated to operate survival craft and rescue boats other than fast rescue boats | No | Yes | Yes[8] |
| VI/2 | Certificate of Proficiency – Fast rescue boats | Seafarers designated to operate fast rescue boats | No | Yes | Yes[8] |
| VI/3 | Certificate of Proficiency[7] – Advanced fire fighting | Seafarers designated to control fire-fighting operations | No | Yes | Yes[8] |
| VI/4 | Certificate of Proficiency[7, 11] – Medical first aid | Seafarers designated to provide medical first aid on board ship | No | Yes | No |
| VI/4 | Certificate of Proficiency[11] – Medical care | Seafarers designated to take charge of medical care on board ship | No | Yes | No |
| VI/5 | Certificate of Proficiency – Ship security officer | Seafarers designated as ship security officer | No | Yes | No |

| | | | | | |
|---|---|---|---|---|---|
| VI/6 | Certificate of Proficiency[9, 10] – Security awareness training | Seafarers employed or engaged in any capacity on board a ship which is required to comply with the provisions of the ISPS Code on the business of that ship as part of the ship's complement without designated security duties | No | Yes | No |
| VI/6 | Certificate of Proficiency [9, 10] – Training for seafarers with designated security duties | Seafarers designated to perform security duties, including anti-piracy and anti-armed-robbery-related activities | No | Yes | No |

**Notes:**

1 *Endorsement attesting recognition of a certificate* means endorsement in accordance with regulation I/2, paragraph 7, issued under the conditions specified in regulation I/10, paragraph 1. Documentary proof that an application for an endorsement has been submitted to the Administration shall also be accepted under the conditions specified in regulation I/10 paragraph 5.

2 *Registration required* means as part of a register or registers in accordance with regulation I/2, paragraph 14.

3 *Revalidation of a certificate or maintenance of the required standard of competence* means establishing continued professional competence in accordance with regulation I/11, undertaking appropriate refresher training or providing evidence of having achieved or maintained the required standards of competence in accordance with regulations V/2 and V/3; and sections A-VI/1 to A-VI/3, as applicable.

4 In accordance with article VIII, if a seafarer serves in a capacity for which they do not hold the appropriate certificate, a dispensation issued by the Administration should be required. However, this is not applicable to radio operators, unless the relevant radio regulations provide otherwise.

5 Revalidation in accordance with regulation I/11.

6 As required by regulations V/2, paragraph 4 and V/3, paragraph 12, seafarers shall, at intervals not exceeding 5 years, undertake appropriate refresher training or be required to provide evidence of having achieved the required standard of competence within the previous 5 years.

7 The certificates of competency issued in accordance with regulations II/1, II/2, II/3, III/1, III/2, III/3, III/6 and VII/2 include the proficiency requirements in "basic training", "survival craft and rescue boats other than fast rescue boats", "advanced fire fighting", and "medical first aid"; therefore, holders of certificates mentioned are not required to carry Certificates of Proficiency in respect of those competencies in chapter VI.

8 Seafarers qualified under regulation VI/1 (basic training) related to the competencies "personal survival techniques" and "fire prevention and fire fighting", regulation VI/2 (survival craft, rescue boats and fast rescue boats) and regulation VI/3 (advanced fire fighting) are required, every 5 years, to provide evidence of having maintained the required standards of competency in accordance with the provisions of sections A-VI/1, paragraph 3; A-VI/2, paragraphs 5 and 11; and A-VI/3, paragraph 5.

9 Ship security officer training encompasses the competency requirements of section A-VI/6, and therefore holders of such a certificate of proficiency should not be required to undergo further training and obtain certification under section A-VI/6 related to competency for security awareness and training for seafarers with designated security duties. In addition, training for seafarers with designated security duties encompasses the competency requirements of section A-VI/6, paragraph 4, and therefore holders of such certificate of proficiency should not be required to undergo further training and obtain certification related to competency for security awareness.

10 Where security awareness training or training in designated security duties is not included in the qualification for the certificate to be issued, a certificate of proficiency shall be issued indicating that the holder has attended a course of training for designated security duties.

11 Where training in medical first aid or medical care is not included in the qualifications for the certificate to be issued, a certificate of proficiency shall be issued indicating that the holder has attended a course of training in medical first aid or in medical care.

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# ANNEX 7

## DRAFT MSC RESOLUTION

## AMENDMENTS TO THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS, 1978 (1978 STCW CONVENTION)

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 XII of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 ("the Convention"), concerning the procedures for amending the Convention,

NOTING the repeated references to "high-voltage" in the Seafarers' Training, Certification and Watchkeeping Code (STCW Code), without a specific definition for this term,

HAVING CONSIDERED, at its [103rd] session, amendments to the Convention proposed and circulated in accordance with article XII(1)(a)(i) thereof,

1 ADOPTS, in accordance with article XII(1)(a)(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 XII(1)(a)(vii)(2) of the Convention, that said amendments shall be deemed to have been accepted on [1 July 2022], unless, prior to that date, more than one third of Parties, or Parties the combined merchant fleets of which constitute not less than fifty percent of the gross tonnage of the world's merchant shipping of ships of 100 gross register tons or more, have notified to the Secretary-General of the Organization that they object to the amendments;

3 INVITES Parties to note that, in accordance with article XII(1)(a)(ix) of the Convention, the amendments annexed hereto shall enter into force on [1 January 2023] upon their acceptance, in accordance with paragraph 2 above;

4 URGES Parties to implement the amendments to regulation I/1.1 at an early stage;

5 REQUESTS the Secretary-General, for the purposes of article XII(1)(a)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to the Convention;

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

ANNEX

**DRAFT AMENDMENTS TO THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS, 1978 (1978 STCW CONVENTION)**

## CHAPTER I
## General provisions

1 In regulation I/1.1, the following new definition is added:

".44 *High-voltage* means an alternating current (AC) or direct current (DC) voltage in excess of 1,000 volts."

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**ANNEX 8**

**DRAFT MSC RESOLUTION**

**AMENDMENTS TO PART A OF THE SEAFARERS' TRAINING, CERTIFICATION AND WATCHKEEPING CODE (STCW CODE)**

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 XII and regulation I/1.2.3 of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 ("the Convention"), concerning the procedures for amending part A of the Seafarers' Training, Certification and Watchkeeping Code (STCW Code),

NOTING that all the functions for the capacity "electro-technical officer", introduced as part of the 2010 Amendments (the Manila Amendments), are provided at the "operational level",

HAVING CONSIDERED, at its [103rd] session, amendments to part A of the STCW Code, proposed and circulated in accordance with article XII(1)(a)(i) of the Convention,

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

2 DETERMINES, in accordance with article XII(1)(a)(vii)(2) of the Convention, that said amendments to the STCW Code shall be deemed to have been accepted on [1 July 2022], unless, prior to that date, more than one third of Parties, or Parties the combined merchant fleets of which constitute not less than fifty percent of the gross tonnage of the world's merchant shipping of ships of 100 gross register tons or more, have notified to the Secretary-General of the Organization that they object to the amendments;

3 INVITES Parties to note that, in accordance with article XII(1)(a)(ix) of the Convention, the amendments to the STCW Code annexed hereto shall enter into force on [1 January 2023] upon their acceptance, in accordance with paragraph 2 above;

4 URGES Parties to implement the amendments to section A-I/1 of the STCW Code at an early stage;

5 REQUESTS the Secretary-General, for the purposes of article XII(1)(a)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to the Convention;

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

ANNEX

**DRAFT AMENDMENTS TO PART A OF THE SEAFARERS' TRAINING, CERTIFICATION AND WATCHKEEPING CODE (STCW CODE)***

**CHAPTER I**
**Standards regarding general provisions**

1 In section A-I/1, the definition for "operational level" is amended as follows:

".3 *Operational level* means the level of responsibility associated with:

.3.1 serving as officer in charge of a navigational or engineering watch or as designated duty engineer for periodically unmanned machinery spaces or as electro-technical officer or as radio operator on board a seagoing ship, and"

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* Tracked changes are indicated using "strikeout" for deleted text and "grey shading" to highlight all modifications and new insertions, including deleted text.

**ANNEX 9**

**RESOLUTION MSC.479(102)**
**(adopted on 11 November 2020)**

**REVISED GUIDELINES FOR SECURING ARRANGEMENTS FOR THE TRANSPORT OF ROAD VEHICLES ON RO-RO SHIPS**

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.581(14), whereby the Assembly promulgated the *Guidelines for securing arrangements for the transport of road vehicles on ro-ro ships*, as amended by MSC/Circ.812 and MSC.1/Circ.1355,

RECALLING FURTHER resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards and technical specifications, as well as amendments thereto, should be performed by the Maritime Safety Committee on behalf of the Organization,

TAKING ACCOUNT of the IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units,

RECOGNIZING that a number of serious accidents have occurred because of inadequate securing arrangements on ships and road vehicles,

RECOGNIZING ALSO the need for the Organization to establish guidelines for securing arrangements on board ro-ro ships and on road vehicles,

REALIZING that, given adequately designed ships and properly equipped road vehicles, lashings of sufficient strength will be capable of withstanding the forces imposed on them during the voyage,

REALIZING ALSO that certain requirements for side guards, particularly those positioned very low on road vehicles, will obstruct the proper securing of road vehicles on board ro-ro ships and that appropriate measures will have to be taken to satisfy both road and maritime safety aspects,

BELIEVING that the application of the Guidelines will enhance safety in the transport of road vehicles on ro-ro ships and that this can be achieved on an international basis,

HAVING CONSIDERED the draft amendments to resolution A.581(14) prepared by the Sub-Committee on Carriage of Cargoes and Containers at its sixth session,

1 ADOPTS the *Revised guidelines for securing arrangements for the transport of road vehicles on ro-ro ships* set out in the annex to the present resolution;

2 URGES Member Governments to implement the Revised Guidelines at the earliest possible opportunity in respect of new ro-ro ships and new vehicles and, as far as practicable, in respect of existing vehicles which may be transported on ro-ro ships;

3 REQUESTS the Secretary-General to bring the Revised Guidelines to the attention of Member Governments and relevant international organizations responsible for safety in the design and construction of ships and road vehicles for action as appropriate;

4 DETERMINES that this resolution supersedes resolution A.581(14), as amended;

5 INVITES the Assembly to revoke resolution A.581(14) and endorse the action taken by the Maritime Safety Committee.

***

ANNEX

# REVISED GUIDELINES FOR SECURING ARRANGEMENTS FOR THE TRANSPORT OF ROAD VEHICLES ON RO-RO SHIPS

## Preamble

In light of experience with the transport of road vehicles on ro-ro ships, it is recommended that these Guidelines for securing road vehicles on board such ships should be followed. Shipowners and shipyards, when designing and building ro-ro ships to which these Guidelines apply, should take sections 4 and 6 particularly into account. Manufacturers, owners and operators of road vehicles which may be transported on ro-ro ships should take sections 5 and 7 particularly into account.

## 1 Scope

These Guidelines for securing and lashing road vehicles on board ro-ro ships outline in particular the securing arrangements on the ship and on the vehicles, and the securing methods to be used.

## 2 Application

2.1 These Guidelines apply to ro-ro ships which regularly carry road vehicles on either long or short international voyages in unsheltered waters. They concern:

.1 road vehicles as defined in 3.2.1, 3.2.2, 3.2.3 and 3.2.5 with an authorized maximum total mass on vehicles and cargo of between 3.5 and 40 tonnes; and

.2 articulated road trains as defined in 3.2.4 with a maximum total mass of not more than 45 tonnes, which can be carried on ro-ro ships.

2.2 These Guidelines do not apply to buses.

2.3 For road vehicles having characteristics outside the general parameters for road vehicles (particularly where the normal height of the centre of gravity is exceeded), the location and the number of securing points should be specially considered.

## 3 Definitions

3.1 *"Ro-ro ship"* means a ship which has one or more decks either closed or open, not normally subdivided in any way and generally running the entire length of the ship, in which goods (packaged or in bulk, in or on road vehicles (including road tank-vehicles), trailers, containers, pallets, demountable or portable tanks or in or on similar cargo transport units or other receptacles) can be loaded or unloaded normally in a horizontal direction.

3.2 In these Guidelines the term road vehicle[1] includes:

[1] Refer to ISO Standard No.3833

.1 *Commercial vehicle*, which means a motor vehicle which, on account of its design and appointments, is used mainly for conveying goods. It may also be towing a trailer.

.2 *Semi-trailer*, which means a trailer which is designed to be coupled to a semi-trailer towing vehicle and to impose a substantial part of its total mass on the towing vehicle.

.3 *Road train*, which means the combination of a motor vehicle with one or more independent trailers connected by a drawbar (for the purpose of section 5 each element of a road train is considered a separate vehicle).

.4 *Articulated road train*, which means the combination of a semi-trailer towing vehicle with a semi-trailer.

.5 *Combination of vehicles*, which means a motor vehicle coupled with one or more towed vehicles (for the purpose of section 5 each element of a combination of vehicles is considered a separate vehicle).

## 4 Securing points on ships' decks

4.1 The ship should carry a Cargo Securing Manual in accordance with resolution A.489(XII) containing the information listed and recommended in paragraph 10 of the annex to that resolution.

4.2 The decks of a ship intended for road vehicles as defined in 3.2 should be provided with securing points. The arrangement of securing points should be left to the discretion of the shipowner provided that for each road vehicle or element of a combination of road vehicles there is the following minimum arrangement of securing points:

.1 The distance between securing points in the longitudinal direction should in general not exceed 2.5 m. However, there may be a need for the securing points in the forward and after parts of the ship to be more closely spaced than they are amidships.

.2 The athwartships spacing of securing points should not be less than 2.8 m nor more than 3 m. However, there may be a need for the securing points in the forward and after parts of the ship to be more closely spaced than they are amidships.

.3 The maximum securing load (MSL) of each securing point should be not less than 100 kN. If the securing point is designed to accommodate more than one lashing (y lashings), the MSL should be not less than y x 100 kN.

4.3 In ro-ro ships which only occasionally carry road vehicles, the spacing and strength of securing points should be such that the special considerations which may be necessary to stow and secure road vehicles safely are taken into account.

## 5 Securing points on road vehicles

5.1 Securing points on road vehicles should be designed for securing the road vehicles to the ship and should have an aperture capable of accepting only one lashing. The securing point and aperture should permit varying directions of the lashing to the ship's deck.[2]

5.2 The same number of not less than two or not more than six securing points should be provided on each side of the road vehicle in accordance with the provisions of 5.3.

5.3 Subject to the provisions of notes 1, 2 and 3 below, the minimum number and minimum strength of securing points should be in accordance with the following table:

| Gross vehicle mass (GVM) tonnes | Minimum number of securing points on each side of the road vehicle | Minimum strength without permanent deformation of each securing point as lifted (kN) |
|---|---|---|
| 3.5 t ≤ GVM ≤ 20 t<br>20 t < GVM ≤ 30 t<br>30 t < GVM ≤ 40 t | 2<br>3<br>4 | $\frac{\text{GVM} \times 10 \times 1.2}{n^*}$ |

** Where n is the total number of securing points on each side of the road vehicle.*

*Note 1: For road trains, the table applies to each component, i.e. to the motor vehicle and each trailer, respectively.*

*Note 2: Semi-trailer towing vehicles are excluded from the table above. They should be provided with two securing points at the front of the vehicle, the strength of which should be sufficient to prevent lateral movement of the front of the vehicle. A towing coupling at the front may replace the two securing points.*

*Note 3: If the towing coupling is used for securing vehicles other than semi-trailer towing vehicles, this should not replace or be substituted for the above-mentioned minimum number and strength of securing points on each side of the vehicle.*

5.4 Each securing point on the vehicle should be marked in a clearly visible colour.

5.5 Securing points on vehicles should be so located as to ensure effective restraint of the vehicle by the lashings.

5.6 Securing points should be capable of transferring the forces from the lashings to the chassis of the road vehicle and should never be fitted to bumpers or axles unless these are specially constructed and the forces are transmitted directly to the chassis.

5.7 Securing points should be so located that lashings can be readily and safely attached, particularly where side-guards are fitted to the vehicle.

5.8 The internal free passage of each securing point's aperture should be not less than 80 mm, but the aperture need not be circular in shape.

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[2] If more than one aperture is provided at a securing point, each aperture should have the strength for the securing point in the table in 5.3.

5.9 Equivalent or superior securing arrangements may be considered for vehicles for which the provisions of table 5.3 are unsuitable.

## 6 Lashings

6.1 The maximum securing load (MSL) of lashings should in general not be less than 100 kN and lashings should be made of material having suitable elongation characteristics. However, the required number and MSL of lashings may be calculated according to annex 13 to the Code of Safe Practice for Cargo Stowage and Securing (CSS Code), taking into consideration the criteria mentioned in paragraph 1.5.1 of the CSS Code.

6.2 Lashings should be so designed and attached that, provided there is safe access, it is possible to tighten them if they become slack. Where practicable and necessary, the lashings should be examined at regular intervals during the voyage and tightened as necessary.

6.3 Lashings should be attached to the securing points with hooks or other devices so designed that they cannot disengage from the aperture of the securing point if the lashing slackens during the voyage.

6.4 Only one lashing should be attached to any one aperture of the securing point on the vehicle.

6.5 Lashings should only be attached to the securing points provided for that purpose.

6.6 Lashings should be attached to the securing points on the vehicle in such a way that the angle between the lashing and the horizontal and vertical planes lies preferably between 30°and 60°.

6.7 Bearing in mind the characteristics of the ship and the weather conditions expected on the intended voyage, the master should decide on the number of securing points and lashings to be used for each voyage.

6.8 Where there is doubt that a road vehicle complies with the provisions of table 5.3, the master may, at his or her discretion, load the vehicle on board, taking into account the apparent condition of the vehicle, the weather and sea conditions expected on the intended voyage and all other circumstances.

## 7 Stowage

7.1 Depending on the area of operation, the predominant weather conditions and the characteristics of the ship, road vehicles should be stowed so that the chassis are kept as static as possible by not allowing free play in the suspension of the vehicles. This can be done, for example, by compressing the springs by tightly securing the vehicle to the deck, by jacking up the chassis prior to securing the vehicle or by releasing the air pressure on compressed air suspension systems.

7.2 Taking into account the conditions referred to in 7.1 and the fact that compressed air suspension systems may lose air, the air pressure should be released on every vehicle fitted with such a system if the voyage is of more than 24 hours duration. If practicable, the air pressure should be released also on voyages of a shorter duration. If the air pressure is not released, the vehicle should be jacked up to prevent any slackening of the lashings resulting from any air leakage from the system during the voyage.

7.3 Where jacks are used on a vehicle, the chassis should be strengthened in way of the jacking-up points and the position of the jacking-up points should be clearly marked.

7.4 Special consideration should be given to the securing of road vehicles stowed in positions where they may be exposed to additional forces. Where vehicles are stowed athwartship, special consideration should be given to the forces which may arise from such stowage.

7.5 Wheels should be chocked to provide additional security in adverse conditions.

7.6 Vehicles with diesel engines should not be left in gear during the voyage.

7.7 Vehicles designed to transport loads likely to have an adverse effect on their stability, such as hanging meat, should have integrated in their design a means of neutralizing the suspension system.

7.8 Stowage should be arranged in accordance with the following:

.1 The parking brakes of each vehicle or of each element of a combination of vehicles should be applied and locked.

.2 Semi-trailers, by the nature of their design, should not be supported on their landing legs during sea transport unless the landing legs are specially designed for that purpose and so marked. An uncoupled semi-trailer should be supported by a trestle or similar device placed in the immediate area of the drawplate so that the connection of the fifth-wheel to the kingpin is not restricted. Semi-trailer designers should consider the space and the reinforcements required and the selected areas should be clearly marked.

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**ANNEX 10**

**RESOLUTION MSC.480(102)**
**(adopted on 11 November 2020)**

**PERFORMANCE STANDARDS FOR SHIPBORNE JAPANESE QUASI-ZENITH SATELLITE SYSTEM (QZSS) RECEIVER EQUIPMENT**

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 function of adopting performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee and/or the Marine Environment Protection Committee, as appropriate, on behalf of the Organization,

RECALLING FURTHER that, in accordance with resolution A.1046(27), containing the "Revised Report on the Study of a Worldwide Radionavigation System", adopted as the IMO policy for the recognition and acceptance of suitable radionavigation systems intended for international use, the Japanese Quasi-Zenith Satellite System (QZSS) may be recognized as a possible component of the worldwide radionavigation system,

NOTING that shipborne receiving equipment for the worldwide radionavigation system should be designed to satisfy the detailed requirements of the particular system concerned,

RECOGNIZING the need to develop performance standards for shipborne Japanese QZSS receiver equipment in order to ensure the operational reliability of such equipment and taking into account the technological progress and experience gained,

HAVING CONSIDERED, at its 102nd session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue, at its seventh session,

1 ADOPTS the *Performance standards for shipborne Japanese Quasi-Zenith Satellite System (QZSS) receiver equipment*, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that shipborne Japanese QZSS receiver equipment installed on or after 1 January 2024 conforms to performance standards not inferior to those specified in the annex to the present resolution.

ANNEX

**PERFORMANCE STANDARDS FOR SHIPBORNE
JAPANESE QUASI-ZENITH SATELLITE SYSTEM (QZSS) RECEIVER EQUIPMENT**

## 1 Introduction

1.1 QZSS is a regional navigation satellite system compatible and interoperable with other navigation satellite systems worldwide. QZSS is a system independently developed and operated by Japan and is comprised of three major components: space constellation, ground control segment and user terminals. At the time of QZSS 4-satellite constellation, there are three quasi-zenith orbit (QZO) satellites and one geostationary orbit (GEO) satellite. QZO is the inclined geosynchronous orbit (IGSO) with a slight eccentricity. QZO satellites have different orbital planes from one another that are inclined at about 40° and elliptical. The centre of longitude at three QZO orbit is around 139° E. Three QZO satellites have an orbital plane phase that has been adjusted so that they have almost the same ground track and the orbital period of QZO is the same as GEO. GEO satellite is positioned at 127° E. At the time of QZSS 7-satellite constellation, two QZO satellites and one GEO satellite will be added in 4-satellite constellation. Each satellite transmits standard positioning service signal on "L1" and "L5" bands with carrier frequencies as 1 575.42 MHz and 1 176.45 MHz, respectively. Standard positioning signals include ranging codes which are defined in the GPS IS documents, i.e. using the same code sequences as GPS pseudo random noise (PRN) codes and can provide the open service. A navigation data message is superimposed on these codes. QZSS satellites are identified by PRN codes. QZSS can be used in combination with GPS.

1.2 QZSS provides positioning, navigation and timing (PNT) service, free of direct user charges. QZSS receiver equipment should be capable of receiving and processing the standard service signal.

1.3 QZSS receiver equipment intended for navigation purposes on ships with a speed not exceeding 70 knots, in addition to the general requirements specified in resolution A.694(17),[1] should comply with the minimum performance requirements set out below.

1.4 The standards cover the basic requirements of position fixing, determination of course over ground (COG), speed over ground (SOG) and timing, either for navigation purposes or as input to other functions. The standards do not cover other computational facilities which may be in the equipment nor do they cover the requirements for other systems that may take input from the QZSS receiver.

1.5 It should be noted that this is the regional navigation satellite system being recognized as a future component of the Worldwide Radionavigation System (WWRNS) and the service is limited to the following coverage area:

Coverage area: Asia-Oceania region area, as enclosed by the following coordinates:

| | | |
|---|---|---|
| A | 56°45'.28 N, | 143°43'.24 E |
| B | 13°22'.78 N, | 173°23'.09 E |
| C | 04°18'.48 S, | 173°23'.09 E |
| D | 59°59'.28 S, | 139°47'.72 E |
| E | 44°46'.28 S, | 095°06'.47 E |
| F | 03°21'.83 S, | 082°32'.05 E |
| G | 31°03'.91 N, | 093°58'.10 E |

[1] Refer to publication IEC 60945.

1.6 Figure 1 shows the coverage area of QZSS PNT service.

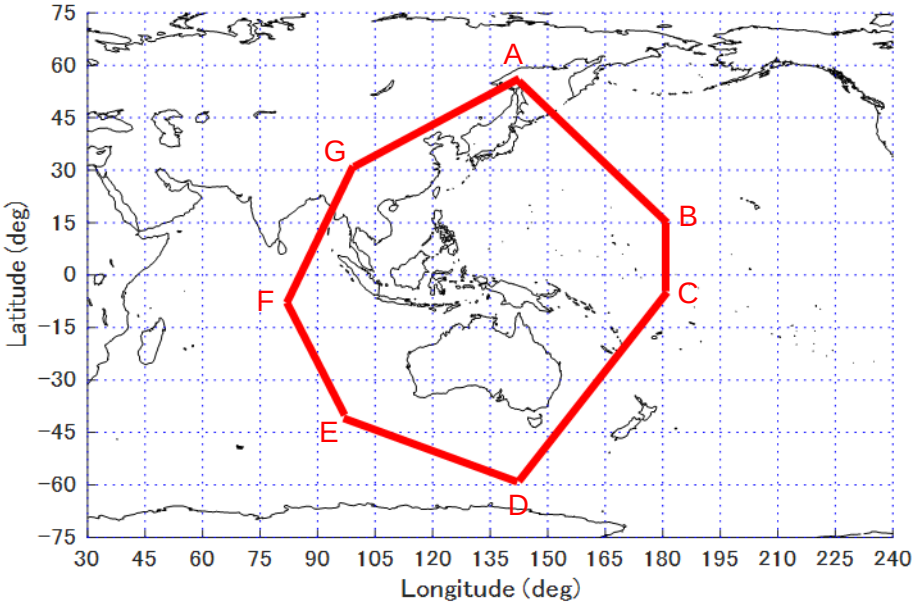


**Figure 1: Coverage area of QZSS PNT Service**

## 2 QZSS receiver equipment

2.1 The term "QZSS receiver equipment", as used in the performance standards, includes all the components and units necessary for the system to properly perform its intended functions. QZSS receiver equipment should include the following minimum facilities:

.1 antenna capable of receiving QZSS signals;

.2 QZSS receiver and processor;

.3 means of accessing the computed latitude/longitude position;

.4 data control and interface; and

.5 position display and, if required, other forms of output.

2.2 The antenna design should be suitable for fitting at a position on the ship which ensures a clear view of the satellite constellation, taking into consideration any obstructions that might exist on the ship.

## 3 Performance standards for QZSS receiver equipment

QZSS receiver equipment should:

.1 be capable of receiving and processing the QZSS navigation signals, and use the ionospheric model;

.2 provide position information based upon ITRF or WGS-84 coordinates and should be in accordance with international standards;[2]

[2] Publication IEC 61162.

.3 provide time referenced to Universal Time Coordinated (UTC);

.4 be provided with at least one output from which position information, UTC, COG, SOG and alarms can be supplied to other equipment. The output of UTC, COG, SOG and alarms should be consistent with the requirements of paragraph 3.15;

.5 have static accuracy such that, for the service area in figure 1 where a horizontal dilution of precision (HDOP) is equal to or less than 6.7, the position of the antenna is determined to be within 50.4 m horizontal (95%);

.6 have dynamic accuracy under the conditions of sea states and ships' motion likely to be experienced in ships,[3] such that for the service area in figure 1 where a HDOP is equal to or less than 6.7, the position of the antenna is determined to within 50.4 m horizontal (95%);

.7 have position information in latitude and longitude in degrees, minutes and thousandths of minutes with a position resolution equal to or better than 0.001 min of latitude and longitude;

.8 be capable of selecting automatically the appropriate satellite-transmitted signals to determine the ship's position and velocity, and time with the required accuracy and update rate;

.9 be capable of acquiring satellite signals with input signals having carrier levels in the range of -134 dBm to -124 dBm. Once the satellite signals have been acquired, the equipment should continue to operate satisfactorily with satellite signals having carrier levels down to -137 dBm;

.10 be capable of operating satisfactorily under normal interference conditions consistent with the requirements of resolution A.694(17);

.11 be capable of acquiring position to the required accuracy, within 30 min, when there is no valid almanac data;

.12 be capable of acquiring position to the required accuracy, within 5 min, when there is valid almanac data;

.13 be capable of re-acquiring position to the required accuracy, within 2 min, when subjected to a power interruption of up to 60 s;

.14 generate and output to a display and digital interface[4] a new position solution at least once every 1 s for conventional craft and be recommended at least once every 0.5 s for high-speed craft;

.15 provide the COG, SOG and UTC outputs with a validity mark aligned with that on the position output. The accuracy requirements for COG and SOG should not be inferior to the relevant performance standards for heading[5] and

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3 Refer to resolution A.694(17) and publications IEC 6721-3-6 and IEC 60945.

4 Conforming to the IEC 61162 series.

5 Refer to resolution A.424(XI) for conventional craft and resolution A.821(19) for high-speed craft.

speed and distance measuring equipment (SDME)[6] and the accuracy should be obtained under the various dynamic conditions that could be experienced on board ships; and

.16 have the facilities to process augmentation data. When a QZSS receiver is equipped to process augmentation data, performance standards for static and dynamic accuracies should be less than 10 m (95%).

## 4 Integrity checking, failure warnings and status indication

4.1 QZSS receiver equipment should indicate whether the performance of QZSS is likely to be outside the bounds of requirements for general navigation.

4.2 QZSS receiver equipment should, as a minimum:

.1 provide a warning within 5 s of loss of position or if a new position based on the information provided has not been calculated for more than 1 s. Under such conditions, the last known position and the time of last valid fix, with the explicit indication of the state allowing for no ambiguity, should be output until normal operation is resumed; and

.2 use receiver autonomous integrity monitoring to provide integrity performance appropriate to the operation being undertaken.

## 5 Protection

Precautions should be taken to ensure that no permanent damage can result from an accidental short circuit or grounding of the antenna or any of its input or output connections or any of the QZSS receiver equipment inputs or outputs for a duration of 5 min.

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[6] Refer to resolution A.824(19).

**ANNEX 11**

**DRAFT ASSEMBLY RESOLUTION**

**GUIDELINES FOR VESSEL TRAFFIC SERVICES**

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 and the prevention and control of marine pollution from ships,

RECALLING ALSO regulation V/12 of the International Convention on Safety of Life at Sea, 1974 ("the Convention"), on vessel traffic services,

BEARING IN MIND the responsibility of Governments for the safety of navigation and protection of the marine environment in areas under their jurisdiction,

BEING AWARE that vessel traffic services are provided worldwide and make a valuable contribution to safety of navigation, improved efficiency of traffic flow and the protection of the marine environment,

RECOGNIZING that various organizational, operational and technological developments have taken place globally in a rapidly changing maritime domain since the adoption, in 1997, of resolution A.857(20) on *Guidelines for vessel traffic services* and that a revision of those Guidelines became necessary,

RECOGNIZING ALSO that the level of safety and efficiency in the movement of maritime traffic within an area covered by vessel traffic services is dependent upon close cooperation between those operating the vessel traffic services and participating ships,

RECOGNIZING FURTHER that the use of differing procedures may cause confusion to ship masters, and that vessel traffic services should be established and operated in a harmonized manner and in accordance with internationally approved guidelines,

NOTING that the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) has contributed significantly to the development of internationally harmonized guidance for vessel traffic services,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its 102nd session,

1 ADOPTS the revised *Guidelines for vessel traffic services*, set out in the annex to the present resolution;

2 RECOMMENDS Contracting Governments and Members of the Organization which are not Contracting Governments to the Convention to take into account the Guidelines contained in the annex when planning and implementing vessel traffic services in accordance with regulation V/12 of the Convention;

3 RECOMMENDS Governments to encourage masters of ships navigating in an area for which a vessel traffic service is provided to make use of such a service;

4 AUTHORIZES the Maritime Safety Committee to keep the aforementioned Guidelines under review and amend them, as appropriate;

5 REVOKES resolution A.857(20).

ANNEX

# GUIDELINES FOR VESSEL TRAFFIC SERVICES

## 1 INTRODUCTION

1.1 These Guidelines are associated with regulation V/12 of the International Convention on Safety of Life at Sea, 1974 ("the Convention") and should be taken into account by Contracting Governments to the Convention when planning, implementing and operating vessel traffic services (VTS) under national law**.** Members of the Organization which are not Contracting Governments to the Convention are also encouraged to take these Guidelines into account.

1.2 IMO, in its role in regulating the planning, implementation and operation of VTS, is responsible for providing guidance on their establishment, operation, qualification and training. This includes a leadership role in providing a forum and framework for cooperation among Governments to facilitate the consistent and harmonized delivery of VTS worldwide.

1.3 IALA is recognized as an important contributor to IMO's role and responsibilities relating to VTS.

1.4 In complying with these Guidelines, Contracting Governments should take account of applicable IMO instruments and refer to the relevant international guidance prepared and published by appropriate international organizations.

## 2 TERMS AND DEFINITIONS

The following terms are used in connection with vessel traffic services:

.1 *Vessel traffic services (VTS)* means services implemented by a Government with the capability to interact with vessel traffic and respond to developing situations within a VTS area to improve safety and efficiency of navigation, contribute to the safety of life at sea and support the protection of the environment.

.2 *Competent authority* means the entity made responsible by the Government for vessel traffic services.

.3 *VTS provider* means the organization or entity authorized by the Government or competent authority to provide vessel traffic services.

.4 *VTS area* means the delineated, formally declared area for which the VTS provider is authorized to deliver vessel traffic services.

.5 *VTS personnel* means persons performing tasks associated with vessel traffic services, trained in vessel traffic services operations and appropriately qualified.

.6 *Allied services* means services other than vessel traffic services involved in the safe and efficient passage of a ship through a VTS area, such as pilotage, tugs and linesmen.

.7 *Participating ship* means a ship required to participate with vessel traffic services.

## 3 PURPOSE OF VESSEL TRAFFIC SERVICES

3.1 The purpose of VTS is to contribute to the safety of life at sea, improve the safety and efficiency of navigation and support the protection of the environment within a VTS area by mitigating the development of unsafe situations through:

.1 providing timely and relevant information on factors that may influence ship movements and assist onboard decision-making. This may include:

.1 position, identity, intention and movements of ships;

.2 maritime safety information;

.3 limitations of ships in the VTS area that may impose restrictions on the navigation of other ships (e.g. manoeuvrability), or any other potential hindrances;

.4 other information such as reporting formalities and International Ship and Port Facility Security Code (ISPS Code) details; and

.5 support for, and cooperation with, allied services;

.2 monitoring and managing ship traffic to ensure the safety and efficiency of ship movements. This may include:

.1 planning ship movements in advance;

.2 organizing ships under way;

.3 organizing space allocation;

.4 establishing a system of traffic clearances;

.5 establishing a system of voyage or passage plans;

.6 providing route advice; and

.7 ensuring compliance with and enforcement of regulatory provisions for which they are empowered;

.3 responding to developing unsafe situations, which may include:

.1 a ship unsure of its route or position;

.2 a ship deviating from the route;

.3 a ship requiring guidance to an anchoring position;

.4 a ship that has defects or deficiencies, such as navigation or manoeuvring equipment failure;

.5 severe meteorological conditions (e.g. low visibility, strong winds);

.6 a ship at risk of grounding or collision; and

.7 emergency response or support for emergency services.

3.2 To achieve their purpose, VTS should provide information or issue advice, warnings and instructions, as deemed necessary.

## 4 REGULATORY AND LEGAL FRAMEWORK

4.1 VTS are recognized internationally as a navigational safety measure through regulation V/12 of the Convention.

4.2 Under the general provisions of treaty law and of IMO conventions, Contracting Governments are responsible for promulgating laws and regulations and for taking all other steps which may be necessary to give those instruments full and complete effect.

4.3 The establishment of VTS is dependent on national law and relevant international conventions, recognizing factors such as the volume of traffic, degree of risk, and geographical and environmental conditions.

4.4 VTS may be established in association with IMO adopted ships' routeing systems or mandatory ship reporting systems, in accordance with regulations V/10 and V/11 of the Convention, respectively.

4.5 VTS may also be established beyond the territorial seas of a coastal State to provide information and advice on the basis of voluntary participation.

4.6 Contracting Governments should ensure that ships flying their flag comply with the requirements of VTS. Those Contracting Governments which have received information of an alleged violation of VTS by a ship flying their flag should provide the Government which has reported the offence with details of any appropriate action taken.

## 5 VESSEL TRAFFIC SERVICES RESPONSIBILITIES

5.1 The Contracting Government should:

.1 establish a legal basis for VTS that gives effect to regulation V/12 of the Convention;

.2 appoint and authorize a competent authority for VTS;

.3 take appropriate action against a ship flying its flag that is reported not to have complied with the provisions of VTS; and

.4 take account of future technical and other developments recognized by the Organization relating to VTS.

5.2 The competent authority for VTS should:

.1 establish a regulatory framework for establishing and operating VTS in accordance with relevant international conventions and IMO instruments, IALA standards and national law;

.2 authorize VTS providers to operate VTS within a delineated VTS area;

.3 ensure that VTS training is approved and VTS personnel are certified; and

.4 establish a compliance and enforcement framework with respect to violations of VTS regulatory requirements.

5.3 The VTS provider should:

.1 ensure that VTS conform with the regulatory framework set by the competent authority for VTS;

.2 set operational objectives for VTS that are consistent with improving the safety and efficiency of ship traffic and the protection of the environment. The objectives set should be routinely evaluated to demonstrate that they are being achieved;

.3 ensure that appropriate equipment, systems and facilities for the delivery of VTS are provided;

.4 ensure that VTS are adequately staffed and that VTS personnel are appropriately trained and qualified; and

.5 ensure that information regarding requirements and procedures of VTS and the categories of ships required to participate in VTS are promulgated in appropriate nautical publications.

## 6 PARTICIPATING SHIPS

6.1 In a VTS area, participating ships should:

.1 provide reports or information required by VTS;

.2 take into account the information provided, or advice and warnings issued, by VTS;

.3 comply with the requirements and instructions given to the ship by VTS unless contradictory safety or marine environment protection reasons exist; and

.4 report any pollution or dangers to navigation to VTS.

6.2 Ships not designated as participating ships may take part in VTS, subject to complying with the requirements of VTS and any guidance issued by the VTS provider.

6.3 Masters may be required to report on their actions should they decide to disregard any instruction given by VTS.

## 7 GENERAL PRINCIPLES

7.1 Nothing in these Guidelines changes the ultimate responsibility of the master for all aspects of the operation of the ship including the responsibility for safe navigation.

7.2 The need for VTS should be assessed and reviewed through risk assessment.

7.3 VTS communications should be timely, clear, concise and unambiguous.

7.4 VTS operate within a comprehensive environment in which ships, ports, allied services and other organizations fulfil their respective roles, as appropriate.

7.5 Effective harmonized data exchange and information-sharing is fundamental to the overall operational efficiency and safety. VTS providers are encouraged to make use of automated reporting where possible.

7.6 VTS operations should be harmonized with ship reporting systems, ships' routeing measures and allied services, as appropriate.

7.7 Where two or more Governments have a common interest in establishing VTS in a particular area, they should develop coordinated VTS on the basis of an agreement between them. Where coordinated VTS are established, they should have uniform procedures and operations.

## 8 QUALIFICATIONS AND TRAINING

8.1 A major factor in the operation of VTS is the competence of their personnel.

8.2 VTS personnel should only be considered competent when appropriately trained and qualified for their VTS duties. This includes:

.1 satisfactorily completing generic VTS training approved by a competent authority;

.2 satisfactorily completing on-the-job training at the VTS where the personnel are employed;

.3 undergoing periodic assessments and revalidation training to ensure competence is maintained; and

.4 being in possession of appropriate certification.

## 9 IALA STANDARDS

9.1 IALA publishes standards and associated recommendations, guidelines and model courses specifically related to the establishment and operation of VTS to contribute to achieving worldwide harmonization of VTS.

9.2 Contracting Governments are encouraged to take into account IALA standards and associated recommendations, guidelines and model courses.

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**ANNEX 12**

**RESOLUTION MSC.429(98)/REV.2**
**(adopted on 11 November 2020)**

**REVISED EXPLANATORY NOTES TO THE SOLAS CHAPTER II-1 SUBDIVISION AND DAMAGE STABILITY REGULATIONS**

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO that, by resolution MSC.216(82), it adopted the regulations on subdivision and damage stability as contained in SOLAS chapter II-1 which are based on the probabilistic concept, using the probability of survival after collision as a measure of ships' safety in a damaged condition,

NOTING that, at its eighty-second session, it approved *Interim explanatory notes to the SOLAS chapter II-1 subdivision and damage stability regulations* (MSC.1/Circ.1226), to assist Administrations in the uniform interpretation and application of the aforementioned subdivision and damage stability regulations,

NOTING ALSO that, at its eighty-fifth session, it adopted the *Explanatory notes to the SOLAS chapter II-1 subdivision and damage stability regulations* (resolution MSC.281(85)),

NOTING FURTHER that, by resolution MSC.421(98), it adopted amendments to regulations on subdivision and damage stability, as contained in SOLAS chapter II-1, and in conjunction with the adoption of the aforementioned amendments, adopted the Revised Explanatory Notes to the SOLAS chapter II-1 subdivision and damage stability regulations, by resolution MSC.429(98),

NOTING that, by resolution MSC.474(102), it adopted additional amendments to regulations on subdivision and damage stability, as contained in SOLAS chapter II-1,

RECOGNIZING that the consolidated Revised Explanatory Notes should be adopted in conjunction with the adoption of the aforementioned amendments to subdivision and damage stability regulations,

RECOGNIZING ALSO that the appropriate application of the Revised Explanatory Notes is essential for ensuring the uniform application of the SOLAS chapter II-1 subdivision and damage stability regulations,

HAVING CONSIDERED, at its 102nd session, the recommendations made by the Sub-Committee on Ship Design and Construction, at its seventh session,

1 ADOPTS the consolidated *Revised explanatory notes to the SOLAS chapter II-1 subdivision and damage stability regulations* set out in the annex to the present resolution;

2 URGES Contracting Governments and all parties concerned to utilize the consolidated Revised Explanatory Notes when applying the SOLAS chapter II-1 subdivision and damage stability regulations adopted by resolution MSC.216(82), as amended;

3 INVITES Contracting Governments to note that these consolidated Revised Explanatory Notes should take effect on 1 January 2024 and should apply to ships as defined in SOLAS regulation II-1/1.1.1.1;

4 REVOKES resolution MSC.429(98)/Rev.1 on 1 January 2024.

ANNEX

# REVISED EXPLANATORY NOTES TO THE SOLAS CHAPTER II-1 SUBDIVISION AND DAMAGE STABILITY REGULATIONS

## Contents

## PART A

## INTRODUCTION

1 The harmonized SOLAS regulations on subdivision and damage stability, as contained in SOLAS chapter II-1, are based on a probabilistic concept which uses the probability of survival after collision as a measure of ships' safety in a damaged condition. This probability is referred to as the "attained subdivision index *A*" in the regulations. It can be considered an objective measure of ships' safety and, ideally, there would be no need to supplement this index by any deterministic requirements.

2 The philosophy behind the probabilistic concept is that two different ships with the same attained index are of equal safety and, therefore, there is no need for special treatment of specific parts of the ship, even if they are able to survive different damages. The only areas which are given special attention in the regulations are the forward and bottom regions, which are dealt with by special subdivision rules provided for cases of ramming and grounding.

3 Only a few deterministic elements, which were necessary to make the concept practicable, have been included. It was also necessary to include a deterministic "minor damage" on top of the probabilistic regulations for passenger ships to avoid ships being designed with what might be perceived as unacceptably vulnerable spots in some part of their length.

4 It is easily recognized that there are many factors that will affect the final consequences of hull damage to a ship. These factors are random and their influence is different for ships with different characteristics. For example, it would seem obvious that in ships of similar size carrying different amounts of cargo, damages of similar extents may lead to different results because of differences in the range of permeability and draught during service. The mass and velocity of the ramming ship is obviously another random variable.

5 Owing to this, the effect of a three-dimensional damage to a ship with given watertight subdivision depends on the following circumstances:

.1 which particular space or group of adjacent spaces is flooded;

.2 the draught, trim and intact metacentric height at the time of damage;

.3 the permeability of affected spaces at the time of damage;

.4 the sea state at the time of damage; and

.5 other factors such as possible heeling moments owing to unsymmetrical weights.

6 Some of these circumstances are interdependent and the relationship between them and their effects may vary in different cases. Additionally, the effect of hull strength on penetration will obviously have some effect on the results for a given ship. Since the location and size of the damage is random, it is not possible to state which part of the ship becomes flooded. However, the probability of flooding a given space can be determined if the probability of occurrence of certain damages is known from experience, that is, damage statistics. The probability of flooding a space is then equal to the probability of occurrence of all such damages which just open the considered space to the sea.

7 For these reasons and because of mathematical complexity as well as insufficient data, it would not be practicable to make an exact or direct assessment of their effect on the probability that a particular ship will survive a random damage if it occurs. However, accepting some approximations or qualitative judgments, a logical treatment may be achieved by using the probability approach as the basis for a comparative method for the assessment and regulation of ship safety.

8 It may be demonstrated by means of probability theory that the probability of ship survival should be calculated as the sum of probabilities of its survival after flooding each single compartment, each group of two, three, etc., adjacent compartments multiplied, respectively, by the probabilities of occurrence of such damages leading to the flooding of the corresponding compartment or group of compartments.

9 If the probability of occurrence for each of the damage scenarios the ship could be subjected to is calculated and then combined with the probability of surviving each of these damages with the ship loaded in the most probable loading conditions, we can determine the attained index *A* as a measure for the ship's ability to sustain a collision damage.

10 It follows that the probability that a ship will remain afloat without sinking or capsizing as a result of an arbitrary collision in a given longitudinal position can be broken down to:

.1 the probability that the longitudinal centre of damage occurs in just the region of the ship under consideration;

.2 the probability that this damage has a longitudinal extent that only includes spaces between the transverse watertight bulkheads found in this region;

.3 the probability that the damage has a vertical extent that will flood only the spaces below a given horizontal boundary, such as a watertight deck;

.4 the probability that the damage has a transverse penetration not greater than the distance to a given longitudinal boundary; and

.5 the probability that the watertight integrity and the stability throughout the flooding sequence is sufficient to avoid capsizing or sinking.

11 The first three of these factors are solely dependent on the watertight arrangement of the ship, while the last two depend on the ship's shape. The last factor also depends on the actual loading condition. By grouping these probabilities, calculations of the probability of survival, or attained index *A*, have been formulated to include the following probabilities:

.1 the probability of flooding each single compartment and each possible group of two or more adjacent compartments; and

.2 the probability that the stability after flooding a compartment or a group of two or more adjacent compartments will be sufficient to prevent capsizing or dangerous heeling due to loss of stability or to heeling moments in intermediate or final stages of flooding.

12 This concept allows a rule requirement to be applied by requiring a minimum value of *A* for a particular ship. This minimum value is referred to as the "required subdivision index *R*" in the present regulations and can be made dependent on ship size, number of passengers or other factors legislators might consider important.

13 Evidence of compliance with the rules then simply becomes:

$$A \geq R$$

13.1 As explained above, the attained subdivision index *A* is determined by a formula for the entire probability as the sum of the products for each compartment or group of compartments of the probability that a space is flooded, multiplied by the probability that the ship will not capsize or sink due to flooding of the considered space. In other words, the general formula for the attained index can be given in the form:

$$A = \Sigma p_i s_i$$

13.2 Subscript "*i*" represents the damage zone (group of compartments) under consideration within the watertight subdivision of the ship. The subdivision is viewed in the longitudinal direction, starting with the aftmost zone/compartment.

13.3 The value of "$p_i$" represents the probability that only the zone "*i*" under consideration will be flooded, disregarding any horizontal subdivision, but taking transverse subdivision into account. Longitudinal subdivision within the zone will result in additional flooding scenarios, each with its own probability of occurrence.

13.4 The value of "$s_i$" represents the probability of survival after flooding the zone "*i*" under consideration.

14 Although the ideas outlined above are very simple, their practical application in an exact manner would give rise to several difficulties if a mathematically perfect method were to be developed. As pointed out above, an extensive but still incomplete description of the damage will include its longitudinal and vertical location as well as its longitudinal, vertical and transverse extent. Apart from the difficulties in handling such a five-dimensional random variable, it is impossible to determine its probability distribution very accurately with the presently available damage statistics. Similar limitations are true for the variables and physical relationships involved in the calculation of the probability that a ship will not capsize or sink during intermediate stages or in the final stage of flooding.

15 A close approximation of the available statistics would result in extremely numerous and complicated computations. In order to make the concept practicable, extensive simplifications are necessary. Although it is not possible to calculate the exact probability of survival on such a simplified basis, it has still been possible to develop a useful comparative measure of the merits of the longitudinal, transverse and horizontal subdivision of a ship.

## PART B

## GUIDANCE ON INDIVIDUAL SOLAS CHAPTER II-1 SUBDIVISION AND DAMAGE STABILITY REGULATIONS

### REGULATION 1 – APPLICATION

### Regulation 1.3

1 If a passenger ship built before 1 January 2009 undergoes alterations or modifications of major character, it may still remain under the damage stability regulations applicable to ships built before 1 January 2009.

2 If a passenger ship constructed on or after 1 January 2009 but before the applicable dates in regulation 1.1.1.1[1] undergoes alterations or modifications of major character that do not impact the watertight subdivision of the ship, or only have a minor impact, it may still remain under the damage stability regulations that were applicable when it was constructed. However, if alterations or modifications of major character significantly impact the watertight subdivision of the ship, it should comply with the damage stability regulations in part B-1 applicable when the alterations or modifications of major character are carried out unless the Administration determines that this is not reasonable and practicable, in which case the attained subdivision index *A* should be raised above the original construction required subdivision index *R* as much as practical.

3 Application of MSC.1/Circ.1246 is limited to cargo ships constructed before 1 January 2009.

4 A cargo ship constructed on or after 1 January 2009 of less than 80 m in length that is later lengthened beyond that limit should fully comply with the damage stability regulations according to its type and length.

5 If a passenger ship that has been in domestic service only and never been issued a SOLAS Passenger Ship Safety Certificate is converted to international service, for purposes of the stability requirements in parts B, B-1, B-2, B-3 and B-4 it should be treated as a passenger ship constructed on the date on which such a conversion commences.

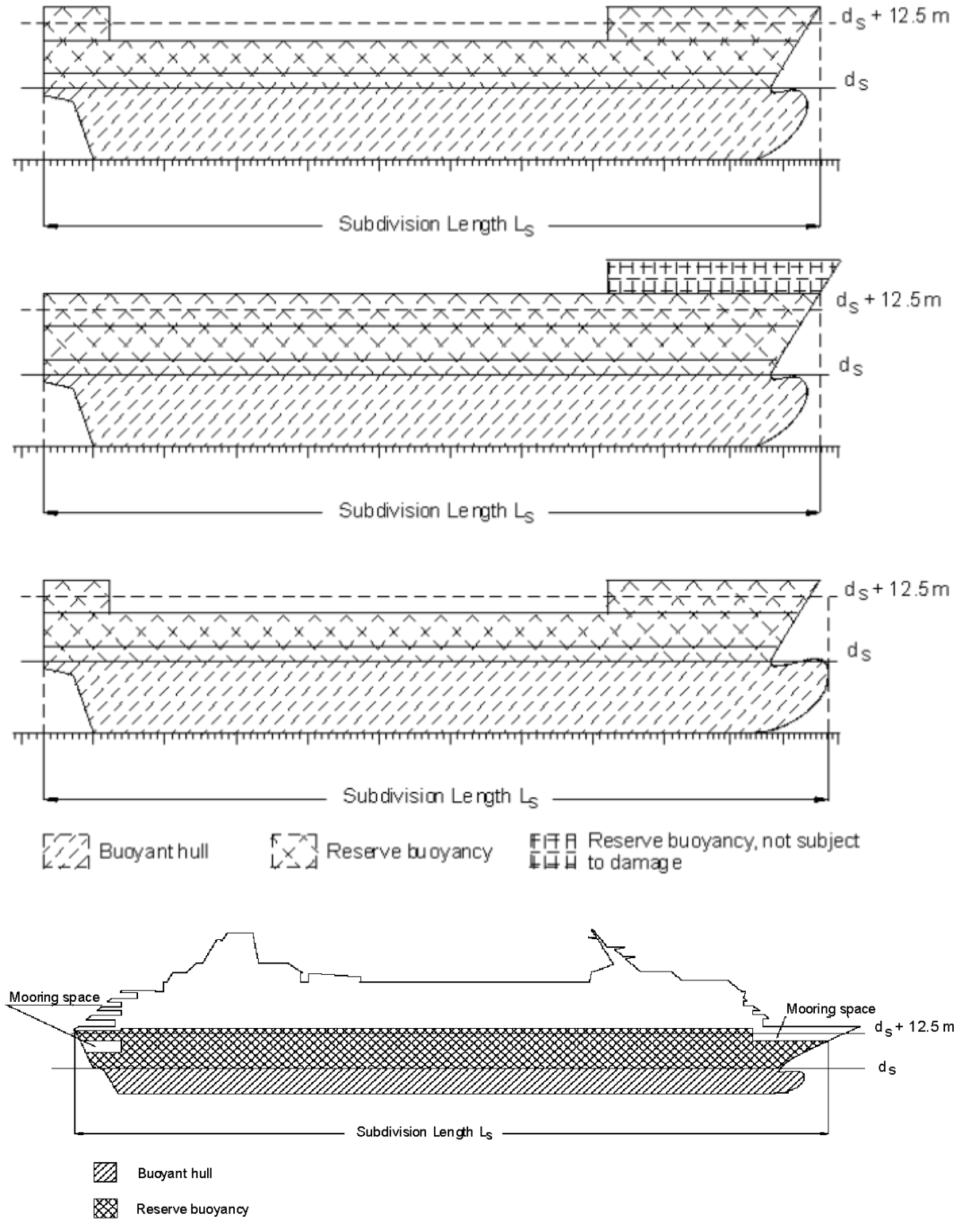
**REGULATION 2 – DEFINITIONS**

**Regulation 2.1**

Subdivision length ($L_s$) – Different examples of $L_s$ showing the buoyant hull and the reserve buoyancy are provided in the figures below. The limiting deck for the reserve buoyancy may be partially watertight.

The maximum possible vertical extent of damage above the baseline is $d_s$ + 12.5 metres.

[1] References to regulations in this Guidance are to regulations of SOLAS chapter II-1, unless expressly provided otherwise.




**Regulation 2.6**

Freeboard deck – See explanatory notes for regulation 13-1 for the treatment of a stepped freeboard deck with regard to watertightness and construction requirements.

**Regulation 2.11**

Light service draught ($d_l$) – The light service draught ($d_l$) corresponds, in general, to the ballast arrival condition with 10% consumables for cargo ships. For passenger ships it corresponds, in general, to the arrival condition with 10% consumables, a full complement of passengers and crew and their effects, and ballast as necessary for stability and trim. Any temporary ballast water exchange conditions for compliance with the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 or any non-service conditions, such as dry-docking, should not be taken as $d_l$.

**Regulation 2.19**

Bulkhead deck – See explanatory notes for regulation 13 for the treatment of a stepped bulkhead deck with regard to watertightness and construction requirements.

**REGULATION 4 – GENERAL**

**Regulation 4.5**

See explanatory notes for regulation 7-2.2, for information and guidance related to these provisions.

**REGULATION 5 – INTACT STABILITY**

**Regulation 5.2**

1 For the purpose of this regulation, a sister ship means a cargo ship built by the same shipyard from the same plans.

2 For any new sister ship with known differences from the lead sister ship that do not exceed the lightship displacement and longitudinal centre of gravity deviation limits specified in regulation 5.2, a detailed weights and centres of gravity calculation to adjust the lead sister ship's lightship properties should be carried out. These adjusted lead sister ship lightship properties are then used for comparison to the new sister ship's lightweight survey results. However, in cases when the known differences from the lead sister ship exceed lightship displacement or longitudinal centre of gravity deviation limits specified in regulation 5.2, the ship should be inclined.

3 When the lightweight survey results do not exceed the specified deviation limits, the lightship displacement and the longitudinal and transverse centres of gravity obtained from the lightweight survey should be used in conjunction with the higher of either the lead sister ship's vertical centre of gravity or the calculated, adjusted value.

4 Regulation 5.2 may be applied to the SPS Code ships certified to carry less than 240 persons.

**Regulation 5.4**

1 When alterations are made to a ship in service that result in calculable differences in the lightship properties, a detailed weights and centres of gravity calculation to adjust the lightship properties should be carried out. If the adjusted lightship displacement or longitudinal centre of gravity, when compared to the approved values, exceeds one of the deviation limits specified in regulation 5.5, the ship should be re-inclined. In addition, if the adjusted lightship vertical centre of gravity, when compared to the approved value, exceeds 1%, the ship should be re-inclined. The lightship transverse centre of gravity is not subject to a deviation limit.

2 When a ship does not exceed the deviation limits specified in explanatory note 1 above, amended stability information should be provided to the master using the new calculated lightship properties if any of the following deviations from the approved values are exceeded:

.1 1% of the lightship displacement; or

.2 0.5% of L for the longitudinal centre of gravity; or

.3 0.5% of the vertical centre of gravity.

However, in cases when these deviation limits are not exceeded, it is not necessary to amend the stability information supplied to the master.

3 When multiple alterations are made to a ship in service over a period of time and each alteration is within the deviation limits specified above, the cumulative total changes to the lightship properties from the most recent inclining also should not exceed the deviation limits specified above or the ship should be re-inclined.

**Regulation 5.5**

When the lightweight survey results do not exceed the specified deviation limits, the lightship displacement and the longitudinal and transverse centres of gravity obtained from the lightweight survey should be used in conjunction with the vertical centre of gravity derived from the most recent inclining in all subsequent stability information supplied to the master.

**REGULATION 5-1 – STABILITY INFORMATION TO BE SUPPLIED TO THE MASTER**

**Regulation 5-1.3**

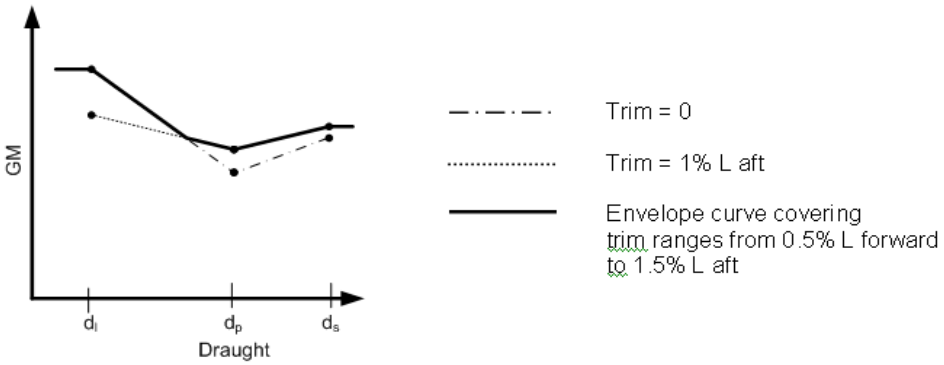
The requirement that applied trim values shall coincide in all stability information intended for use on board is intended to address initial stability calculations as well as those that may be necessary during the service life of the ship.

**Regulation 5-1.4 (see also regulation 7.2)**

1 Linear interpolation of the limiting values between the draughts $d_s$, $d_p$ and $d_l$ is only applicable to minimum *GM* values. If it is intended to develop curves of maximum permissible *KG*, a sufficient number of $KM_T$ values for intermediate draughts should be calculated to ensure that the resulting maximum *KG* curves correspond with a linear variation of *GM*. When light service draught is not with the same trim as other draughts, $KM_T$ for draughts between partial and light service draught should be calculated for trims interpolated between trim at partial draught and trim at light service draught.

2 In cases where the operational trim range is intended to exceed ±0.5% of *L*, the original *GM* limit line should be designed in the usual manner with the deepest subdivision draught and partial subdivision draught calculated at level trim and estimated service trim used for the light service draught. Then additional sets of *GM* limit lines should be constructed on the basis of the operational range of trims which is covered by loading conditions for each of the three draughts $d_s$, $d_p$ and $d_l$ ensuring that intervals of 1% *L* are not exceeded. The sets of *GM* limit lines are combined to give a single envelope limiting *GM* curve. The effective trim range of the curve should be clearly stated.

3 If multiple *GM* limiting curves are obtained from damage stability calculations of differing trims in accordance with regulation 7, an envelope curve covering all calculated trim values should be developed. Calculations covering different trim values should be carried out in steps not exceeding 1% of *L*. The whole range including intermediate trims should be covered by the damage stability calculations. Refer to the example showing an envelope curve obtained from calculations of 0 trim and 1% of *L*.

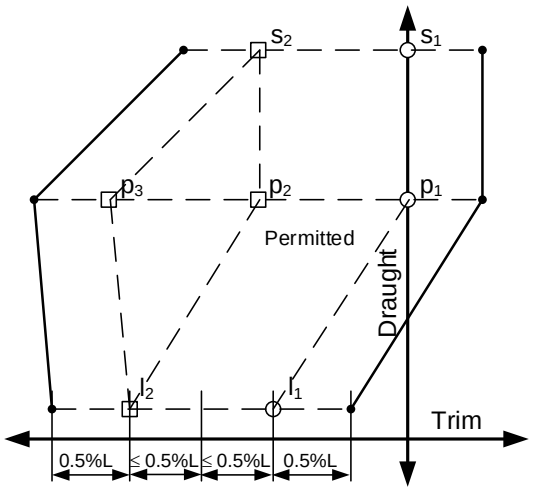



4 Temporary loading conditions may occur with a draught less than the light service draught $d_l$ due to ballast water exchange requirements, etc. In these cases, for draughts below $d_l$, the *GM* limit value at $d_l$ is to be used.

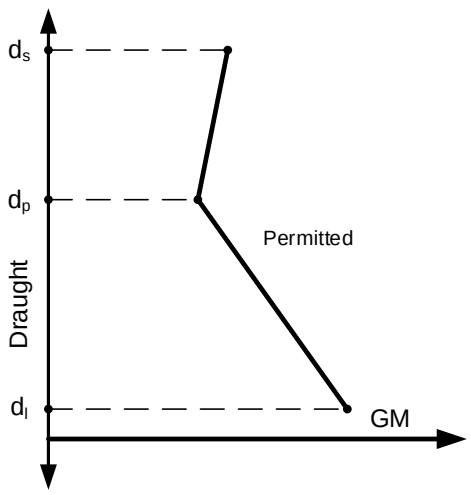
5 Ships may be permitted to sail at draughts above the deepest subdivision draught $d_s$ according to the International Convention on Load Lines, e.g. using the tropical freeboard. In these cases, for draughts above $d_s$ the *GM* limit value at $d_s$ is to be used.

**Regulation 5-1.5**

There could be cases where it is desirable to expand the trim range, for instance around $d_p$. This approach is based on the principle that it is not necessary that the same number of trims be used when the *GM* is the same throughout a draught and when the steps between trims do not exceed 1% of *L*. In these cases there will be three *A* values based on draughts $s_1$, $p_1$, $l_1$ and $s_2$, $p_2$, $l_2$ and $s_2$, $p_3$, $l_2$. The lowest value of each partial index $A_s$, $A_p$ and $A_l$ across these trims should be used in the summation of the attained subdivision index *A*.




**Trim limit diagram**




**GM limit curve**

**Regulation 5-1.6**

This provision is intended to address cases where an Administration approves an alternative means of verification.

## REGULATION 6 – REQUIRED SUBDIVISION INDEX *R*

**Regulation 6.1**

To demonstrate compliance with these provisions, see the *Guidelines for the preparation of subdivision and damage stability calculations*, set out in the appendix, regarding the presentation of damage stability calculation results.

## REGULATION 7 – ATTAINED SUBDIVISION INDEX *A*

**Regulation 7.1**

1 The probability of surviving after collision damage to the ship's hull is expressed by the index *A*. Producing an index *A* requires calculation of various damage scenarios defined by the extent of damage and the initial loading conditions of the ship before damage. Three loading conditions should be considered and the result weighted as follows:

$$A = 0.4A_s + 0.4A_p + 0.2A_l$$

where the indices *s*, *p* and *l* represent the three loading conditions and the factor to be multiplied to the index indicates how the index *A* from each loading condition is weighted.

2 The method of calculating *A* for a loading condition is expressed by the formula:

$$A_c = \sum_{i=1}^{i=t} p_i \left[ v_i s_i \right]$$

2.1 The index *c* represents one of the three loading conditions, the index *i* represents each investigated damage or group of damages and *t* is the number of damages to be investigated to calculate $A_c$ for the particular loading condition.

2.2 To obtain a maximum index *A* for a given subdivision, *t* has to be equal to *T*, the total number of damages.

3 In practice, the damage combinations to be considered are limited either by significantly reduced contributions to *A* (i.e. flooding of substantially larger volumes) or by exceeding the maximum possible damage length.

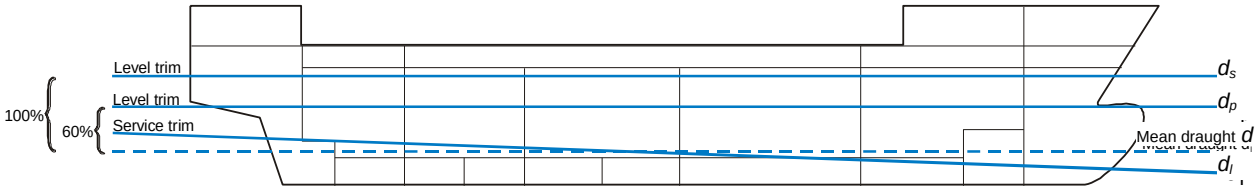
4 The index *A* is divided into partial factors as follows:

$p_i$ The *p* factor is solely dependent on the geometry of the watertight arrangement of the ship.

$v_i$ The *v* factor is dependent on the geometry of the watertight arrangement (decks) of the ship and the draught of the initial loading condition. It represents the probability that the spaces above the horizontal subdivision will not be flooded.

$s_i$ The *s* factor is dependent on the calculated survivability of the ship after the considered damage for a specific initial condition.

5 Three initial loading conditions should be used for calculating each index *A.* The loading conditions are defined by their mean draught *d,* trim and *GM (*or *KG).* The mean draught and trim are illustrated in the figure below.




6 The *GM* (or *KG*) values for the three loading conditions could, as a first attempt, be taken from the intact stability *GM* (or *KG*) limit curve. If the required index *R* is not obtained, the *GM* (or *KG*) values may be increased (or reduced), implying that the intact loading conditions from the intact stability book must now meet the *GM* (or *KG*) limit curve from the damage stability calculations derived by linear interpolation between the three *GM*s.

7 For a series of new passenger or cargo ships built from the same plans each of which have the same draughts $d_s$, $d_p$ and $d_l$ as well as the same *GM* and trim limits, the attained subdivision index *A* calculated for the lead ship may be used for the other ships. In addition, small differences in the draught $d_l$ (and the subsequent change in the draught $d_p$) are acceptable if they are due to small differences in the lightship characteristics that do not exceed the deviation limits specified in regulation 5.2. For cases where these conditions are not met, a new attained subdivision index *A* should be calculated.

"Built from the same plans" means that the watertight and weathertight aspects of the hull, bulkheads, decks, openings and other parts of a ship that impact the attained subdivision index *A* calculation remain exactly the same.

8 For a passenger or cargo ship in service which undergoes alterations that materially affect the stability information supplied to the master and require it to be re-inclined in accordance with regulation 5.4, a new attained subdivision index *A* should be calculated. However, for alteration cases where a re-inclining is not required and the alterations do not change the watertight and weathertight arrangements of the ship that impact the attained subdivision index *A*, if $d_s$ and the *GM* and trim limits remain the same then a new attained subdivision index *A* is not required.

9 For passenger ships subject to lightweight surveys every 5 years, if the lightweight survey results are within the limits specified in regulation 5.5, and $d_s$ and the *GM* and trim limits remain the same, a new attained subdivision index *A* is not required. However, if the lightweight survey results exceed either limit specified in regulation 5.5, a new attained subdivision index *A* should be calculated.

10 For any new passenger or cargo ship for which the deviation in lightship characteristics between the preliminary and the as built values are within the limits specified in regulation 5.2 and $d_s$ is unchanged, then the preliminary attained subdivision index *A* calculation may be approved as the final attained subdivision index *A* calculation. However, for cases where these conditions are not met, then a new attained subdivision index *A* should be calculated.

**Regulation 7.2**

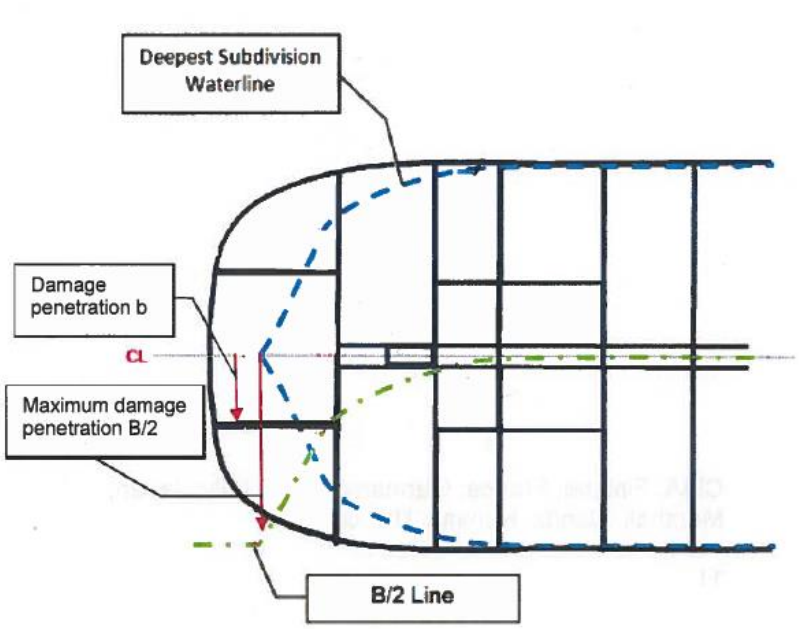
When additional calculations of *A* are performed for different trims, for a given set of calculations the difference between trim values for $d_s$, $d_p$ and $d_l$ may not exceed 1% *L*.

**Regulation 7.5**

1 With the same intent as wing tanks, the summation of the attained index *A* should reflect effects caused by all watertight bulkheads and flooding boundaries within the damaged zone. It is not correct to assume damage only to one half of the ship's breadth *B* and ignore changes in subdivision that would reflect lesser contributions.

2 In the forward and aft ends of the ship where the sectional breadth is less than the ship's breadth *B*, transverse damage penetration can extend beyond the centreline bulkhead. This application of the transverse extent of damage is consistent with the methodology to account for the localized statistics which are normalized on the greatest moulded breadth *B* rather than the local breadth.

3 Where, at the extreme ends of the ship, the subdivision exceeds the waterline at the deepest subdivision draught, the damage penetration *b* or *B*/2 is to be taken from centreline. The figure below illustrates the shape of the *B*/2 line.




4 Where longitudinal corrugated bulkheads are fitted in wing compartments or on the centreline, they may be treated as equivalent plane bulkheads provided the corrugation depth is of the same order as the stiffening structure. The same principle may also be applied to transverse corrugated bulkheads.

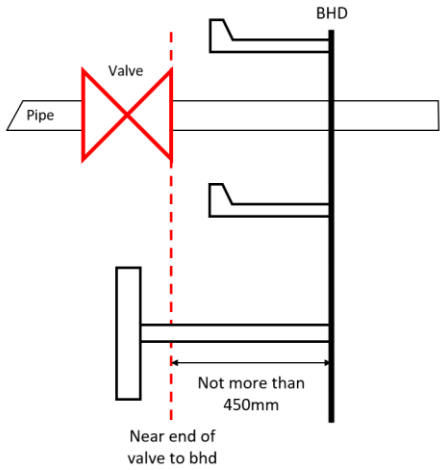
**Regulation 7.6**

Refer to the explanatory notes for regulation 7-2.2 for the treatment of free surfaces during all stages of flooding.

**Regulation 7.7**

1 *This explanatory note only applies to ships for which the building contract is placed on or after 1 January 2020 and which are constructed before 1 January 2024.* Pipes and valves directly adjacent or situated as close as practicable to a bulkhead or to a deck can be considered to be part of the bulkhead or deck, provided the separation distance on either side of the bulkhead or deck is of the same order as the bulkhead or deck stiffening structure. The same applies for small recesses, drain wells, etc.

2 *This explanatory note only applies to ships constructed on or after 1 January 2024.* Pipes and valves directly adjacent or situated as close as practicable to a bulkhead or to a deck can be considered to be part of the bulkhead or deck, provided the separation distance on either side of the bulkhead or deck is of the same order as the bulkhead or deck stiffening structure. The same applies for small recesses, drain wells, etc. In no case should the separation distance on either side of the bulkhead or deck be more than 450 mm measured from the valve's near end to the bulkhead or deck.




3 For ships up to *L* = 150 m the provision for allowing "minor progressive flooding" should be limited to pipes penetrating a watertight subdivision with a total cross-sectional area of not more than 710 $mm^2$ between any two watertight compartments. For ships of *L* = 150 m and upwards the total cross-sectional area of pipes should not exceed the cross-sectional area of one pipe with a diameter of *L*/5000 m.

**REGULATION 7-1 – CALCULATION OF THE FACTOR $p_i$**

**General**

1 The definitions below are intended to be used for the application of part B-1 only.

2 In regulation 7-1, the words "compartment" and "group of compartments" should be understood to mean "zone" and "adjacent zones".

3 Zone – a longitudinal interval of the ship within the subdivision length.

4 Room – a part of the ship, limited by bulkheads and decks, having a specific permeability.

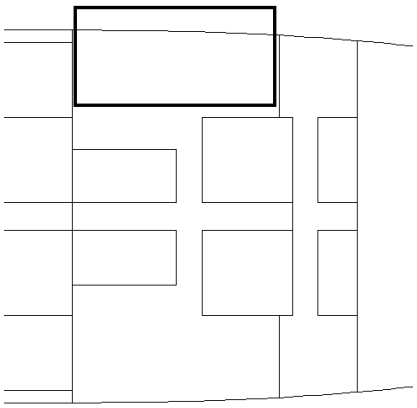
5 Space – a combination of rooms.

6 Compartment – a space within watertight boundaries.

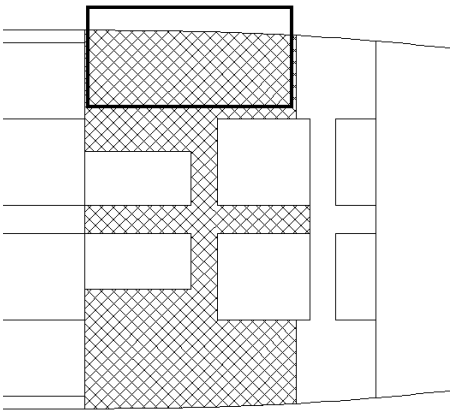
7 Damage – the three-dimensional extent of the breach in the ship.

8 For the calculation of *p*, *v*, *r* and *b* only the damage should be considered, for the calculation of the *s*-value the flooded space should be considered. The figures below illustrate the difference.

Damage shown as the bold square:



Flooded space shown below:



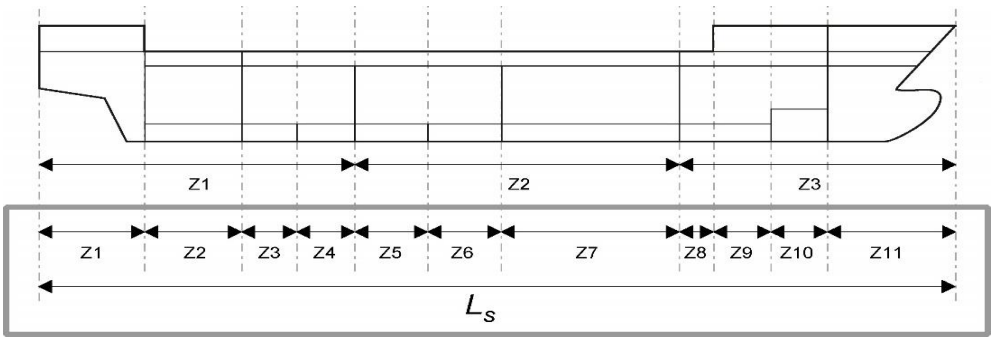
**Regulation 7-1.1.1**

1 The coefficients $b_{11}$, $b_{12}$, $b_{21}$ and $b_{22}$ are coefficients in the bi-linear probability density function on normalized damage length (*J*). The coefficient $b_{12}$ is dependent on whether $L_s$ is greater or less than $L^*$ (i.e. 260 m); the other coefficients are valid irrespective of $L_s$.

***Longitudinal subdivision***

2 In order to prepare for the calculation of index *A*, the ship's subdivision length $L_s$ is divided into a fixed discrete number of damage zones. These damage zones will determine the damage stability investigation in the way of specific damages to be calculated.

3 There are no specific rules for longitudinally subdividing the ship, except that the length $L_s$ defines the extremities of the zones. Zone boundaries need not coincide with physical watertight boundaries. However, it is important to consider a strategy carefully to obtain a good result (that is a large attained index *A*). All zones and combination of adjacent zones may contribute to the index *A*. In general it is expected that the more zone boundaries the ship is divided into the higher the attained index will be, but this benefit should be balanced against extra computing time. The figure below shows different longitudinal zone divisions of the length $L_s$.



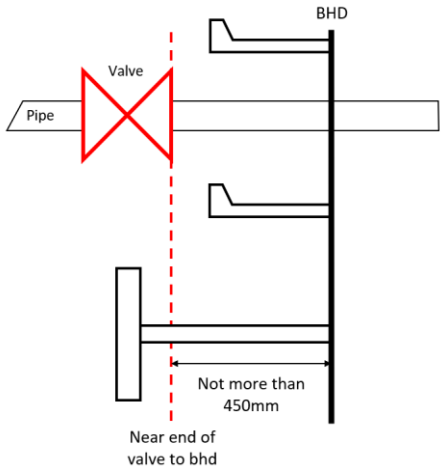
4 The first example is a very rough division into three zones of approximately the same size with limits where longitudinal subdivision is established. The probability that the ship will survive a damage in one of the three zones is expected to be low (i.e. the *s*-factor is low or zero) and, therefore, the total attained index *A* will be correspondingly low.

5 In the second example the zones have been placed in accordance with the watertight arrangement, including minor subdivision (as in double bottom, etc.). In this case there is a much better chance of obtaining higher *s*-factors.

6 Where transverse corrugated bulkheads are fitted, they may be treated as equivalent plane bulkheads, provided the corrugation depth is of the same order as the stiffening structure.

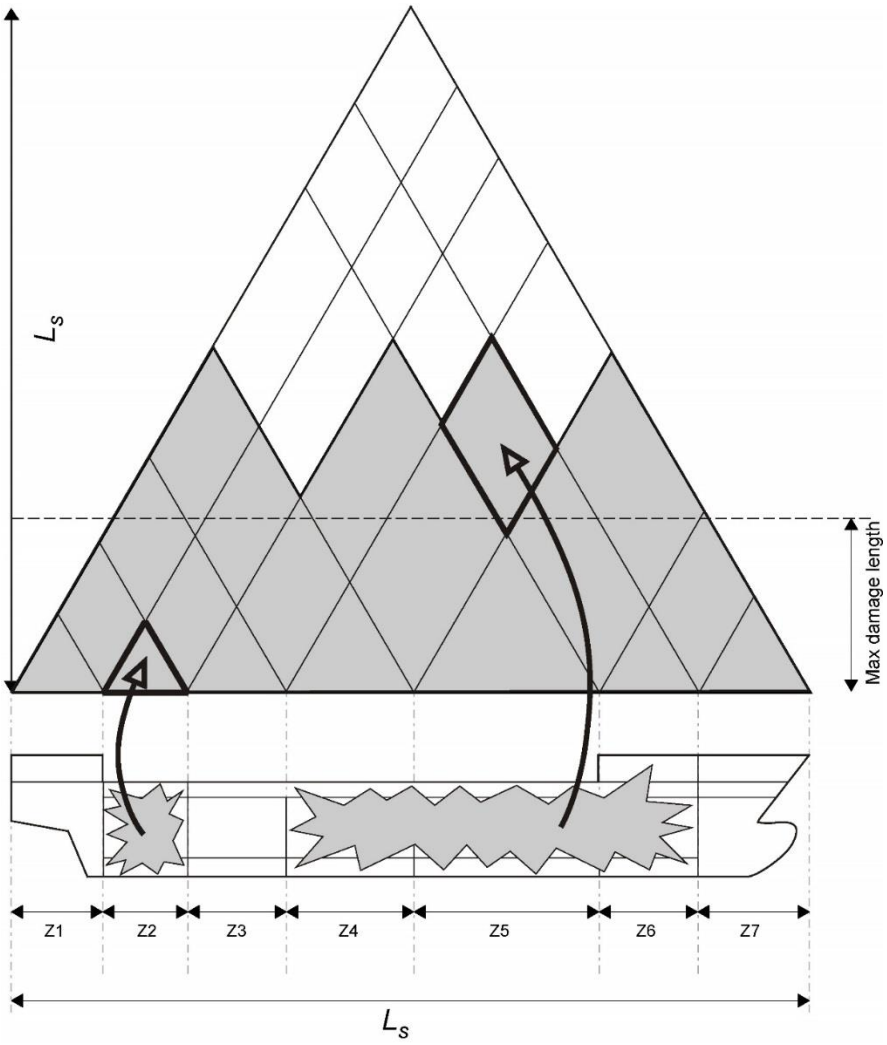
7 *This explanatory note only applies to ships for which the building contract is placed on or after 1 January 2020 and which are constructed before 1 January 2024.* Pipes and valves directly adjacent or situated as close as practicable to a transverse bulkhead can be considered to be part of the bulkhead, provided the separation distance on either side of the bulkhead is of the same order as the bulkhead stiffening structure. The same applies for small recesses, drain wells, etc.

8 *This explanatory note only applies to ships constructed on or after 1 January 2024.* Pipes and valves directly adjacent or situated as close as practicable to a transverse bulkhead can be considered to be part of the bulkhead, provided the separation distance on either side of the bulkhead is of the same order as the bulkhead stiffening structure. The same applies for small recesses, drain wells, etc. In no case should the separation distance on either side of the bulkhead or deck be more than 450 mm measured from the valve's near end to the bulkhead or deck.




9 For cases where the pipes and valves cannot be considered as being part of the transverse bulkhead, when they present a risk of progressive flooding to other watertight compartments that will have influence on the overall attained index *A*, they should be handled either by introducing a new damage zone and accounting for the progressive flooding to associated compartments or by introducing a gap.

10 The triangle in the figure below illustrates the possible single and multiple zone damages in a ship with a watertight arrangement suitable for a seven-zone division. The triangles at the bottom line indicate single zone damages and the parallelograms indicate adjacent zones damages.




11 As an example, the triangle illustrates a damage opening the rooms in zone 2 to the sea and the parallelogram illustrates a damage where rooms in zones 4, 5 and 6 are flooded simultaneously.

12 The shaded area illustrates the effect of the maximum absolute damage length. The *p*-factor for a combination of three or more adjacent zones equals zero if the length of the combined adjacent damage zones minus the length of the foremost and the aft most damage zones in the combined damage zone is greater than the maximum damage length. Having this in mind when subdividing $L_s$ could limit the number of zones defined to maximize the attained index *A*.

13 As the *p*-factor is related to the watertight arrangement by the longitudinal limits of damage zones and the transverse distance from the ship side to any longitudinal barrier in the zone, the following indices are introduced:

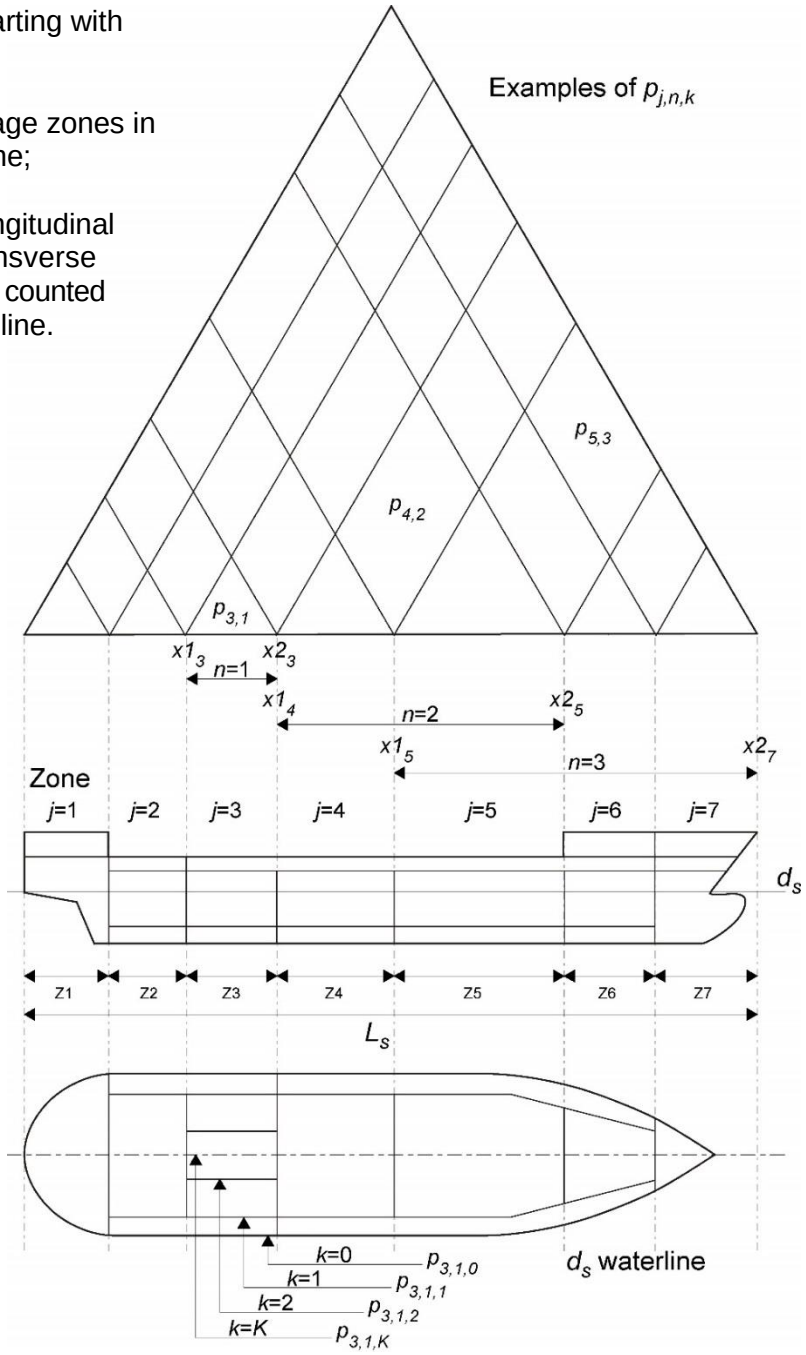
*j*: the damage zone number starting with No.1 at the stern;

*n*: the number of adjacent damage zones in question where *j* is the aft zone;

*k*: the number of a particular longitudinal bulkhead as a barrier for transverse penetration in a damage zone counted from shell towards the centreline. The shell has No.0;

*K*: total number of transverse penetration boundaries;

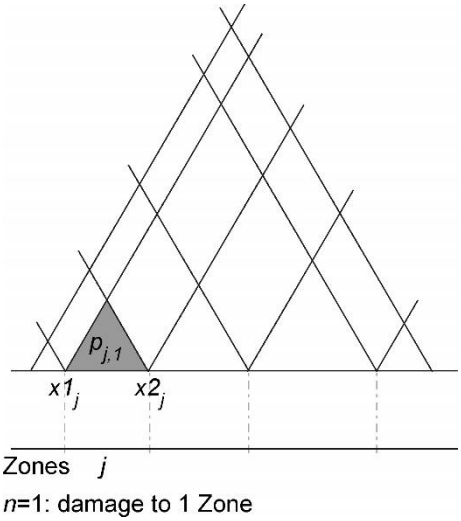
$p_{j,n,k}$: the *p*-factor for a damage in zone *j* and next (*n*-1) zones forward of *j* damaged to the longitudinal bulkhead *k*.



***Pure longitudinal subdivision***

Single damage zone, pure longitudinal subdivision:

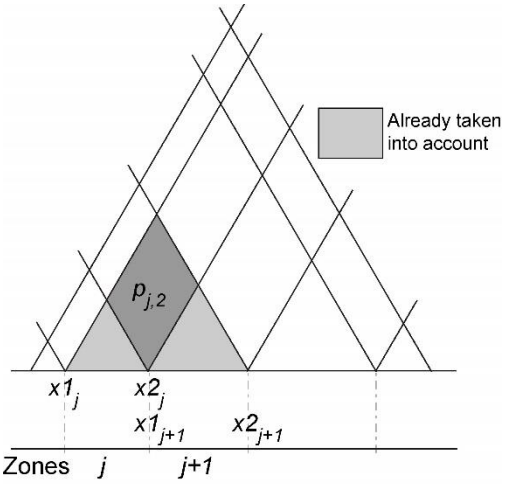
$p_{j,1} = p(x1_j,x2_j)$




*n*=1: damage to 1 Zone

Two adjacent zones, pure longitudinal subdivision:

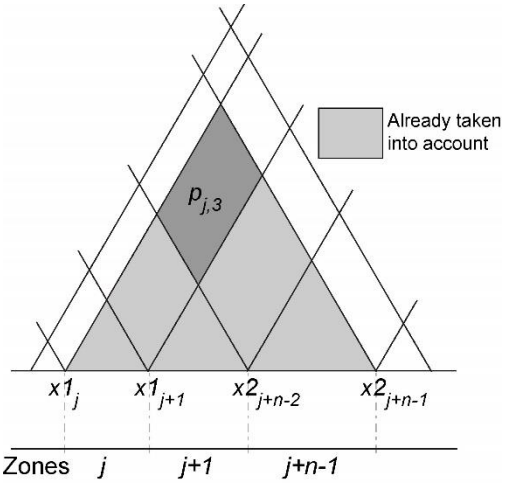
$p_{j,2} = p(x1_j,x2_{j+1}) - p(x1_j,x2_j) - p(x1_{j+1},x2_{j+1})$




*n*=2: damage to 2 Zones

Three or more adjacent zones, pure longitudinal subdivision:

$p_{j,n} = p(x1_j,x2_{j+n-1}) - p(x1_j,x2_{j+n-2}) - p(x1_{j+1},x2_{j+n-1}) + p(x1_{j+1},x2_{j+n-2})$




*n*=3: damage to 3 Zones

**Regulation 7-1.1.2**

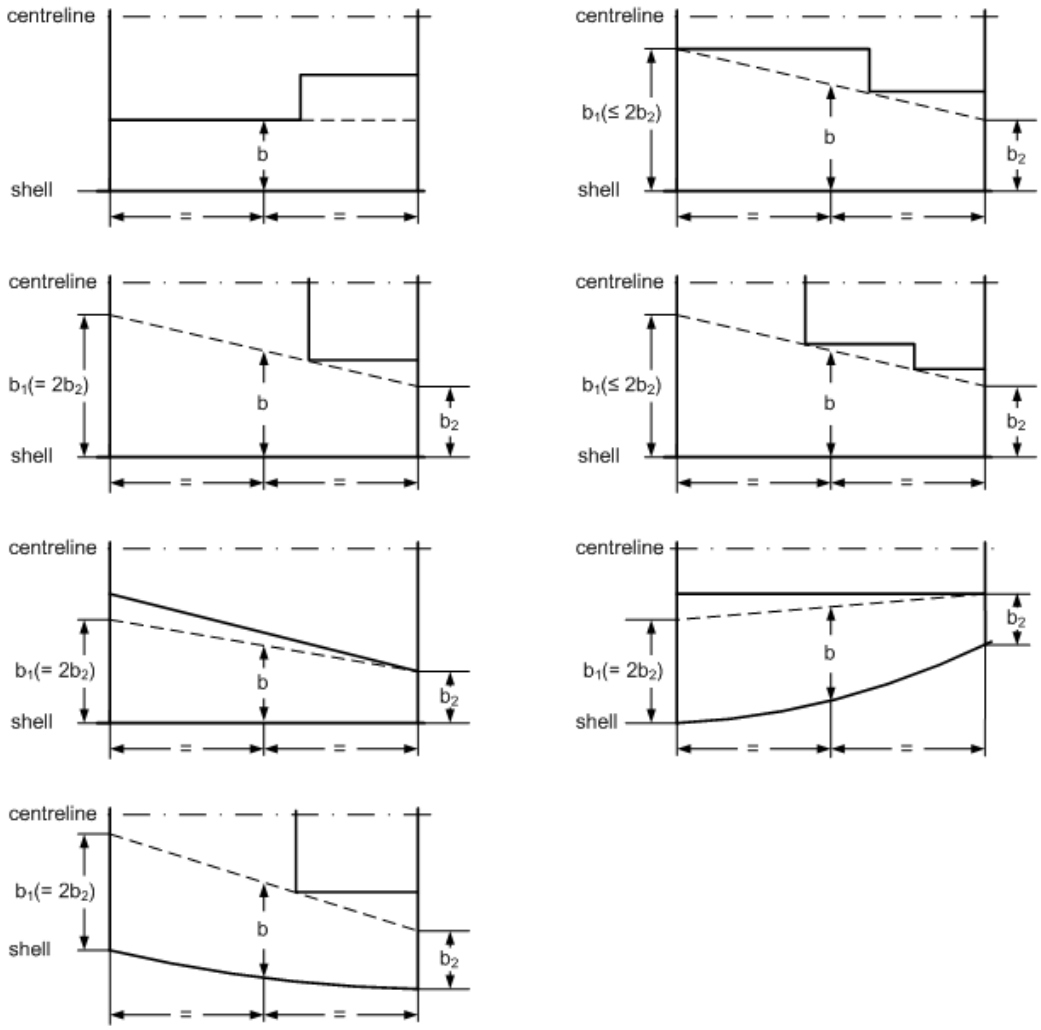
***Transverse subdivision in a damage zone***

1 Damage to the hull in a specific damage zone may just penetrate the ship's watertight hull or penetrate further towards the centreline. To describe the probability of penetrating only a wing compartment, a probability factor *r* is used, based mainly on the penetration depth *b*. The value of *r* is equal to 1, if the penetration depth is *B/2* where *B* is the maximum breadth of the ship at the deepest subdivision draught $d_s$, and *r* = 0 if *b* = 0.

2 The penetration depth *b* is measured at level deepest subdivision draught $d_s$ as a transverse distance from the ship side right-angled to the centreline to a longitudinal barrier.

3 Where the actual watertight bulkhead is not a plane parallel to the shell, *b* should be determined by means of an assumed line, dividing the zone to the shell in a relationship $b_1/b_2$ with $1/2 \leq b_1/b_2 \leq 2$ .

4 Examples of such assumed division lines are illustrated in the figure below. Each sketch represents a single damage zone at a water line plane level $d_s$ and the longitudinal bulkhead represents the outermost bulkhead position below $d_s$ + 12.5 m.



4.1 If a transverse subdivision intercepts the deepest subdivision draught waterline within the extent of the zone, *b* is equal to zero in that zone for that transverse subdivision [see figure 1]. A non-zero *b* can be obtained by including an additional zone, see figure 2.

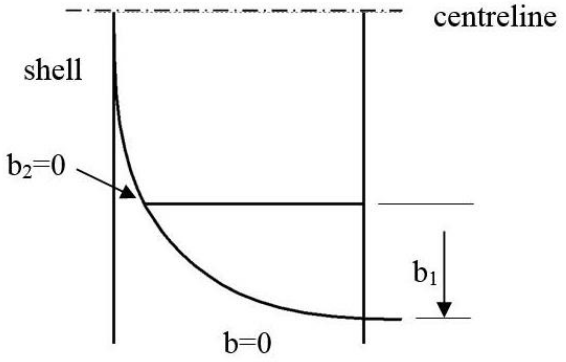



Figure 1

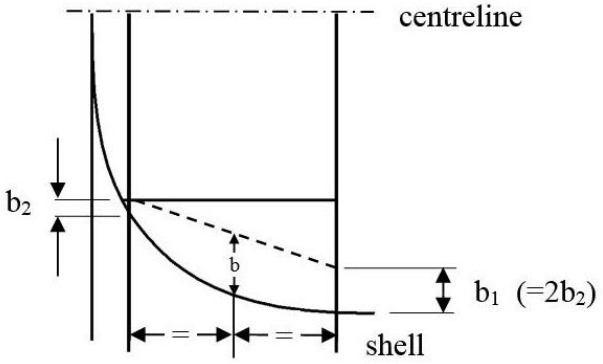



Figure 2

4.2 If the deepest subdivision draught waterline on the side of a single hull ship includes a part where multiple transverse (y) coordinates occur for a longitudinal (x) location, a straightened reference waterline can be used for the calculation of *b*. If this approach is chosen, the original waterline is replaced by an envelope curve including straight parts perpendicular to the centreline where multiple transverse coordinates occur [see figures 1 to 4]. The maximum transverse damage extent *B/2* should then be calculated from waterline or the reference waterline, if applicable, at the deepest subdivision draught.

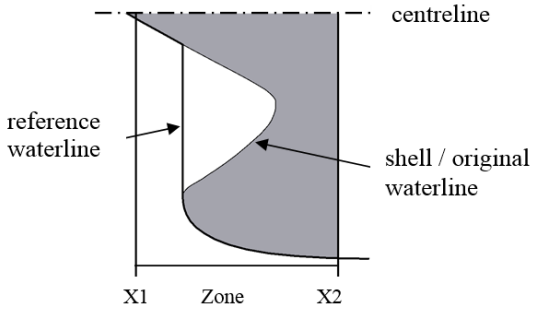



Figure 1

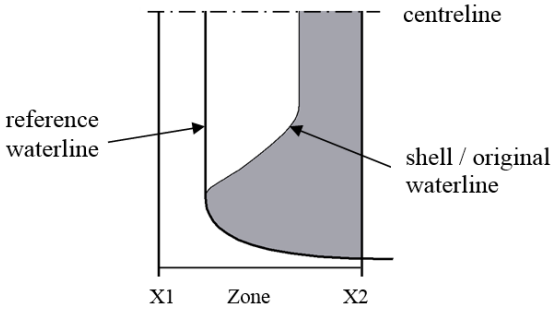



Figure 2

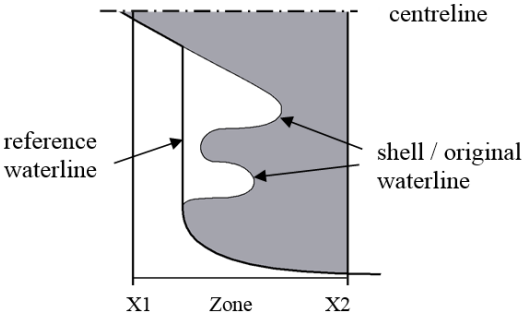



Figure 3

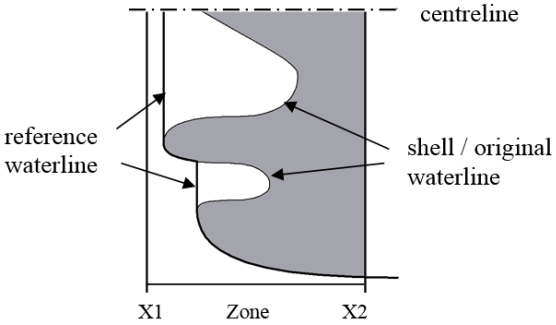



Figure 4

5 In calculating *r*-values for a group of two or more adjacent compartments, the *b*-value is common for all compartments in that group, and equal to the smallest *b*-value in that group:

$$b = \min\{b_1, b_2, \ldots, b_n\}$$

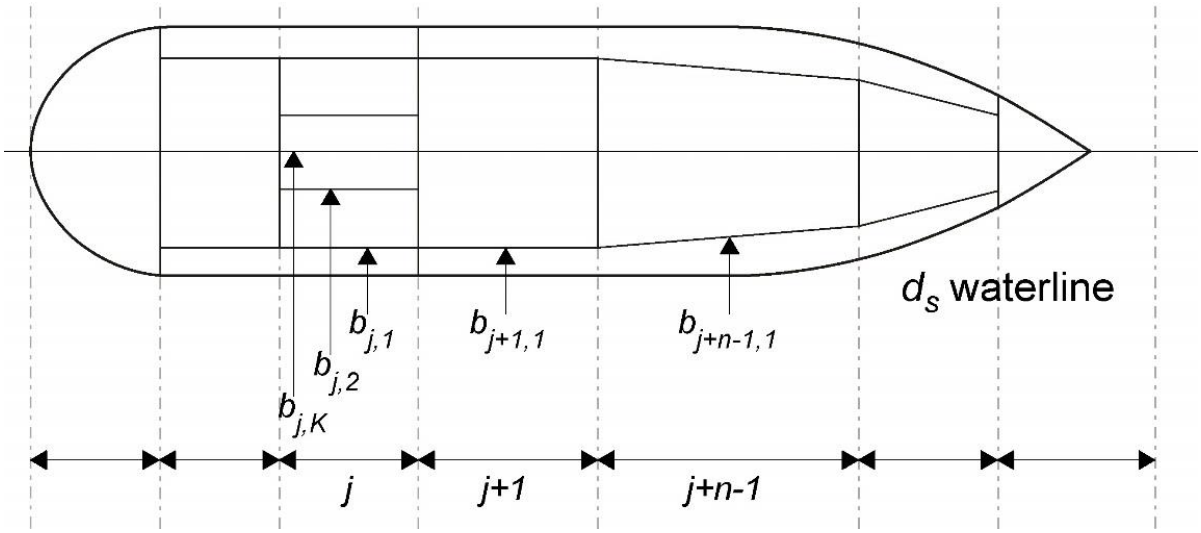
where: $n =$ number of wing compartments in that group;
$b_1, b_2, \ldots, b_n =$ mean values of *b* for individual wing compartments contained in the group.

*Accumulating p*

6 The accumulated value of *p* for one zone or a group of adjacent zones is determined by:

$$p_{j,n} = \sum_{k=1}^{k=K_{j,n}} p_{j,n,k}$$

where $K_{j,n} = \sum_{j}^{j+n-1} K_j$ the total number of $b_k$'s for the adjacent zones in question.




7 The figure above illustrates *b*'s for adjacent zones. The zone *j* has two penetration limits and one to the centre, the zone *j+1* has one *b* and the zone *j+n-1* has one value for *b*. The multiple zones will have (2+1+1) four values of *b*, and sorted in increasing order they are:

$(b_{j,1}\,;\, b_{j+1,1}\,;\, b_{j+n-1,1}\,;\, b_{j,2}\,;\, b_K)$

8 Because of the expression for *r(x1, x2, b)* only one $b_K$ should be considered. To minimize the number of calculations, *b*'s of the same value may be deleted.

As $b_{j,1} = b_{j+1,1}$ the final *b*'s will be $(b_{j,1}\,;\, b_{j+n-1,1}\,;\, b_{j,2}\,;\, b_K)$

***Examples of multiple zones having a different b***

9 Examples of combined damage zones and damage definitions are given in the figures below. Compartments are identified by R10, R12, etc.

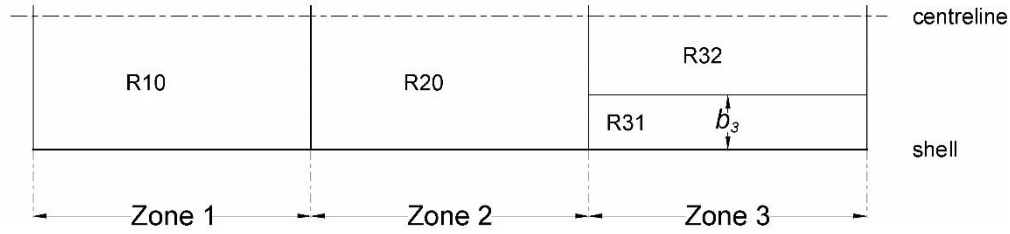



Figure: Combined damage of zones 1 + 2 + 3 includes a limited penetration to $b_3$, taken into account generating two damages:

1) to $b_3$ with R10, R20 and R31 damaged;
2) to *B/2* with R10, R20, R31 and R32 damaged.

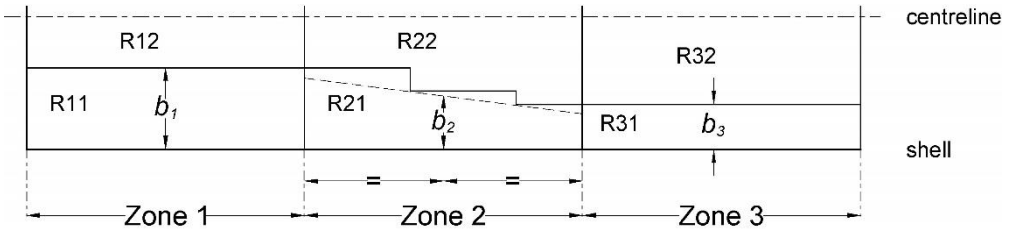



Figure: Combined damage of zones 1 + 2 + 3 includes 3 different limited damage penetrations generating four damages:

1) to $b_3$ with R11, R21 and R31 damaged;
2) to $b_2$ with R11, R21, R31 and R32 damaged;
3) to $b_1$ with R11, R21, R31, R32, and R22 damaged;
4) to *B/2* with R11, R21, R31, R32, R22 and R12 damaged.

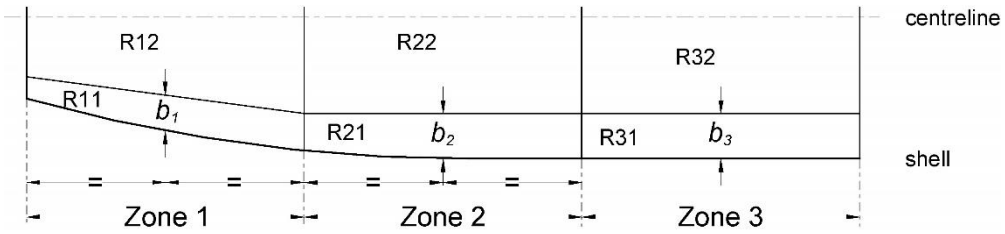
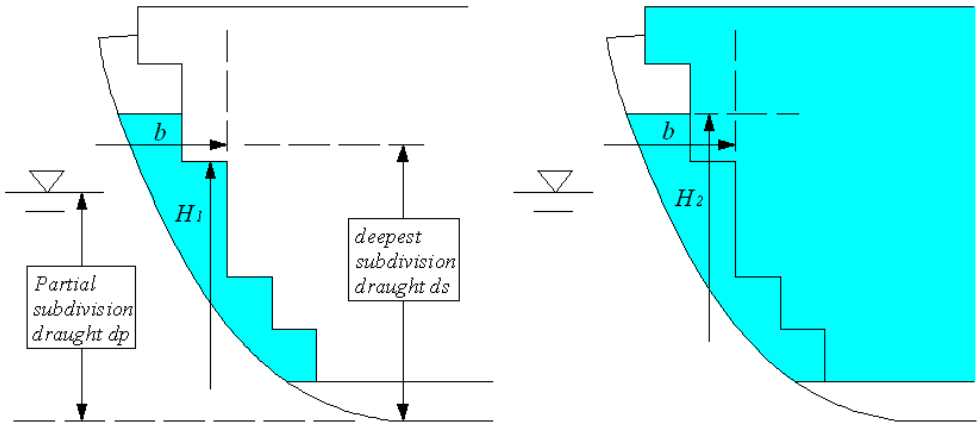



Figure: Combined damage of zone 1 + 2 + 3 including 2 different limited damage penetrations ($b_1 < b_2 = b_3$) generating three damages:

1) to $b_1$ with R11, R21 and R31 damaged;
2) to $b_2$ with R11, R21, R31 and R12 damaged;
3) to *B/2* with R11, R21, R31, R12, R22 and R32 damaged.

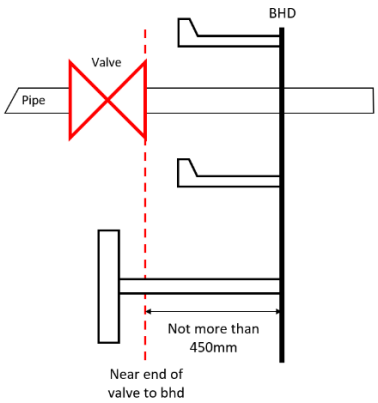
10 A damage having a transverse extent *b* and a vertical extent $H_2$ leads to the flooding of both wing compartment and hold; for *b* and $H_1$ only the wing compartment is flooded. The figure below illustrates a partial subdivision draught $d_p$ damage.




11 The same is valid if *b*-values are calculated for arrangements with sloped walls.

12 *This explanatory note only applies to ships for which the building contract is placed on or after 1 January 2020 and which are constructed before 1 January 2024.* Pipes and valves directly adjacent or situated as close as practicable to a longitudinal bulkhead can be considered to be part of the bulkhead, provided the separation distance on either side of the bulkhead is of the same order as the bulkhead stiffening structure. The same applies for small recesses, drain wells, etc.

13 *This explanatory note only applies to ships constructed on or after 1 January 2024.* Pipes and valves directly adjacent or situated as close as practicable to a longitudinal bulkhead can be considered to be part of the bulkhead, provided the separation distance on either side of the bulkhead is of the same order as the bulkhead stiffening structure. The same applies for small recesses, drain wells, etc. In no case should the separation distance on either side of the bulkhead or deck be more than 450 mm measured from the valve's near end to the bulkhead or deck.




## REGULATION 7-2 – CALCULATION OF THE FACTOR $s_i$

### General

1 Initial condition – an intact loading condition to be considered in the damage analysis described by the mean draught, vertical centre of gravity and the trim; or alternative parameters from where the same may be determined (e.g. displacement, *GM* and trim). There are three initial conditions corresponding to the three draughts $d_s$, $d_p$ and $d_l$.

2 Immersion limits – immersion limits are an array of points that are not to be immersed at various stages of flooding as indicated in regulations 7-2.5.2 and 7-2.5.3.

3 Openings – all openings need to be defined: both weathertight and unprotected. Openings are the most critical factor to preventing an inaccurate index *A*. If the final waterline immerses the lower edge of any opening through which progressive flooding takes place, the factor "*s*" may be recalculated taking such flooding into account. However, in this case the *s* value should also be calculated without taking into account progressive flooding and corresponding opening. The smallest *s* value should be retained for the contribution to the attained index.

**Regulation 7-2.1**

1 In cases where the *GZ* curve may include more than one "range" of positive righting levers for a specific stage of flooding, only one continuous positive "range" of the *GZ* curve may be used within the allowable range/heel limits for calculation purposes. Different stages of flooding may not be combined in a single *GZ* curve.

Figure 1

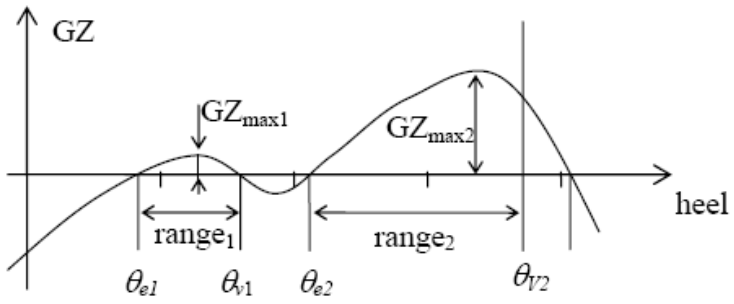
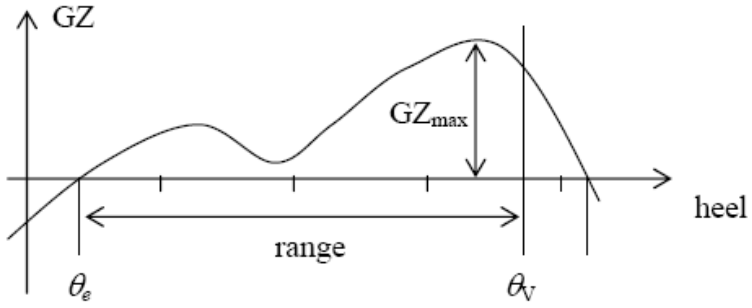



Figure 2




2 In figure 1, the *s*-factor may be calculated from the heel angle, range and corresponding $GZ_{max}$ of the first or second "range" of positive righting levers. In figure 2, only one *s*-factor can be calculated.

**Regulation 7-2.2**

***Intermediate stages of flooding***

1 The case of instantaneous flooding in unrestricted spaces in way of the damage zone does not require intermediate stage flooding calculations. Where intermediate stages of flooding calculations are necessary in connection with progressive flooding, flooding through non-watertight boundaries or cross-flooding, they should reflect the sequence of filling as well as filling level phases. Calculations for intermediate stages of flooding should be performed whenever equalization is not instantaneous, i.e. equalization is of a duration greater than 60 s. Such calculations consider the progress through one or more floodable (non-watertight)

spaces, or cross-flooded spaces. Bulkheads surrounding refrigerated spaces, incinerator rooms and longitudinal bulkheads fitted with non-watertight doors are typical examples of structures that may significantly slow down the equalization of main compartments.

***Flooding boundaries***

2 If a compartment contains decks, inner bulkheads, structural elements and doors of sufficient tightness and strength to seriously restrict the flow of water, for intermediate stage flooding calculation purposes it should be divided into corresponding non-watertight spaces. It is assumed that the non-watertight divisions considered in the calculations are limited to "A" class fire-rated bulkheads and decks, and do not apply to "B" class fire-rated bulkheads normally used in accommodation areas (e.g. cabins and corridors). This guidance also relates to regulation 4.5. For spaces in the double bottom, in general, only main longitudinal structures with a limited number of openings have to be considered as flooding boundaries.

***Sequential flooding computation***

3 For each damage scenario, the damage extent and location determine the initial stage of flooding. Calculations should be performed in stages, each stage comprising at least two intermediate filling phases in addition to the full phase per flooded space. Unrestricted spaces in way of damage should be considered as flooded immediately. Every subsequent stage involves all connected spaces being flooded simultaneously until an impermeable boundary or final equilibrium is reached. Unless the flooding process is simulated using time-domain methods, when a flooding stage leads to both a self-acting cross-flooding device and a non-watertight boundary, the self-acting cross-flooding device is assumed to act immediately and occur before the non-watertight boundary is breached. If due to the configuration of the subdivision in the ship it is expected that other intermediate stages of flooding are more onerous, then those should be investigated.

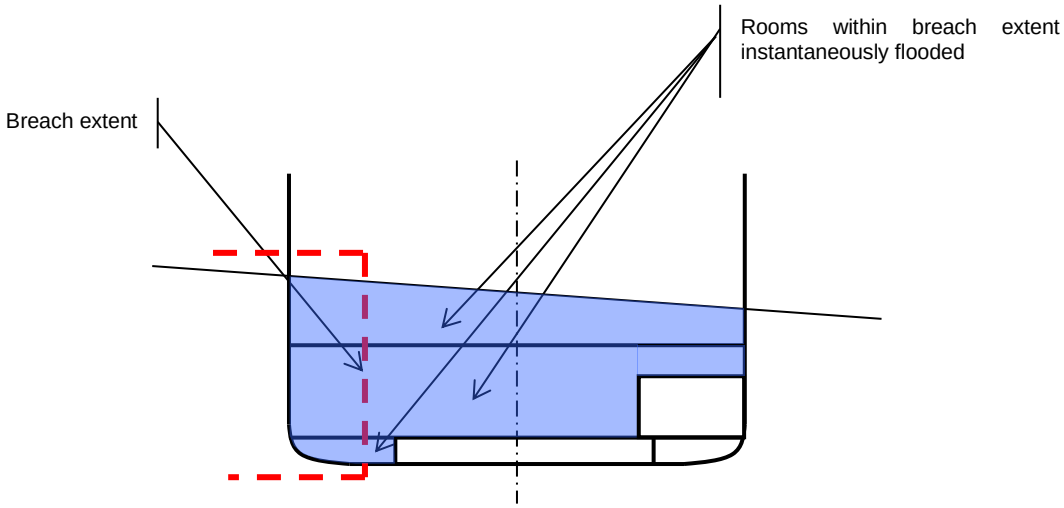
3.1 For each phase of a flooding stage (except the final full phase), the instantaneous transverse moment of this floodwater is calculated by assuming a constant volume of water at each heeling angle. The *GZ* curve is calculated with a constant intact displacement at all stages of flooding. Only one free surface needs to be assumed for water in spaces flooded during the current stage.

3.1.1 In the final full phase of each stage, the water level in rooms flooded during this stage reaches the outside sea level, so the lost buoyancy method can be used. The same method applies for every successive stage (added volume of water with a constant intact displacement for all phases before the final full phase of the stage in consideration), while each of the previous stages at the final full phase can be calculated with the lost buoyancy method.

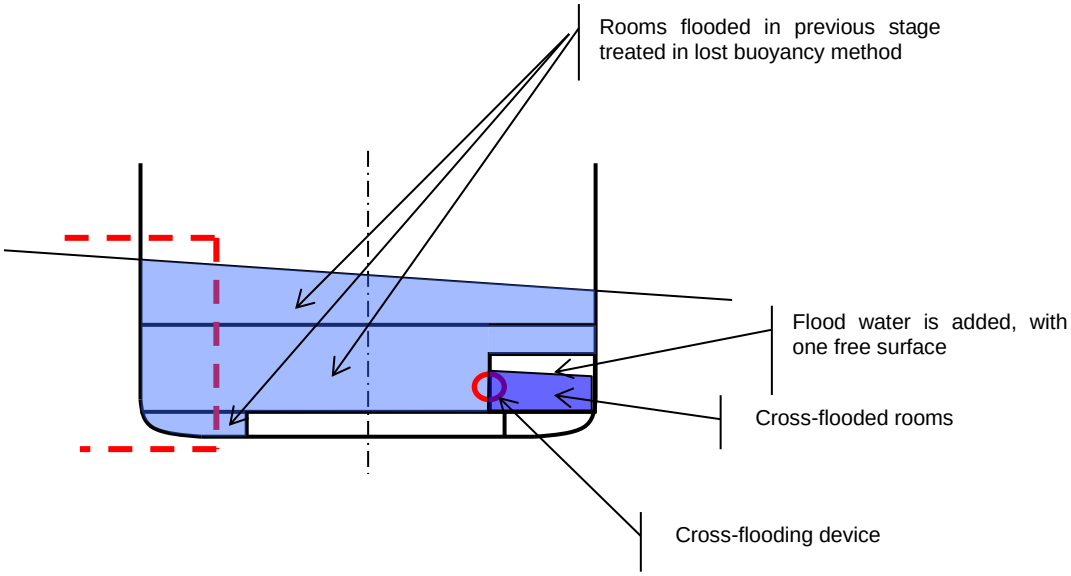
3.1.2 The examples below present a simplified, sequential approach to intermediate stage downflooding and cross-flooding. Because simultaneous downflooding and cross-flooding is not accounted for, any time-to-flood calculated with this sequential approach should be conservative. Alternative approaches, such as time-domain flooding simulation, are also acceptable.

*Example 1: Major damage with cross-flooding device*

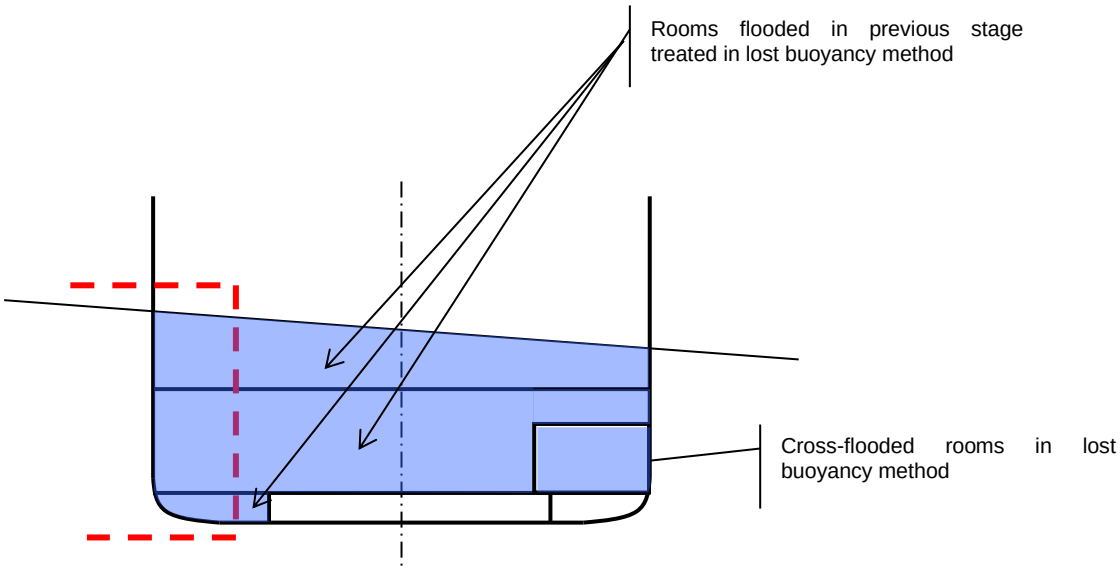
Stage 0: Unrestricted spaces in way of damage should be considered as flooded immediately (intermediate phases are not considered). The lost buoyancy method is applied as this is a full (final) phase. Provided the ship does not capsize and remains at a floating position from which cross-flooding can proceed, stage 0 need not be taken into account for the $s_{factor}$ calculation as the first intermediate stage to be calculated is after 60 s. See cross-flooding/equalization explanatory note 5 below.




Stage 1: Cross-flooding of opposite room



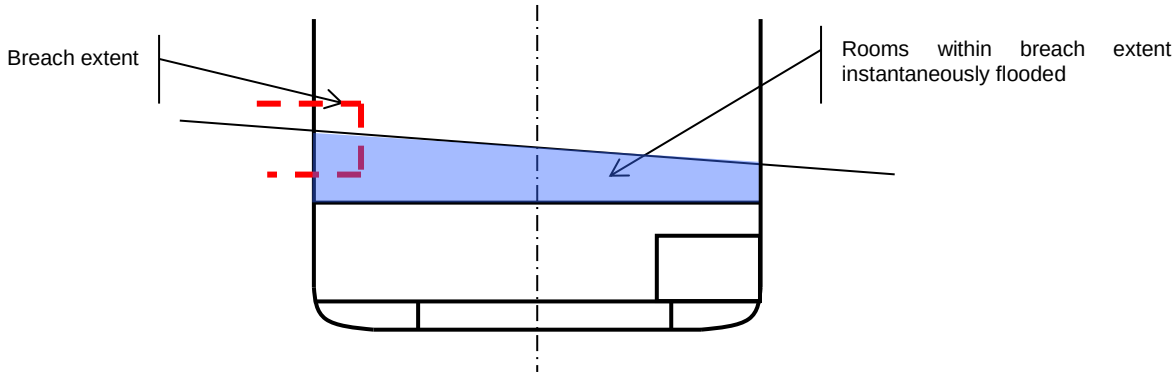

An intermediate phase



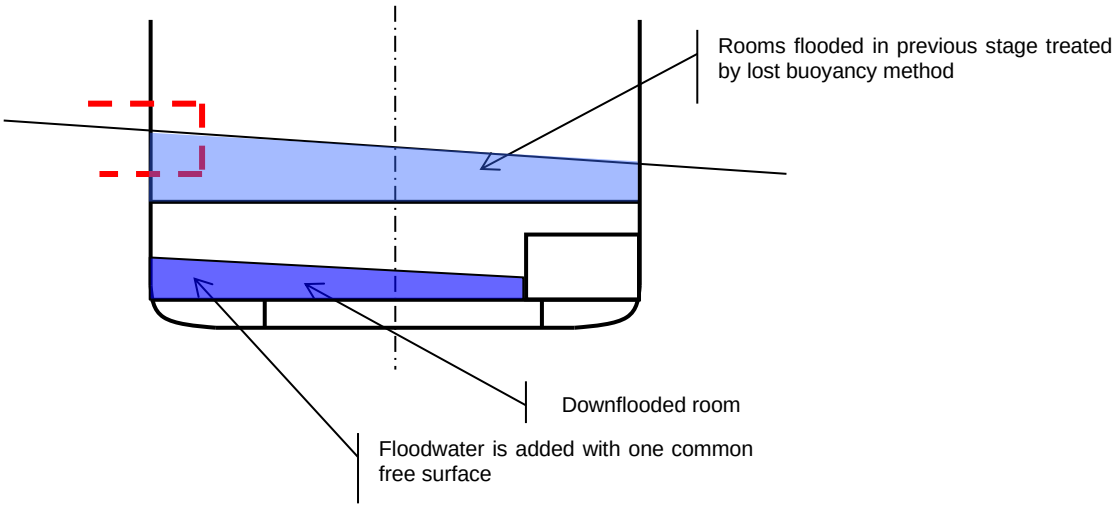

Full (final) phase of flooding stage 1

*Example 2: Minor damage with downflooding and cross-flooding*

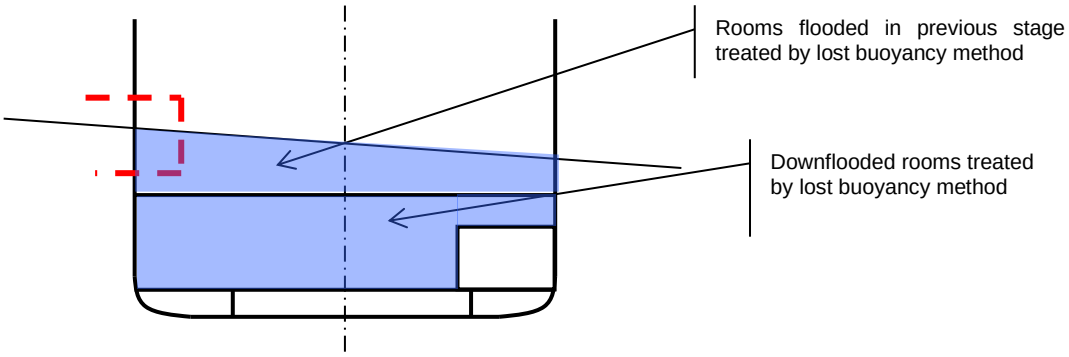
Stage 0: Unrestricted spaces in way of damage should be considered as flooded immediately (intermediate phases are not considered). The lost buoyancy method is applied as this is a full (final) phase. Provided the ship does not capsize and remains at a floating position from which cross-flooding can proceed, stage 0 need not be taken into account for the $s_{factor}$ calculation as the first intermediate stage to be calculated is after 60 s. See cross-flooding/equalization explanatory note 5 below.




Stage 1: Downflooding through non-watertight deck

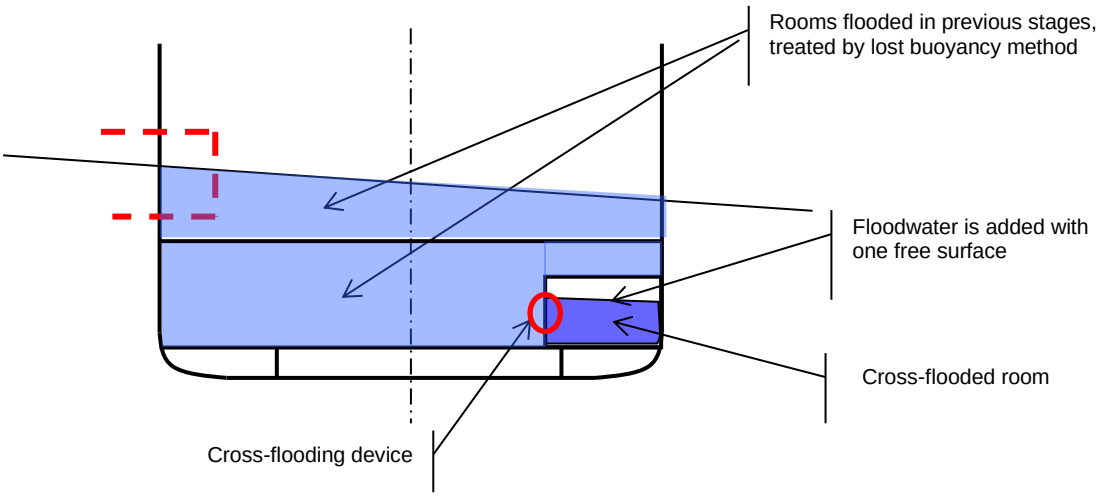



An intermediate phase

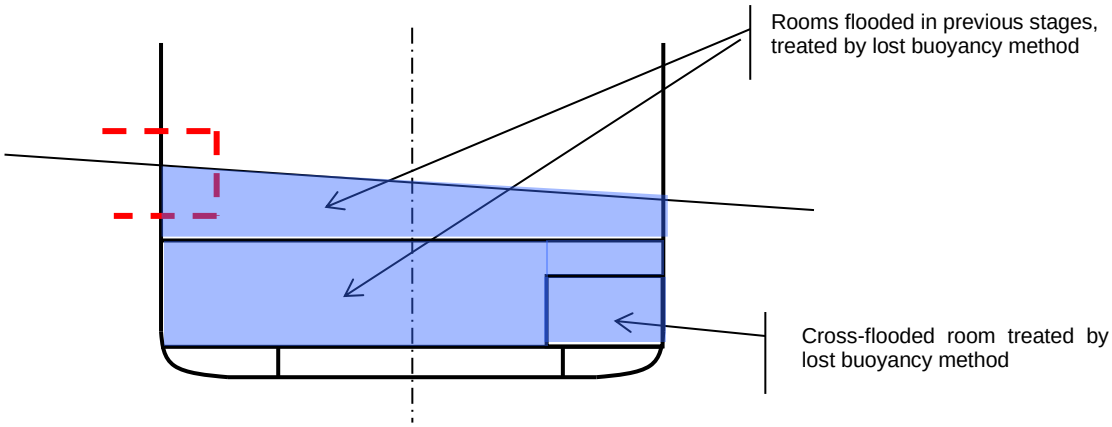



Final (full) phase of stage 1

Stage 2: Cross-flooding




An intermediate phase




Full (final) phase of stage 2

***Cross-flooding/equalization***

4 In general, cross-flooding is flooding of an undamaged space of the ship to reduce the heel in the final equilibrium condition.

5 The cross-flooding time should be calculated in accordance with the *Revised recommendation on a standard method for evaluating cross-flooding arrangements* (resolution MSC.362(92)). If complete fluid equalization occurs in 60 s or less, it should be treated as instantaneous and no further calculations need to be carried out. Additionally, in cases where $s_{final} = 1$ is achieved in 60 s or less, but equalization is not complete, instantaneous flooding may also be assumed if $s_{final}$ will not become reduced. In any cases where complete fluid equalization exceeds 60 s, the value of $s_{intermediate}$ after 60 s is the first intermediate stage to be considered. Only self-acting open cross-flooding arrangements without valves should be considered effective for instantaneous flooding cases.

6 Provided that the ship has a *GZ* greater than 0 and remains in a position from which cross-flooding can proceed, stage 0 need not be taken into account for the $s_{factor}$ calculation as the first intermediate stage to be calculated is after 60 s.

7 Only cross-flooding devices which are sufficiently submerged below the external waterline at stage 0 are to be used in the calculation for cross-flooding according to resolution MSC.362(92).

8 If complete fluid equalization can be finalized in 10 min or less, the assessment of survivability is carried out using the formula in regulation 7-2.1.1 (i.e. as the smallest value of $s_{intermediate}$ or $s_{final} \cdot s_{mom}$)

9 In case the equalization time is longer than 10 min, $s_{final}$ is calculated for the floating position achieved after 10 min of equalization. This floating position is computed by calculating the amount of flood water according to resolution MSC.362(92) using interpolation, where the equalization time is set to 10 min, i.e. the interpolation of the flood water volume is made between the case before equalization ($T$=0) and the total calculated equalization time. For damage cases involving different cross-flooding devices serving different spaces, when the interpolation between the case before equalization ($T$=*0*) and the total calculated equalization time is needed for flood water volume calculation after 60 s or 10 min, the total equalization time is to be calculated separately for each cross-flooding device.

10 In any cases where complete fluid equalization exceeds 10 min, the value of $s_{final}$ used in the formula in regulation 7-2.1.1 should be the minimum of $s_{final}$ at 10 min or at final equalization.

11 The factor $s_{intermediate,i}$ may be used for cross-flooding stages if they are intermediate stages which are followed by other subsequent flooding stages (e.g. the flooding stages of non-watertight compartments).

***Alternatives***

12 As an alternative to the procedure described above in the explanatory notes for regulation 7-2.2, direct calculation using computational fluid dynamics (CFD), time-domain flooding simulations or model testing may be used to analyse intermediate stages of flooding and determine the time for equalization.

**Regulation 7-2.3**

1 The formulation of $s_{final,i}$ is based on target values for *GZ* and *Range* to achieve $s = 1$. These values are defined as $TGZ_{max}$ and *TRange*.

2 If ro-ro spaces are damaged there might be the possibility of water accumulation on these deck spaces. To account for this, in any damage case where the ro-ro space is damaged the higher values for $TGZ_{max}$ and *TRange* are to be applied for the calculation of $s_i$.

**Regulation 7-2.4.1.2**

The parameter *A* (projected lateral area) used in this paragraph does not refer to the attained subdivision index.

**Regulation 7-2.5.2.1 and 7-2.5.2.3**

***Unprotected openings***

1 The flooding angle will be limited by immersion of such an opening. It is not necessary to define a criterion for non-immersion of unprotected openings at equilibrium, because if it is immersed, the range of positive *GZ* limited to flooding angle will be zero so "s" will be equal to zero.

2 An unprotected opening connects two rooms or one room and the outside. An unprotected opening will not be taken into account if the two connected rooms are flooded or none of these rooms are flooded. If the opening is connected to the outside, it will not be taken into account if the connected compartment is flooded. An unprotected opening does not need to be taken into account if it connects a flooded room or the outside to an undamaged room, if this room will be considered as flooded in a subsequent stage.

***Openings fitted with a weathertight means of closing ("weathertight openings")***

*Applies to passenger ships for which the building contract is placed on or after 1 January 2020 and which are constructed before 1 January 2024, and to cargo ships*.

3 The survival "s" factor will be "0" if any such point is submerged at a stage which is considered as "final". Such points may be submerged during a stage or phase which is considered as "intermediate", or within the range beyond equilibrium.

4 If an opening fitted with a weathertight means of closure is submerged at equilibrium during a stage considered as intermediate, it should be demonstrated that this weathertight means of closure can sustain the corresponding head of water and that the leakage rate is negligible.

5 These points are also defined as connecting two rooms or one room and the outside, and the same principle as for unprotected openings is applied to take them into account or not. If several stages have to be considered as "final", a "weathertight opening" does not need to be taken into account if it connects a flooded room or the outside to an undamaged room if this room will be considered as flooded in a successive "final" stage.

**Regulation 7-2.5.2.2**

1 Partial immersion of the bulkhead deck may be accepted at final equilibrium. This provision is intended to ensure that evacuation along the bulkhead deck to the vertical escapes will not be impeded by water on that deck. A "horizontal evacuation route" in the context of this regulation means a route on the bulkhead deck connecting spaces located on and under this deck with the vertical escapes from the bulkhead deck required for compliance with SOLAS chapter II-2.

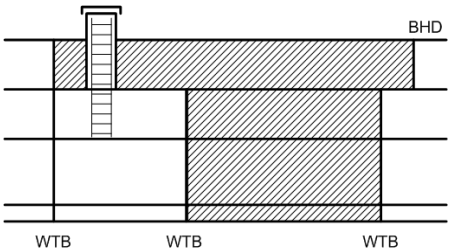
2 Horizontal evacuation routes on the bulkhead deck include only escape routes (designated as category 2 stairway spaces according to SOLAS regulation II-2/9.2.2.3 or as category 4 stairway spaces according to SOLAS regulation II-2/9.2.2.4 for passenger ships carrying not more than 36 passengers) used for the evacuation of undamaged spaces. Horizontal evacuation routes do not include corridors (designated as category 3 corridor spaces according to SOLAS regulation II-2/9.2.2.3 or as category 2 corridor spaces according to SOLAS regulation II-2/9.2.2.4 for passenger ships carrying not more than 36 passengers) or escape routes within a damaged zone. No part of a horizontal evacuation route serving undamaged spaces should be immersed.

3 $s_i$ = 0 where it is not possible to access a stair leading up to the embarkation deck from an undamaged space as a result of flooding to the "stairway" or "horizontal stairway" on the bulkhead deck.

**Regulation 7-2.5.3.1**

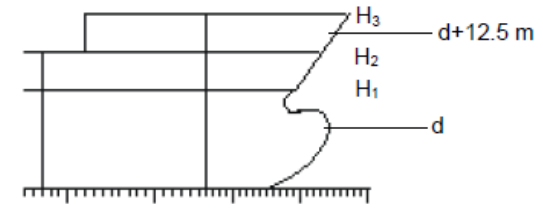
1 The purpose of this paragraph is to provide an incentive to ensure that evacuation through a vertical escape will not be obstructed by water from above. The paragraph is intended for smaller emergency escapes, typically hatches, where fitting of a watertight or weathertight means of closure would otherwise exclude them from being considered as flooding points.

2 Since the probabilistic regulations do not require that the watertight bulkheads be carried continuously up to the bulkhead deck, care should be taken to ensure that evacuation from intact spaces through flooded spaces below the bulkhead deck will remain possible, for instance by means of a watertight trunk.



**Regulation 7-2.6**

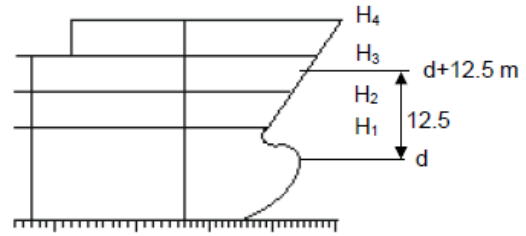
The sketches in the figure illustrate the connection between position of watertight decks in the reserve buoyancy area and the use of factor *v* for damages below these decks.




Example 1: vertical extent of damage above the waterline

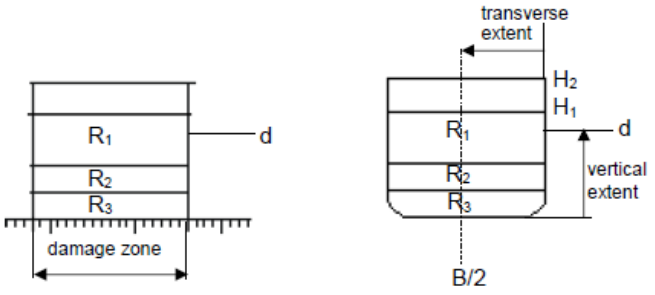
In example 1, there are 3 horizontal subdivisions ($H_1$, $H_2$ and $H_3$) to be taken into account as the vertical extent of damage.

The example shows the maximum possible vertical extent of damage $d$ + 12.5 m is positioned between $H_2$ and $H_3$. $H_1$ with factor $v_1$, $H_2$ with factor $v_2 > v_1$ but $v_2 < 1$ and $H_3$ with factor $v_3 = 1$.




Example 2: vertical extent of damage above the waterline

In example 2, the factors $v_1$ and $v_2$ are the same as above. The reserve buoyancy above $H_3$ should be taken undamaged in all damage cases.




Example 3: vertical extent of damage below the waterline

In example 3, the combination of damages into the rooms $R_1$, $R_2$ and $R_3$ positioned below the initial water line should be chosen so that the damage with the lowest *s*-factor is taken into account. That often results in the definition of alternative damages to be calculated and compared within a damage zone taking into account the vertical and the transverse extent. If the deck taken as the lower limit of damage is not watertight, down flooding should be considered.

**Regulation 7-2.6.1**

The parameters $x_1$ and $x_2$ are the same as parameters *x1* and *x2* used in regulation 7-1.

**REGULATION 7-3 – PERMEABILITY**

**Regulation 7-3.2**

1 The following additional cargo permeabilities may be used:

| Spaces | Permeability at draught $d_s$ | Permeability at draught $d_p$ | Permeability at draught $d_l$ |
|---|---|---|---|
| Timber cargo in holds | 0.35 | 0.7 | 0.95 |
| Wood chip cargo | 0.6 | 0.7 | 0.95 |

2 Reference is made to MSC/Circ.998 (*IACS Unified Interpretation regarding timber deck cargo in the context of damage stability requirements*) regarding timber deck cargo.

**Regulation 7-3.3**

1 Concerning the use of other figures for permeability "if substantiated by calculations", such permeabilities should reflect the general conditions of the ship throughout its service life rather than specific loading conditions.

2 This paragraph allows for the recalculation of permeabilities. This should only be considered in cases where it is evident that there is a major discrepancy between the values shown in the regulation and the real values. It is not designed for improving the attained value of a deficient ship of regular type by the modification of chosen spaces in the ship that are known to provide significantly onerous results. All proposals should be considered on a case-by-case basis by the Administration and should be justified with adequate calculations and arguments.

## REGULATION 8 – SPECIAL REQUIREMENTS CONCERNING PASSENGER SHIP STABILITY

**Regulation 8.1**

This regulation is intended to ensure a sufficient safety level if a large compartment is located aft of the collision bulkhead.

## REGULATION 8-1 – SYSTEM CAPABILITIES AND OPERATIONAL INFORMATION AFTER A FLOODING CASUALTY ON PASSENGER SHIPS

**Regulation 8-1.2**

1 In the context of this regulation, "compartment" has the same meaning as defined under regulation 7-1 of these explanatory notes (i.e. an onboard space within watertight boundaries).

2 The purpose of the paragraph is to prevent any flooding of limited extent from immobilizing the ship. This principle should be applied regardless of how the flooding might occur. Only flooding below the bulkhead deck need be considered.

## REGULATION 9 – DOUBLE BOTTOMS IN PASSENGER SHIPS AND CARGO SHIPS OTHER THAN TANKERS

**Regulation 9.1**

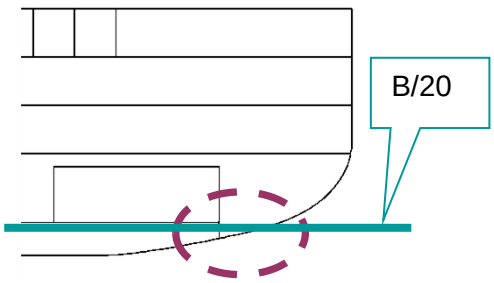
1 This regulation is intended to minimize the impact of flooding from a minor grounding. Special attention should be paid to the vulnerable area at the turn of the bilge. When justifying a deviation from fitting an inner bottom, an assessment of the consequences of allowing a more extensive flooding than reflected in the regulation should be provided.

2 The determination regarding the requirement to fit a double bottom "as far as this is practicable and compatible with the design and proper working of the ship" is made, or should be accepted by, the Administration or a recognized organization acting on its behalf.

3 Compliance with the damage stability requirement in regulation 9.8 should not be considered as an equivalent optional requirement to the fitting of a dimensionally compliant double bottom. This is because a flooded watertight compartment, such as an engine-room, that complies with the damage stability requirement in regulation 9.8 is not equivalent to a flooded double bottom below that compartment. Compliance with the damage stability requirement in regulation 9.8 is intended to provide a minimum level of safety in cases when the fitting of a double bottom is not practicable or compatible with the design and proper working of the ship.

**Regulation 9.2**

1 Except as provided in regulations 9.3 and 9.4, parts of the double bottom not extended for the full width of the ship as required by regulation 9.2 should be considered an unusual arrangement for the purpose of this regulation and should be handled in accordance with regulation 9.7. An example is provided below.




2 If an inner bottom is located higher than the partial subdivision draught $d_p$, this should be considered an unusual arrangement and is to be handled in accordance with regulation 9.7.

**Regulations 9.3.2.2, 9.6 and 9.7**

For cargo ships of less than 80 m in length (*L*), the alternative arrangements to provide a level of safety satisfactory to the Administration should be limited to compartments not having a double bottom, having an unusual bottom arrangement, or having an "other well" extending below the required double bottom height that is greater than the *h*/2 or 500 mm limit indicated in regulation 9.3.2.1. In these cases compliance with the bottom damage standard in regulation 9.8 should be demonstrated assuming that the damage will only occur between the transverse watertight bulkheads in compartments not having a double bottom, having an unusual bottom arrangement, or having an "other well" extending below the required double bottom height that is greater than the *h*/2 or 500 mm limit indicated in regulation 9.3.2.1.

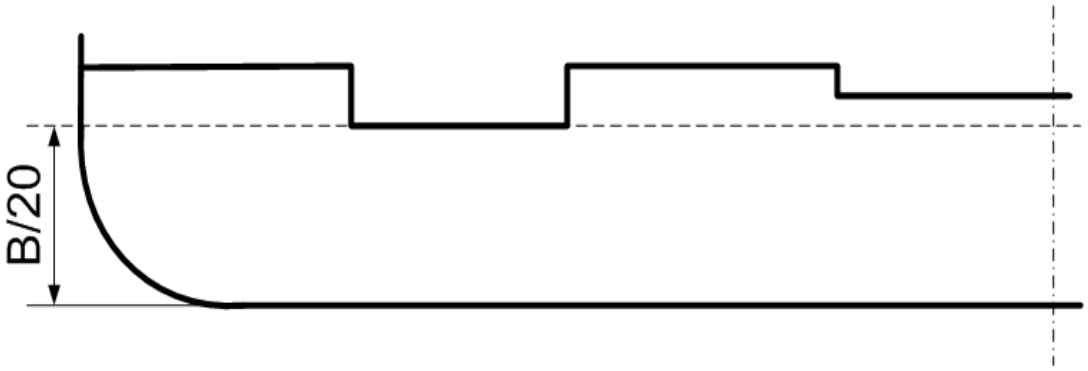
**Regulation 9.6**

1 Any part of a passenger ship or a cargo ship of 80 m in length (*L*) and upwards where a double bottom is omitted in accordance with regulation 9.1, 9.4 or 9.5 shall be capable of withstanding bottom damages, as specified in regulation 9.8. The intent of this provision is to specify the circumstances under which the Administration should require calculations, which damage extents to assume and what survival criteria to apply when double bottoms are not fitted.

2 The definition of "watertight" in regulation 2.17 implies that the strength of inner bottoms and other boundaries assumed to be watertight should be verified if they are to be considered effective in this context.

**Regulation 9.7**

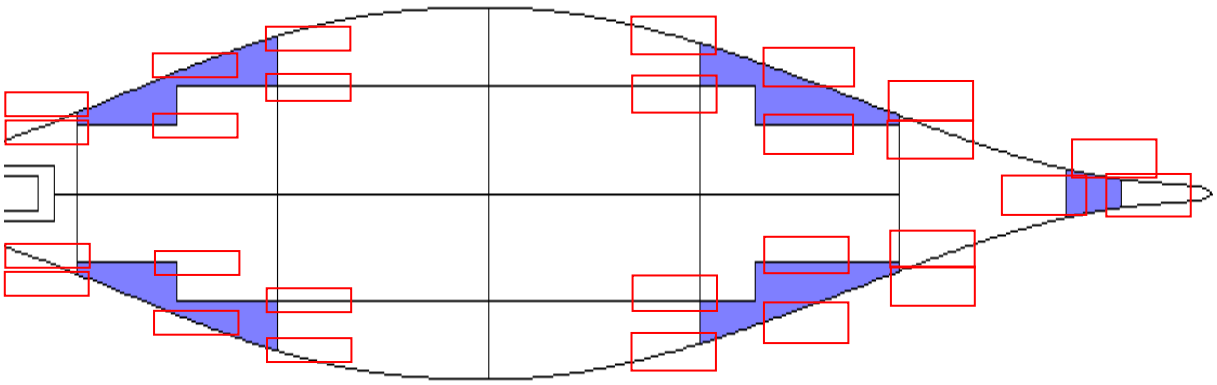
The reference to a "plane" in regulation 9.2 does not imply that the surface of the inner bottom may not be stepped in the vertical direction. Minor steps and recesses need not be considered unusual arrangements for the purpose of this paragraph as long as no part of the inner bottom is located below the reference plane. Discontinuities in way of wing tanks are covered by regulation 9.4.




**Regulation 9.8**

1 For ships to which the probabilistic damage stability requirements of part B-1 apply, the term "all service conditions" used in this paragraph means the three loading conditions with all trims used to calculate the attained subdivision index *A*. For ships not subject to the probabilistic damage stability requirements in part B-1, such as cargo ships that comply with the subdivision and damage stability requirements of other instruments as allowed by regulation II-1/4.2.1.2 and cargo ships of less than 80 m in length (*L*), "all service conditions" means that the limit curves or tables required by regulation 5-1.2.1 should include values calculated for the same draught and trim range(s) as for the other applicable stability requirements.

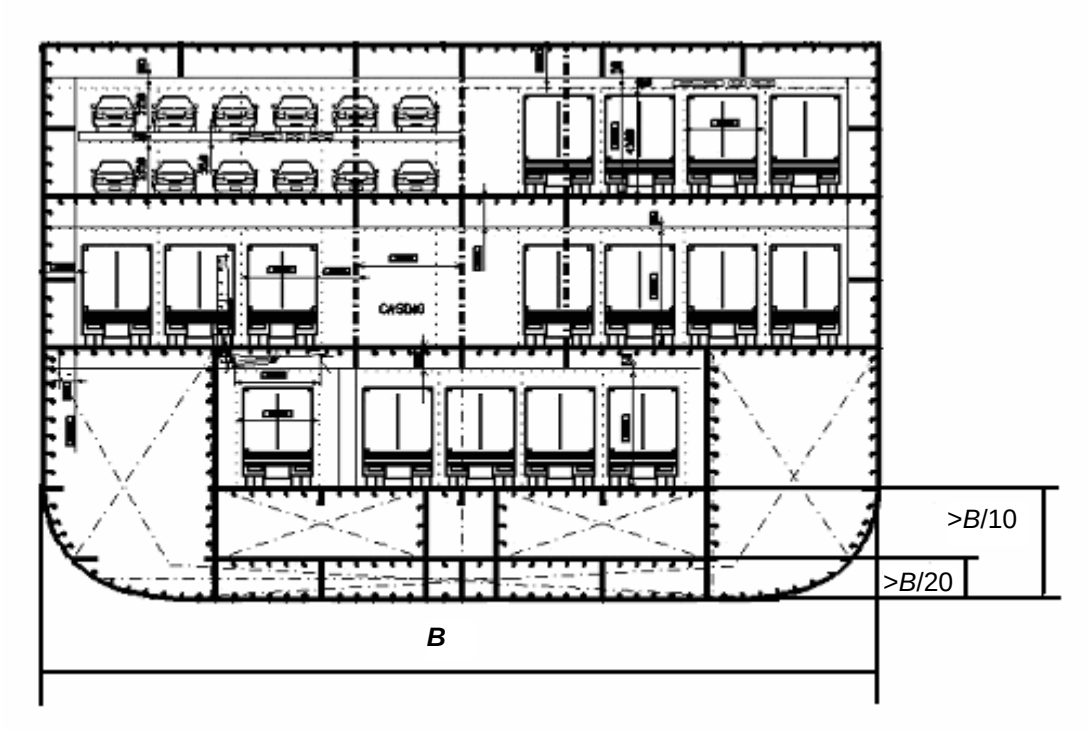
2 The damage extents specified in this paragraph should be applied to all parts of the ship where no double bottom is fitted, as permitted by regulations 9.1, 9.4 or 9.5, and include any adjacent spaces located within the extent of damage. Small wells in accordance with regulation 9.3.1 do not need to be considered damaged even if within the extent of the damage. Possible positions of the damages are shown in an example below (parts of the ship not fitted with a double bottom are shaded; the damages to be assumed are indicated by boxes).



**Regulation 9.9**

1 For the purpose of identifying "large lower holds", horizontal surfaces having a continuous deck area greater than approximately 30% in comparison with the waterplane area at subdivision draught should be taken to be located anywhere in the affected area of the ship. For the alternative bottom damage calculation, a vertical extent of *B*/10 or 3 m, whichever is less, should be assumed.

2 The increased minimum double bottom height of not more than *B*/10 or 3 m, whichever is less, for passenger ships with large lower holds, is applicable to holds in direct contact with the double bottom. Typical arrangements of ro-ro passenger ships may include a large lower hold with additional tanks between the double bottom and the lower hold, as shown in the figure below. In such cases, the vertical position of the double bottom required to be *B*/10 or 3 m, whichever is less, should be applied to the lower hold deck, maintaining the required double bottom height of *B*/20 or 2 m, whichever is less (but not less than 760 mm). The figure below shows a typical arrangement of a modern ro-ro passenger ferry.




**REGULATION 10 – CONSTRUCTION OF WATERTIGHT BULKHEADS**

**Regulation 10.1**

For the treatment of steps in the bulkhead deck of passenger ships see explanatory notes for regulation 13. For the treatment of steps in the freeboard deck of cargo ships see explanatory notes for regulation 13-1.

**REGULATION 12 – PEAK AND MACHINERY SPACE BULKHEADS, SHAFT TUNNELS, ETC.**

**Regulation 12.6.1**

For cargo ships, for which the building contract is placed on or after 1 January 2020 and which are constructed before 1 January 2024, the following figures show examples of suitable butterfly valve arrangements:

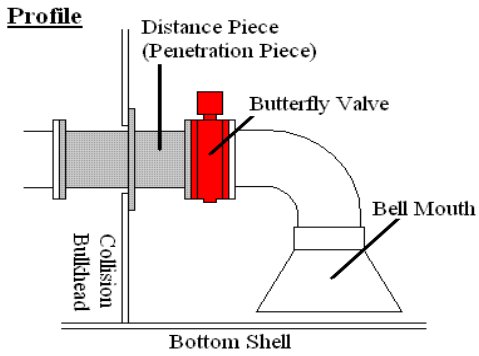



**Figure 1**

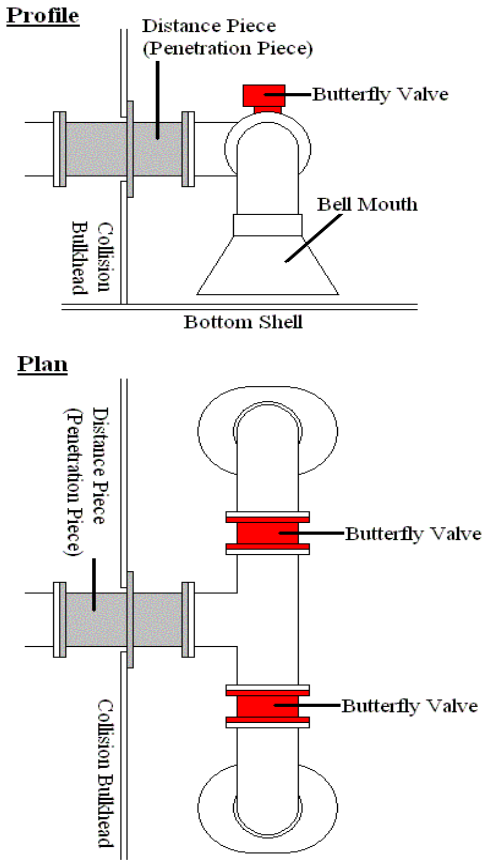



**Figure 2**

As butterfly valves must be capable of being remotely operated the following shall apply:

.1 the actuator shall be of a double acting type;

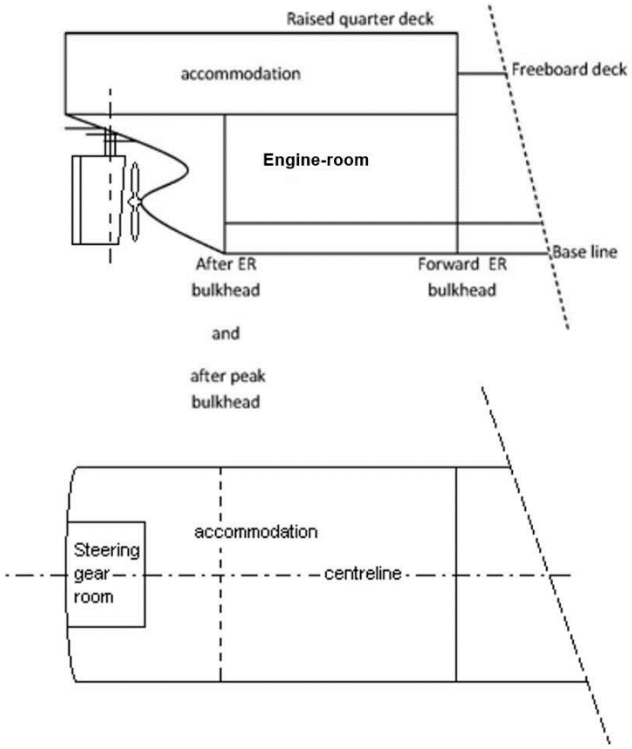
.2 when subject to loss of power, the actuator shall remain in its current position; and

.3 when subject to loss of power, the valve shall be able to be manually operated.

**Regulation 12.10**

1 In cargo ships the after engine-room bulkhead can be regarded as the afterpeak bulkhead provided that the after peak adjoins the engine-room.

2 In cargo ships with a raised quarter deck, it may be impracticable to extend the afterpeak bulkhead to the freeboard deck as the freeboard deck does not extend to the aft perpendicular. Provided that the afterpeak bulkhead extends above the deepest load line, and that all rudderstock bearings are housed in a watertight compartment without open connection to spaces located in front of the afterpeak bulkhead, termination of the afterpeak bulkhead on a watertight deck lower than the freeboard deck can be accepted by the Administration.




**Regulation 12.11**

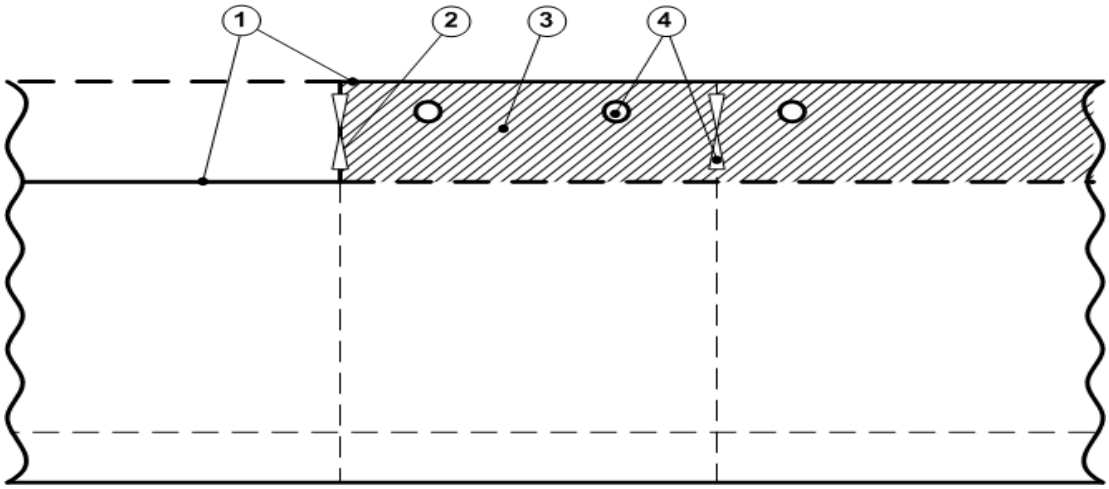
In cargo ships a stern tube enclosed in a watertight space of moderate volume, such as an afterpeak tank, where the inboard end of the stern tube extends through the afterpeak/engine-room watertight bulkhead into the engine-room, is considered to be an acceptable solution satisfying the requirement of this regulation, provided the inboard end of the stern tube is effectively sealed at the afterpeak/engine-room bulkhead by means of an approved watertight/oiltight gland system.

**REGULATION 13 – OPENINGS IN WATERTIGHT BOUNDARIES BELOW THE BULKHEAD DECK IN PASSENGER SHIPS**

**General – Steps in the bulkhead deck**

1 If the transverse watertight bulkheads in a region of the ship are carried to a higher deck which forms a vertical step in the bulkhead deck, openings located in the bulkhead at the step may be considered as being located above the bulkhead deck. Such openings should then comply with regulation 17 and should be taken into account when applying regulation 7-2.

2 All openings in the shell plating below the upper deck throughout that region of the ship should be treated as being below the bulkhead deck and the provisions of regulation 15 should be applied. See figure below.




1 Bulkhead deck
2 Considered as located above the bulkhead deck
3 Ship's side
4 Considered as located below the bulkhead deck

**Regulation 13.2.3**

1 For closed piping systems compliance with this regulation is achieved if approved pipe penetrations are fitted at the crossing of watertight boundaries to ensure that heat-sensitive pipes outside the space affected by the fire remain intact, so that any flooding of the fire affected space does not cause progressive flooding through the piping or pipe penetration.

1.1 For open piping systems compliance with this regulation is achieved if approved pipe penetrations are fitted at the crossing of watertight boundaries as are required for closed piping systems, and additionally each pipe connection to a watertight compartment is fitted with an isolation or non-return valve, as appropriate, to prevent progressive flooding through the piping system after a fire. As an alternative to fitting an isolation or non-return valve, pipes may be routed above the damaged waterline in such a way that progressive flooding is prevented, taking into account the dynamic movements of the ship in a damaged condition.

1.2 However, progressive flooding may be taken into account in accordance with regulation 7-2.5.4 instead.

2 For the purpose of this explanatory note the following definitions apply:

A *closed piping system* is a piping system without openings in multiple watertight compartments.

An *open piping system* is a piping system with openings in multiple watertight compartments.

3 Materials used in systems which penetrate watertight boundaries should be of sufficient strength after exposure to heat or be considered as part of an open piping system. Closing devices using intumescent material (swelling when exposed to heat) for open piping systems should not be considered equivalent to the fitting of a valve, since the fire might be located too far from the device to create a watertight seal.

4 Approval of pipe penetrations fitted to ensure the watertight integrity of a bulkhead or deck where heat-sensitive materials are used should include a prototype test of watertightness after having undergone the standard fire test appropriate for the location in which the penetrations are to be installed.[2]

4.1 The fire tested pipe penetration should then be tested to a test pressure of not less than 1.5 times the design pressure as defined in regulation 2.18. The pressure should be applied to the same side of the division as the fire test.

4.2 The fire tested pipe penetration should be tested for a period of at least 30 min under hydraulic pressure equal to the test pressure, but minimum 1.0 bar. There should be no leakage during this test.

4.3 The fire tested pipe penetration should continue to be tested for a further 30 min with the test pressure. The quantity of water leakage is not to exceed a total of 1 litre.

4.4 The prototype test should be considered valid only for the pipe typology (e.g. thermoplastic and multilayer), pressure classes, the maximum/minimum dimensions tested, and the type and fire rating of the division tested.

5 The pressure test need not be carried out on the hot penetration arrangement. Ample time may be given to prepare for the pressure test, i.e. dismantling the fire testing equipment and rigging the pressure test equipment.

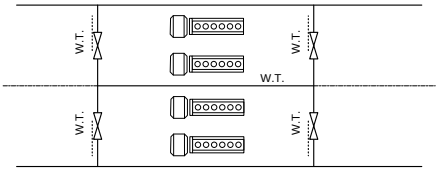
5.1 The pressure test should be carried out with the pipe section used in the fire test still in place.

5.2 Any pipe insulation fitted for the purpose of the fire test may be removed before the pressure test.

5.3 Prototype testing need not be carried out if the pipe penetration is made of steel or equivalent material having a thickness of 3 mm or greater and a length of not less than 900 mm (preferably 450 mm on each side of the division), and there are no openings. Such penetrations shall be suitably insulated by extension of the insulation at the same level of the division. See also regulation II-2/9.3.1 with respect to piping. However, the penetration must still comply with the watertight integrity requirement in regulation 2.17.

**Regulation 13.4**

In cases where main and auxiliary propulsion machinery spaces, including boilers serving the needs for propulsion, are divided by watertight longitudinal bulkheads in order to comply with redundancy requirements (e.g. according to regulation 8-1.2), one watertight door in each watertight bulkhead may be permitted, as shown in the figure below.




[2] Refer to the requirements for A-class division set out in part 3 of annex 1 to the 2010 FTP Code.

## REGULATION 13-1 – OPENINGS IN WATERTIGHT BULKHEADS AND INTERNAL DECKS IN CARGO SHIPS

### Regulation 13-1.1

1 If the transverse watertight bulkheads in a region of the ship are carried to a higher deck than in the remainder of the ship, openings located in the bulkhead at the step may be considered as being located above the freeboard deck.

2 All openings in the shell plating below the upper deck throughout that region of the ship should be treated as being below the freeboard deck, similar to the bulkhead deck for passenger ships (see relevant figure under regulation 13 above), and the provisions of regulation 15 should be applied.

## REGULATION 15 – OPENINGS IN THE SHELL PLATING BELOW THE BULKHEAD DECK OF PASSENGER SHIPS AND THE FREEBOARD DECK OF CARGO SHIPS

### General – Steps in the bulkhead deck and freeboard deck

For the treatment of steps in the bulkhead deck of passenger ships see explanatory notes for regulation 13. For the treatment of steps in the freeboard deck of cargo ships see explanatory notes for regulation 13-1.

## REGULATION 15-1 – EXTERNAL OPENINGS IN CARGO SHIPS

Regulations 15-1.1 to 15-1.3 apply to cargo ships which are subject to the damage stability analysis required in part B-1 or other IMO instruments.

### Regulation 15-1.1

With regard to air-pipe closing devices, they should be considered weathertight closing devices (not watertight). This is consistent with their treatment in regulation 7-2.5.2.1. However, in the context of regulation 15-1, "external openings" are not intended to include air-pipe openings.

## REGULATION 16 – CONSTRUCTION AND INITIAL TESTS OF WATERTIGHT CLOSURES

### General

These requirements are only to establish a general design standard for watertight closures. They are not intended to require any non-watertight hatches to be watertight, nor do they override the requirements of the International Convention on Load Lines.

### Regulation 16.2

Large doors, hatches or ramps on passenger and cargo ships, of a design and size that would make pressure testing impracticable, may be exempted from regulation 16.2, provided it is demonstrated by calculations that the doors, hatches or ramps maintain watertightness at design pressure with a proper margin of resistance. Where such doors utilize gasket seals, a prototype pressure test to confirm that the compression of the gasket material is capable of accommodating any deflection, revealed by the structural analysis, should be carried out. After installation every such door, hatch or ramp should be tested by means of a hose test or equivalent.

***Note***: See explanatory notes for regulation 13 for additional information regarding the treatment of steps in the bulkhead deck of passenger ships. See explanatory notes for regulation 13-1 for additional information regarding the treatment of steps in the freeboard deck of cargo ships.

## REGULATION 17 – INTERNAL WATERTIGHT INTEGRITY OF PASSENGER SHIPS ABOVE THE BULKHEAD DECK

### General – Steps in the bulkhead deck

For the treatment of steps in the bulkhead deck of passenger ships see explanatory notes for regulation 13.

### Regulation 17.1

*This explanatory note only applies to passenger ships for which the building contract is placed on or after 1 January 2020 and which are constructed before 1 January 2024.*

1 Sliding watertight doors with a reduced pressure head that are located above the bulkhead deck and which are immersed in the final or during any intermediate stage of flooding should comply fully with the requirements of regulation 13. These types of sliding watertight doors tested with reduced pressure head must not be immersed at any stage of flooding by a head of water higher than the tested pressure head. See figure 1 below. These sliding watertight doors shall be kept closed during navigation in compliance with the requirements of regulation 22 and this should be clearly indicated in the damage control information required by regulation 19.

2 If watertight doors are located above the worst final and above the worst intermediate waterline in damage cases contributing to the attained subdivision index *A*, but within the area where the door becomes intermittently immersed (fully or partly) at angles of heel in the required range of positive stability beyond the equilibrium position, such doors are to be power-operated and remotely controlled sliding semi-watertight doors complying with the requirements of regulation 13, except that the scantlings and sealing requirements could be reduced to the maximum head of water caused by the waterline being intermittently immersed (see figure 1 below). These doors should be closed in case of damage and this should be clearly indicated in the damage control information required by regulation 19.

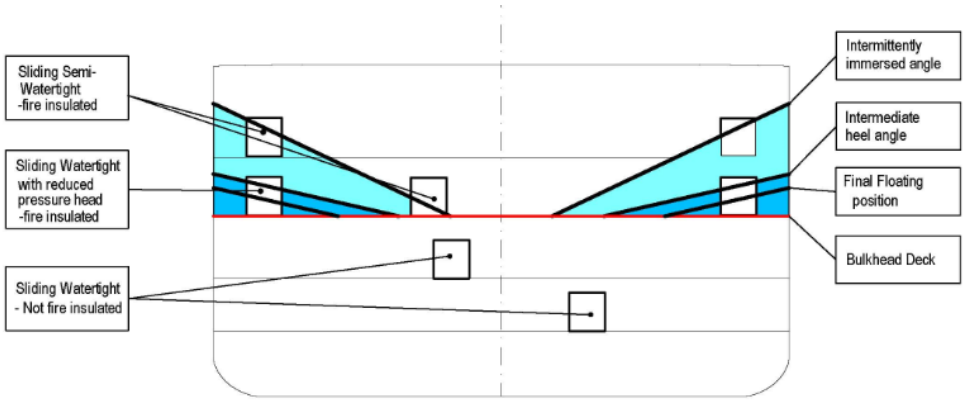



**Figure 1**

3 The use of sliding watertight doors above the bulkhead deck affects the escape provisions of regulation II-2/13. When such doors are used above the bulkhead deck, there should be at least two means of escape from each main vertical zone or similarly restricted

space or group of spaces, at least one of which should be independent of watertight doors and at least one of which should give access to a stairway forming a vertical escape. Sliding watertight doors that will be used frequently by passengers must not create a tripping hazard.

4 Doors fitted above the bulkhead deck which are required to meet both fire protection and watertight requirements should comply with the fire requirements in regulation II-2/9.4.1.1 and the watertight requirements in paragraphs 1 and 2 above. Notwithstanding regulation II-2/9.4.1.1.3, watertight doors fitted above the bulkhead deck should be insulated to the standard required by table 9.1 and regulation II-2/9.2.2.1.1.1 or by table 9.3 and regulation II-2/9.2.2.1.1.2 as appropriate. The door must be capable of operation using both the remote fire door control circuit and the remote watertight door control circuit. If two doors are fitted, they must be capable of independent operation. The operation of either door separately must not preclude closing of the other door. Both doors must be capable of being operated from either side of the bulkhead.

**Regulation 17.2**

*This explanatory note only applies to passenger ships constructed on or after 1 January 2024.*

1 Doors fitted in internal watertight subdivision boundaries located above the bulkhead deck that are immersed at either the final equilibrium or worst intermediate stage of flooding waterlines should be sliding watertight doors that comply fully with the requirements of regulation 13. They should not be immersed at any stage of flooding by a head of water higher than their design scantlings or their tested pressure head. These sliding watertight doors should be kept closed during navigation in accordance with the requirements of regulation 22 and this should be clearly indicated in the damage control information required by regulation 19.

2 The use of sliding watertight doors above the bulkhead deck affects the escape provisions of regulation II-2/13. When such doors are used above the bulkhead deck, there should be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces, at least one of which should be independent of watertight doors and at least one of which should give access to a stairway forming a vertical escape. Sliding watertight doors that will be used frequently by passengers must not create a tripping hazard.

3 Doors fitted above the bulkhead deck which are required to meet both fire protection and watertight requirements should comply with the fire requirements in regulation II-2/9.4.1.1 and the watertight requirements in paragraph 1 above. Notwithstanding regulation II-2/9.4.1.1.3, watertight doors fitted above the bulkhead deck should be insulated to the standard required by table 9.1 and regulation II-2/9.2.2.1.1.1 or by table 9.3 and regulation II-2/9.2.2.1.1.2 as appropriate. The door must be capable of operation using both the remote fire door control circuit and the remote watertight door control circuit. If two doors are fitted, they must be capable of independent operation. The operation of either door separately must not preclude closing of the other door. Both doors must be capable of being operated from either side of the bulkhead.

**Regulation 17.3**

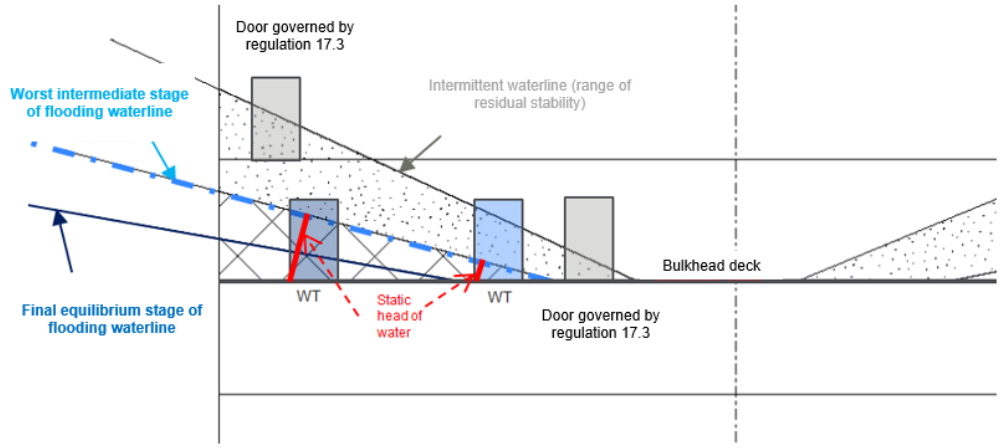
*This explanatory note only applies to passenger ships constructed on or after 1 January 2024.*

1 To be considered capable of preventing the passage of water when intermittently immersed in the required range of positive stability, these doors should meet a watertight standard for a minimum 1 m head of water. These doors may be hinged or sliding, provided they comply with the design requirements applied from both sides of the door. Consideration

should be given to the opening direction for hinged doors, so that they do not open against the intended direction of escape. These doors should be closed in case of damage and this should be clearly indicated in the damage control information required by regulation 19.

2 These doors are required to meet the fire protection requirements in chapter II-2. Because these doors are not watertight doors that comply with the requirements in regulation 13, the exclusions for watertight doors in chapter II-2 do not apply. In addition to operation using the fire door control circuit, these doors should be provided with a separate remote closure control circuit located on the navigation bridge with the central operating console for the power-operated sliding watertight doors that is required by regulation 13.7.1. A diagram showing the location of each door, with visual indicators to show whether each door is open or closed, should also be at the central operating console. A red light should indicate a door is fully open and a green light should indicate a door is fully closed. When the door is closed remotely, the red light should indicate the intermediate position by flashing. The indicating circuit should be independent of the control circuit for each door. Indication should also be provided to the onboard stability computer, if installed in accordance with regulation 8-1.3.1.

3 These doors should also be capable of being remotely closed with the ship listed 15 degrees either way.



| | Situation/waterlines | Type | Structural and functional scantling | Use at sea |
|---|---|---|---|---|
| Watertight door according to regulations 17.2 and 13 | Immersed at the final equilibrium stage of flooding waterline or the worst intermediate stage of flooding waterline | Sliding | According to Revised MSC.1/Circ.1572 | Closed during navigation |
| Door according to regulation 17.3 | Above the worst intermediate and final equilibrium waterlines but within the area where the door becomes intermittently immersed (fully or partially) at angles of heel in the required range of positive stability beyond the equilibrium position | Hinged or Sliding | | Doors that are remotely operated should be closed in case of damage |

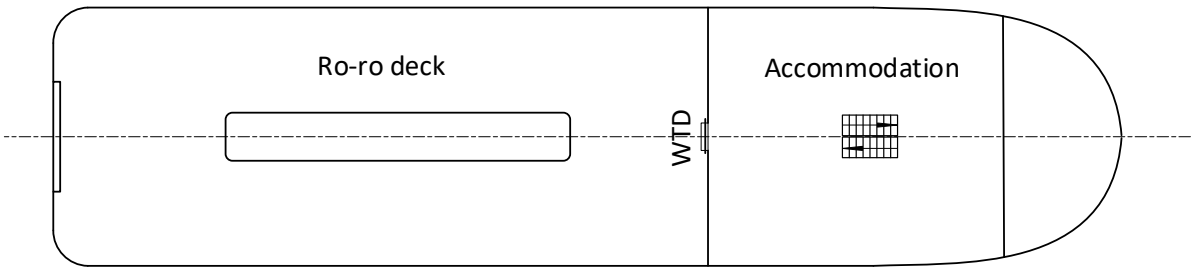
**Regulation 17.5**

*For passenger ships for which the building contract is placed on or after 1 January 2020 and which are constructed before 1 January 2024, this is regulation 17.3.*

This paragraph is intended to ensure that progressive flooding through air pipes of volumes located above a horizontal division in the superstructure, which is considered as a watertight boundary when applying regulation 7-2.6.1.1, will be taken into consideration if a side or bottom damage would cause flooding via tanks or spaces located below the waterline.

**REGULATION 17-1 – INTEGRITY OF THE HULL AND SUPERSTRUCTURE, DAMAGE PREVENTION AND CONTROL ON RO-RO PASSENGER SHIPS**

Regulations 17-1.1.1 and 17-1.1.3 apply only to direct accesses from a ro-ro space to spaces located below the bulkhead deck. The operation of watertight doors in bulkheads separating a ro-ro space and other spaces as per regulation 13.8.1 should be limited to compliance with regulation 23.3.



**Regulation 17-1.1.2**

If a non-watertight vehicle ramp closure is assumed to restrict the flow of water during the calculation of the attained subdivision index *A*, the vehicle ramp opening should comply with regulation 7-2.5.3.4.

**REGULATION 22 – PREVENTION AND CONTROL OF WATER INGRESS, ETC.**

The word "port" used in this regulation includes all berths and sheltered locations where loading and/or discharging may take place.

**Regulation 22.3**

Regarding the requirement that Administrations authorize watertight doors that may be opened during navigation only after careful consideration of the impact on ship operations and survivability taking into account guidance issued by the Organization, no prescribed guidance with respect to stability survivability is considered necessary for cargo ships. For cargo ships, these authorizations are left to the discretion of the Administration.

**Regulation 22.7**

This provision applies to any hatches that are considered watertight in the damage stability calculations, whether fitted above or below the bulkhead deck of passenger ships or the freeboard deck of cargo ships.

**REGULATION 23 – SPECIAL REQUIREMENTS FOR RO-RO PASSENGER SHIPS**

**Regulation 23.6**

In the context of this paragraph, the movement of cargo during navigation should not be considered "the essential working of the ship".

APPENDIX

# GUIDELINES FOR THE PREPARATION OF SUBDIVISION AND DAMAGE STABILITY CALCULATIONS

## 1 GENERAL

### 1.1 Purpose of the Guidelines

1.1.1 These Guidelines serve the purpose of simplifying the process of the damage stability analysis, as experience has shown that a systematic and complete presentation of the particulars results in considerable saving of time during the approval process.

1.1.2 A damage stability analysis serves the purpose of providing proof of the damage stability standard required for the respective ship type. At present, two different calculation methods, the deterministic concept and the probabilistic concept, are applied.

### 1.2 Scope of analysis and documentation on board

1.2.1 The scope of subdivision and damage stability analysis is determined by the required damage stability standard and aims at providing the ship's master with clear intact stability requirements. In general, this is achieved by determining *KG*-respective *GM*-limit curves, containing the admissible stability values for the draught range to be covered.

1.2.2 Within the scope of the analysis thus defined, all potential or necessary damage conditions will be determined, taking into account the damage stability criteria, in order to obtain the required damage stability standard. Depending on the type and size of ship, this may involve a considerable amount of analyses.

1.2.3 Referring to SOLAS chapter II-1, regulation 19, the necessity to provide the crew with the relevant information regarding the subdivision of the ship is expressed, therefore plans should be provided and permanently exhibited for the guidance of the officer in charge. These plans should clearly show for each deck and hold the boundaries of the watertight compartments, the openings therein with means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, Damage Control Booklets containing the aforementioned information should be available.

## 2 DOCUMENTS FOR SUBMISSION

### 2.1 Presentation of documents

The documentation should begin with the following details: principal dimensions, ship type, designation of intact conditions, designation of damage conditions and pertinent damaged compartments, *KG*-respective *GM*-limit curve.

### 2.2 General documents

For the checking of the input data, the following should be submitted:

.1 main dimensions;

.2 lines plan, plotted or numerical;

.3 hydrostatic data and cross curves of stability (including drawing of the buoyant hull);

.4 definition of sub-compartments with moulded volumes, centres of gravity and permeability;

.5 layout plan (watertight integrity plan) for the sub-compartments with all internal and external opening points including their connected sub-compartments, and particulars used in measuring the spaces, such as general arrangement plan and tank plan. The subdivision limits, longitudinal, transverse and vertical, should be included;

.6 light service condition;

.7 load line draught;

.8 coordinates of opening points with their level of tightness (e.g. weathertight, unprotected);

.9 watertight door location with pressure calculation;

.10 side contour and wind profile;

.11 cross and downflooding devices and the calculations thereof according to resolution MSC.362(92) with information about diameter, valves, pipe lengths and coordinates of inlet/outlet;

.12 pipes in damaged area when the destruction of these pipes results in progressive flooding; and

.13 damage extensions and definition of damage cases.

## 2.3 Special documents

The following documentation of results should be submitted.

### 2.3.1 Documentation

2.3.1.1 Initial data:

.1 subdivision length $L_s$;

.2 initial draughts and the corresponding *GM*-values;

.3 required subdivision index *R*; and

.4 attained subdivision index *A* with a summary table for all contributions for all damaged zones.

2.3.1.2 Results for each damage case which contributes to the index *A*:

.1 draught, trim, heel, *GM* in damaged condition;

.2 dimension of the damage with probabilistic values *p*, *v* and *r*;

.3 righting lever curve (including $GZ_{max}$ and range) with factor of survivability *s*;

.4 critical weathertight and unprotected openings with their angle of immersion; and

.5 details of sub-compartments with amount of in-flooded water/lost buoyancy with their centres of gravity.

2.3.1.3 In addition to the requirements in paragraph 2.3.1.2, particulars of non-contributing damages ($s_i = 0$ and $p_i > 0.00$) should also be submitted for passenger ships and ro-ro ships fitted with long lower holds including full details of the calculated factors.

### 2.3.2 Special consideration

For intermediate conditions, as stages before cross-flooding or before progressive flooding, an appropriate scope of the documentation covering the aforementioned items is needed in addition.

***

**ANNEX 13**

**RESOLUTION MSC.429(98)/Rev.1**
**(adopted on 11 November 2020)**

**REVISED EXPLANATORY NOTES TO THE SOLAS CHAPTER II-1 SUBDIVISION AND DAMAGE STABILITY REGULATIONS**

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO that, by resolution MSC.216(82), it adopted the regulations on subdivision and damage stability as contained in SOLAS chapter II-1 which are based on the probabilistic concept, using the probability of survival after collision as a measure of ships' safety in a damaged condition,

NOTING that, at the eighty-second session, it approved *Interim explanatory notes to the SOLAS chapter II-1 subdivision and damage stability regulations* (MSC.1/Circ.1226), to assist Administrations in the uniform interpretation and application of the aforementioned subdivision and damage stability regulations,

NOTING ALSO that, at the eighty-fifth session, it adopted the *Explanatory notes to the SOLAS chapter II-1 subdivision and damage stability regulations* (resolution MSC.281(85)),

NOTING FURTHER that, by resolution MSC.421(98), it adopted amendments to regulations on subdivision and damage stability, as contained in SOLAS chapter II-1,

RECOGNIZING that the Revised Explanatory Notes should be adopted in conjunction with the adoption of the aforementioned amendments to subdivision and damage stability regulations (resolution MSC.421(98)),

RECOGNIZING ALSO that the appropriate application of the Revised Explanatory Notes is essential for ensuring the uniform application of the SOLAS chapter II-1 subdivision and damage stability regulations,

RECALLING that, having considered, at its ninety-eighth session (7 to 16 June 2017), the recommendations made by the Sub-Committee on Ship Design and Construction at its fourth session, it adopted, by resolution MSC.429(98), the *Revised explanatory notes to the SOLAS chapter II-1 subdivision and damage stability regulations*,

HAVING CONSIDERED, at its 102nd session, minor amendments to paragraph 4 of the Explanatory Note to SOLAS regulation 17 (Internal watertight integrity of passenger ships above the bulkhead deck),

1 ADOPTS the *Revised explanatory notes to the SOLAS chapter II-1 subdivision and damage stability regulations* set out in the annex to the present resolution;

2 URGES Contracting Governments and all parties concerned to utilize the Revised Explanatory Notes when applying the SOLAS chapter II-1 subdivision and damage stability regulations adopted by resolution MSC.216(82), as amended;

3 INVITES Contracting Governments to note that these Revised Explanatory Notes take effect on ships as defined in SOLAS regulation II-1/1.1.1, as adopted by resolution MSC.421(98).

4 REVOKES resolution MSC.429(98).

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ANNEX

# REVISED EXPLANATORY NOTES TO THE SOLAS CHAPTER II-1 SUBDIVISION AND DAMAGE STABILITY REGULATIONS

## Contents

## PART A

## INTRODUCTION

1 The harmonized SOLAS regulations on subdivision and damage stability, as contained in SOLAS chapter II-1, are based on a probabilistic concept which uses the probability of survival after collision as a measure of ships' safety in a damaged condition. This probability is referred to as the "attained subdivision index *A*" in the regulations. It can be considered an objective measure of ships' safety and, ideally, there would be no need to supplement this index by any deterministic requirements.

2 The philosophy behind the probabilistic concept is that two different ships with the same attained index are of equal safety and, therefore, there is no need for special treatment of specific parts of the ship, even if they are able to survive different damages. The only areas which are given special attention in the regulations are the forward and bottom regions, which are dealt with by special subdivision rules provided for cases of ramming and grounding.

3 Only a few deterministic elements, which were necessary to make the concept practicable, have been included. It was also necessary to include a deterministic "minor damage" on top of the probabilistic regulations for passenger ships to avoid ships being designed with what might be perceived as unacceptably vulnerable spots in some part of their length.

4 It is easily recognized that there are many factors that will affect the final consequences of hull damage to a ship. These factors are random and their influence is different for ships with different characteristics. For example, it would seem obvious that in ships of similar size carrying different amounts of cargo, damages of similar extents may lead to different results because of differences in the range of permeability and draught during service. The mass and velocity of the ramming ship is obviously another random variable.

5 Owing to this, the effect of a three-dimensional damage to a ship with given watertight subdivision depends on the following circumstances:

.1 which particular space or group of adjacent spaces is flooded;

.2 the draught, trim and intact metacentric height at the time of damage;

.3 the permeability of affected spaces at the time of damage;

.4 the sea state at the time of damage; and

.5 other factors such as possible heeling moments owing to unsymmetrical weights.

6 Some of these circumstances are interdependent and the relationship between them and their effects may vary in different cases. Additionally, the effect of hull strength on penetration will obviously have some effect on the results for a given ship. Since the location and size of the damage is random, it is not possible to state which part of the ship becomes flooded. However, the probability of flooding a given space can be determined if the probability of occurrence of certain damages is known from experience, that is, damage statistics. The probability of flooding a space is then equal to the probability of occurrence of all such damages which just open the considered space to the sea.

7 For these reasons and because of mathematical complexity as well as insufficient data, it would not be practicable to make an exact or direct assessment of their effect on the probability that a particular ship will survive a random damage if it occurs. However, accepting some approximations or qualitative judgments, a logical treatment may be achieved by using the probability approach as the basis for a comparative method for the assessment and regulation of ship safety.

8 It may be demonstrated by means of probability theory that the probability of ship survival should be calculated as the sum of probabilities of its survival after flooding each single compartment, each group of two, three, etc., adjacent compartments multiplied, respectively, by the probabilities of occurrence of such damages leading to the flooding of the corresponding compartment or group of compartments.

9 If the probability of occurrence for each of the damage scenarios the ship could be subjected to is calculated and then combined with the probability of surviving each of these damages with the ship loaded in the most probable loading conditions, the attained index *A* as a measure for the ship's ability to sustain a collision damage can be determined.

10 It follows that the probability that a ship will remain afloat without sinking or capsizing as a result of an arbitrary collision in a given longitudinal position can be broken down to:

.1 the probability that the longitudinal centre of damage occurs in just the region of the ship under consideration;

.2 the probability that this damage has a longitudinal extent that only includes spaces between the transverse watertight bulkheads found in this region;

.3 the probability that the damage has a vertical extent that will flood only the spaces below a given horizontal boundary, such as a watertight deck;

.4 the probability that the damage has a transverse penetration not greater than the distance to a given longitudinal boundary; and

.5 the probability that the watertight integrity and the stability throughout the flooding sequence is sufficient to avoid capsizing or sinking.

11 The first three of these factors are solely dependent on the watertight arrangement of the ship, while the last two depend on the ship's shape. The last factor also depends on the actual loading condition. By grouping these probabilities, calculations of the probability of survival, or attained index *A*, have been formulated to include the following probabilities:

.1 the probability of flooding each single compartment and each possible group of two or more adjacent compartments; and

.2 the probability that the stability after flooding a compartment or a group of two or more adjacent compartments will be sufficient to prevent capsizing or dangerous heeling due to loss of stability or to heeling moments in intermediate or final stages of flooding.

12 This concept allows a rule requirement to be applied by requiring a minimum value of *A* for a particular ship. This minimum value is referred to as the "required subdivision index *R*" in the present regulations and can be made dependent on ship size, number of passengers or other factors legislators might consider important.

13 Evidence of compliance with the rules then simply becomes:

$$A \geq R$$

13.1 As explained above, the attained subdivision index *A* is determined by a formula for the entire probability as the sum of the products for each compartment or group of compartments of the probability that a space is flooded, multiplied by the probability that the ship will not capsize or sink due to flooding of the considered space. In other words, the general formula for the attained index can be given in the form:

$$A = \Sigma p_i s_i$$

13.2 Subscript "*i*" represents the damage zone (group of compartments) under consideration within the watertight subdivision of the ship. The subdivision is viewed in the longitudinal direction, starting with the aftmost zone/compartment.

13.3 The value of "$p_i$" represents the probability that only the zone "*i*" under consideration will be flooded, disregarding any horizontal subdivision, but taking transverse subdivision into account. Longitudinal subdivision within the zone will result in additional flooding scenarios, each with its own probability of occurrence.

13.4 The value of "$s_i$" represents the probability of survival after flooding the zone "*i*" under consideration.

14 Although the ideas outlined above are very simple, their practical application in an exact manner would give rise to several difficulties if a mathematically perfect method were to be developed. As pointed out above, an extensive but still incomplete description of the damage will include its longitudinal and vertical location as well as its longitudinal, vertical and transverse extent. Apart from the difficulties in handling such a five-dimensional random variable, it is impossible to determine its probability distribution very accurately with the presently available damage statistics. Similar limitations are true for the variables and physical relationships involved in the calculation of the probability that a ship will not capsize or sink during intermediate stages or in the final stage of flooding.

15 A close approximation of the available statistics would result in extremely numerous and complicated computations. In order to make the concept practicable, extensive simplifications are necessary. Although it is not possible to calculate the exact probability of survival on such a simplified basis, it has still been possible to develop a useful comparative measure of the merits of the longitudinal, transverse and horizontal subdivision of a ship.

## PART B

## GUIDANCE ON INDIVIDUAL SOLAS CHAPTER II-1 SUBDIVISION AND DAMAGE STABILITY REGULATIONS

### REGULATION 1 – APPLICATION

#### Regulation 1.3

1 If a passenger ship built before 1 January 2009 undergoes alterations or modifications of major character, it may still remain under the damage stability regulations applicable to ships built before 1 January 2009.

2 If a passenger ship constructed on or after 1 January 2009 but before the applicable dates in regulation 1.1.1.1[1] undergoes alterations or modifications of major character that do not impact the watertight subdivision of the ship, or only have a minor impact, it may still remain under the damage stability regulations that were applicable when it was constructed. However, if alterations or modifications of major character significantly impact the watertight subdivision of the ship, it should comply with the damage stability regulations in part B-1 applicable when the alterations or modifications of major character are carried out unless the Administration determines that this is not reasonable and practicable, in which case the attained subdivision index *A* should be raised above the original construction required subdivision index *R* as much as practical.

3 Application of MSC.1/Circ.1246 is limited to cargo ships constructed before 1 January 2009.

4 A cargo ship constructed on or after 1 January 2009 of less than 80 m in length that is later lengthened beyond that limit should fully comply with the damage stability regulations according to its type and length.

5 If a passenger ship that has been in domestic service only and never been issued a SOLAS Passenger Ship Safety Certificate is converted to international service, for purposes of the stability requirements in parts B, B-1, B-2, B-3 and B-4 it should be treated as a passenger ship constructed on the date on which such a conversion commences.

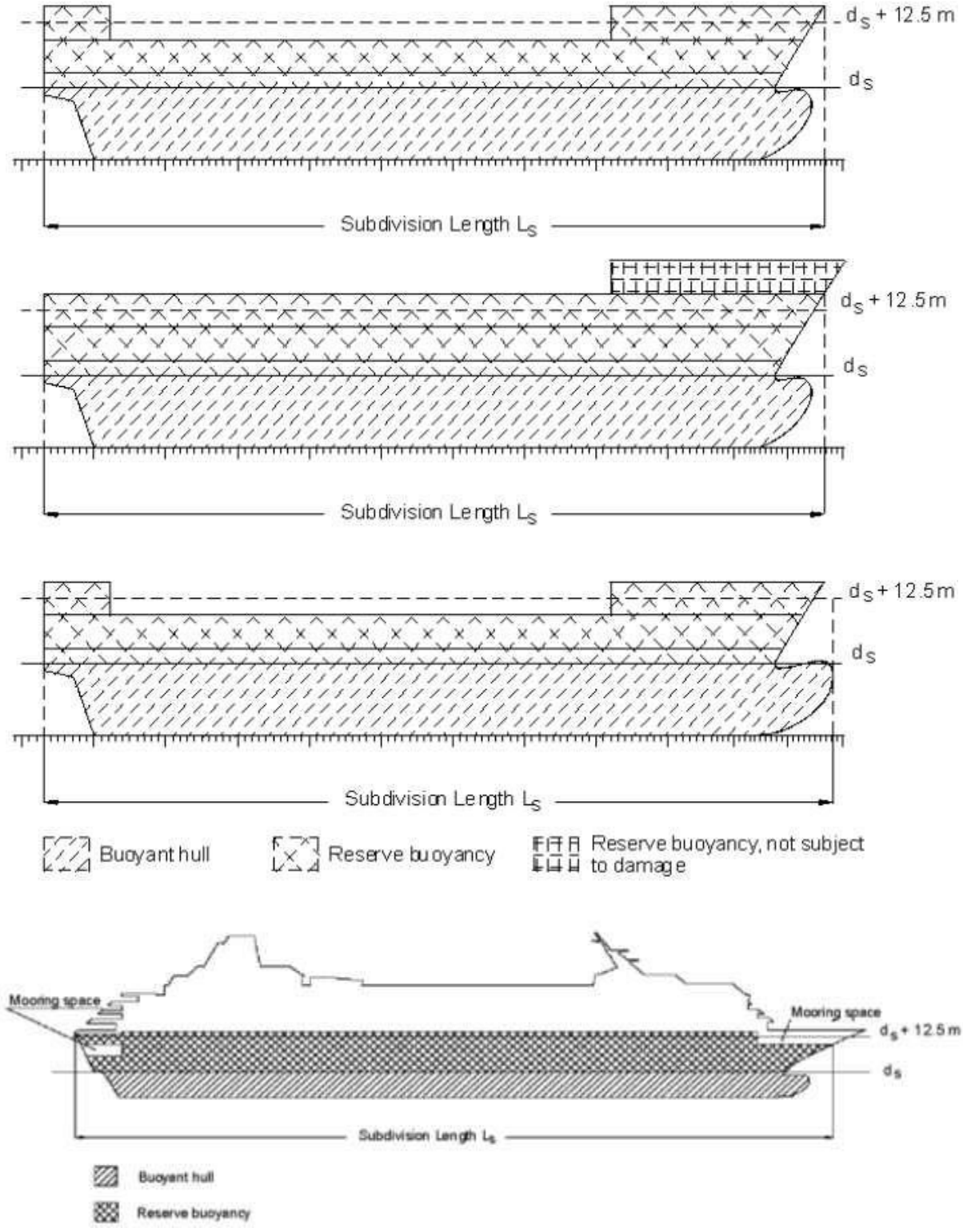
### REGULATION 2 – DEFINITIONS

#### Regulation 2.1

Subdivision length ($L_s$) – Different examples of $L_s$ showing the buoyant hull and the reserve buoyancy are provided in the figures below. The limiting deck for the reserve buoyancy may be partially watertight.

The maximum possible vertical extent of damage above the baseline is $d_s$ + 12.5 metres.

[1] References to regulations in this Guidance are to regulations of SOLAS chapter II-1, unless expressly provided otherwise.




**Regulation 2.6**

Freeboard deck – See explanatory notes for regulation 13-1 for the treatment of a stepped freeboard deck with regard to watertightness and construction requirements.

**Regulation 2.11**

Light service draught ($d_l$) – The light service draught ($d_l$) corresponds, in general, to the ballast arrival condition with 10% consumables for cargo ships. For passenger ships it corresponds, in general, to the arrival condition with 10% consumables, a full complement of passengers and crew and their effects, and ballast as necessary for stability and trim. Any temporary ballast water exchange conditions for compliance with the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 or any non-service conditions, such as dry-docking, should not be taken as $d_l$.

**Regulation 2.19**

Bulkhead deck – See explanatory notes for regulation 13 for the treatment of a stepped bulkhead deck with regard to watertightness and construction requirements.

## REGULATION 4 – GENERAL

**Regulation 4.5**

See explanatory notes for regulation 7-2.2, for information and guidance related to these provisions.

## REGULATION 5 – INTACT STABILITY

**Regulation 5.2**

1 For the purpose of this regulation, a sister ship means a cargo ship built by the same shipyard from the same plans.

2 For any new sister ship with known differences from the lead sister ship that do not exceed the lightship displacement and longitudinal centre of gravity deviation limits specified in regulation 5.2, a detailed weights and centres of gravity calculation to adjust the lead sister ship's lightship properties should be carried out. These adjusted lead sister ship lightship properties are then used for comparison to the new sister ship's lightweight survey results. However, in cases when the known differences from the lead sister ship exceed lightship displacement or longitudinal centre of gravity deviation limits specified in regulation 5.2, the ship should be inclined.

3 When the lightweight survey results do not exceed the specified deviation limits, the lightship displacement and the longitudinal and transverse centres of gravity obtained from the lightweight survey should be used in conjunction with the higher of either the lead sister ship's vertical centre of gravity or the calculated, adjusted value.

4 Regulation 5.2 may be applied to the SPS Code ships certified to carry less than 240 persons.

**Regulation 5.4**

1 When alterations are made to a ship in service that result in calculable differences in the lightship properties, a detailed weights and centres of gravity calculation to adjust the lightship properties should be carried out. If the adjusted lightship displacement or longitudinal centre of gravity, when compared to the approved values, exceeds one of the deviation limits specified in regulation 5.5, the ship should be re-inclined. In addition, if the adjusted lightship vertical centre of gravity, when compared to the approved value, exceeds 1%, the ship should be re-inclined. The lightship transverse centre of gravity is not subject to a deviation limit.

2 When a ship does not exceed the deviation limits specified in explanatory note 1 above, amended stability information should be provided to the master using the new calculated lightship properties if any of the following deviations from the approved values are exceeded:

.1 1% of the lightship displacement; or

.2 0.5% of L for the longitudinal centre of gravity; or

.3 0.5% of the vertical centre of gravity.

2.1 However, in cases when these deviation limits are not exceeded, it is not necessary to amend the stability information supplied to the master.

3 When multiple alterations are made to a ship in service over a period of time and each alteration is within the deviation limits specified above, the cumulative total changes to the lightship properties from the most recent inclining also should not exceed the deviation limits specified above or the ship should be re-inclined.

**Regulation 5.5**

When the lightweight survey results do not exceed the specified deviation limits, the lightship displacement and the longitudinal and transverse centres of gravity obtained from the lightweight survey should be used in conjunction with the vertical centre of gravity derived from the most recent inclining in all subsequent stability information supplied to the master.

**REGULATION 5-1 – STABILITY INFORMATION TO BE SUPPLIED TO THE MASTER**

**Regulation 5-1.3**

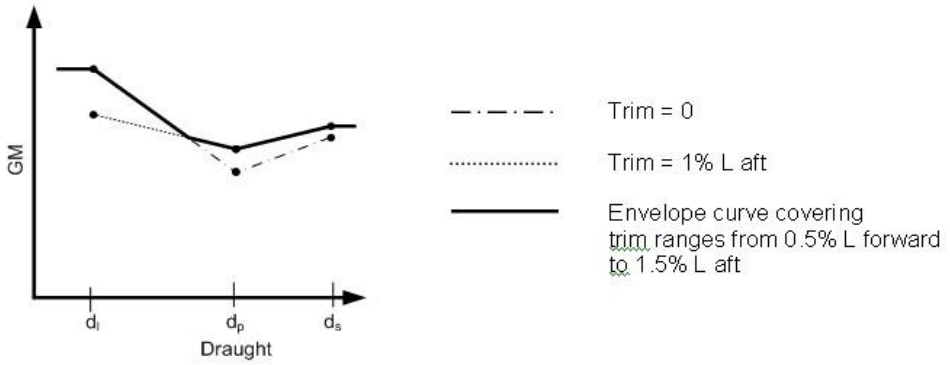
The requirement that applied trim values shall coincide in all stability information intended for use on board is intended to address initial stability calculations as well as those that may be necessary during the service life of the ship.

**Regulation 5-1.4 (see also regulation 7.2)**

1 Linear interpolation of the limiting values between the draughts $d_s$, $d_p$ and $d_l$ is only applicable to minimum *GM* values. If it is intended to develop curves of maximum permissible *KG*, a sufficient number of $KM_T$ values for intermediate draughts should be calculated to ensure that the resulting maximum *KG* curves correspond with a linear variation of *GM*. When light service draught is not with the same trim as other draughts, $KM_T$ for draughts between partial and light service draught should be calculated for trims interpolated between trim at partial draught and trim at light service draught.

2 In cases where the operational trim range is intended to exceed ±0.5% of *L*, the original *GM* limit line should be designed in the usual manner with the deepest subdivision draught and partial subdivision draught calculated at level trim and estimated service trim used for the light service draught. Then additional sets of *GM* limit lines should be constructed on the basis of the operational range of trims which is covered by loading conditions for each of the three draughts $d_s$, $d_p$ and $d_l$ ensuring that intervals of 1% *L* are not exceeded. The sets of *GM* limit lines are combined to give a single envelope limiting *GM* curve. The effective trim range of the curve should be clearly stated.

3 If multiple *GM* limiting curves are obtained from damage stability calculations of differing trims in accordance with regulation 7, an envelope curve covering all calculated trim values should be developed. Calculations covering different trim values should be carried out in steps not exceeding 1% of *L*. The whole range including intermediate trims should be covered by the damage stability calculations. Refer to the example showing an envelope curve obtained from calculations of 0 trim and 1% of *L*.

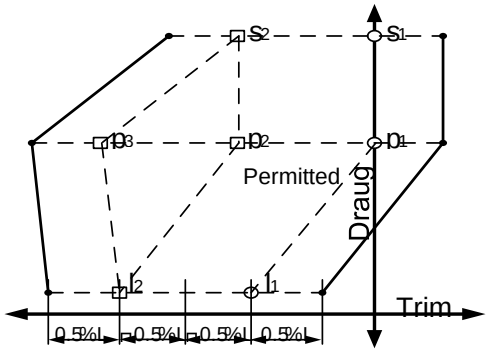



4 Temporary loading conditions may occur with a draught less than the light service draught $d_l$ due to ballast water exchange requirements, etc. In these cases, for draughts below $d_l$, the *GM* limit value at $d_l$ is to be used.

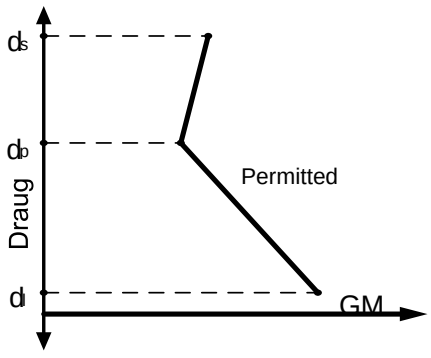
5 Ships may be permitted to sail at draughts above the deepest subdivision draught $d_s$ according to the International Convention on Load Lines, e.g. using the tropical freeboard. In these cases, for draughts above $d_s$ the *GM* limit value at $d_s$ is to be used.

**Regulation 5-1.5**

There could be cases where it is desirable to expand the trim range, for instance around $d_p$. This approach is based on the principle that it is not necessary that the same number of trims be used when the *GM* is the same throughout a draught and when the steps between trims do not exceed 1% of *L*. In these cases there will be three *A* values based on draughts $s_1$, $p_1$, $l_1$ and $s_2$, $p_2$, $l_2$ and $s_2$, $p_3$, $l_2$. The lowest value of each partial index $A_s$, $A_p$ and $A_l$ across these trims should be used in the summation of the attained subdivision index *A*.




**Trim limit diagram**




**GM limit curve**

**Regulation 5-1.6**

This provision is intended to address cases where an Administration approves an alternative means of verification.

## REGULATION 6 – REQUIRED SUBDIVISION INDEX *R*

### Regulation 6.1

To demonstrate compliance with these provisions, see the *Guidelines for the preparation of subdivision and damage stability calculations*, set out in the appendix, regarding the presentation of damage stability calculation results.

## REGULATION 7 – ATTAINED SUBDIVISION INDEX *A*

### Regulation 7.1

1 The probability of surviving after collision damage to the ship's hull is expressed by the index *A*. Producing an index *A* requires calculation of various damage scenarios defined by the extent of damage and the initial loading conditions of the ship before damage. Three loading conditions should be considered and the result weighted as follows:

$$A = 0.4A_s + 0.4A_p + 0.2A_l$$

where the indices *s*, *p* and *l* represent the three loading conditions and the factor to be multiplied to the index indicates how the index *A* from each loading condition is weighted.

2 The method of calculating *A* for a loading condition is expressed by the formula:

$$A_c = \sum_{i=1}^{i=t} p_i [v_i s_i]$$

2.1 The index *c* represents one of the three loading conditions, the index *i* represents each investigated damage or group of damages and *t* is the number of damages to be investigated to calculate $A_c$ for the particular loading condition.

2.2 To obtain a maximum index *A* for a given subdivision, *t* has to be equal to *T*, the total number of damages.

3 In practice, the damage combinations to be considered are limited either by significantly reduced contributions to *A* (i.e. flooding of substantially larger volumes) or by exceeding the maximum possible damage length.

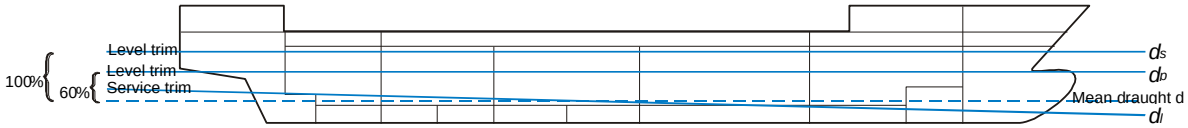
4 The index *A* is divided into partial factors as follows:

$p_i$ The *p* factor is solely dependent on the geometry of the watertight arrangement of the ship.

$v_i$ The *v* factor is dependent on the geometry of the watertight arrangement (decks) of the ship and the draught of the initial loading condition. It represents the probability that the spaces above the horizontal subdivision will not be flooded.

$s_i$ The *s* factor is dependent on the calculated survivability of the ship after the considered damage for a specific initial condition.

5 Three initial loading conditions should be used for calculating each index *A.* The loading conditions are defined by their mean draught *d,* trim and *GM (*or *KG).* The mean draught and trim are illustrated in the figure below.




6 The *GM* (or *KG*) values for the three loading conditions could, as a first attempt, be taken from the intact stability *GM* (or *KG*) limit curve. If the required index *R* is not obtained, the *GM* (or *KG*) values may be increased (or reduced), implying that the intact loading conditions from the intact stability book must now meet the *GM* (or *KG*) limit curve from the damage stability calculations derived by linear interpolation between the three *GM*s.

7 For a series of new passenger or cargo ships built from the same plans each of which have the same draughts $d_s$, $d_p$ and $d_l$ as well as the same *GM* and trim limits, the attained subdivision index *A* calculated for the lead ship may be used for the other ships. In addition, small differences in the draught $d_l$ (and the subsequent change in the draught $d_p$) are acceptable if they are due to small differences in the lightship characteristics that do not exceed the deviation limits specified in regulation 5.2. For cases where these conditions are not met, a new attained subdivision index *A* should be calculated.

"Built from the same plans" means that the watertight and weathertight aspects of the hull, bulkheads, openings and other parts of a ship that impact the attained subdivision index *A* calculation remain exactly the same.

8 For a passenger or cargo ship in service which undergoes alterations that materially affect the stability information supplied to the master and require it to be re-inclined in accordance with regulation 5.4, a new attained subdivision index *A* should be calculated. However, for alteration cases where a re-inclining is not required and the alterations do not change the watertight and weathertight arrangements of the ship that impact the attained subdivision index *A*, if $d_s$ and the *GM* and trim limits remain the same then a new attained subdivision index *A* is not required.

9 For passenger ships subject to lightweight surveys every 5 years, if the lightweight survey results are within the limits specified in regulation 5.5, and $d_s$ and the *GM* and trim limits remain the same, a new attained subdivision index *A* is not required. However, if the lightweight survey results exceed either limit specified in regulation 5.5, a new attained subdivision index *A* should be calculated.

10 For any new passenger or cargo ship for which the deviation in lightship characteristics between the preliminary and the as built values are within the limits specified in regulation 5.2 and $d_s$ is unchanged, then the preliminary attained subdivision index *A* calculation may be approved as the final attained subdivision index *A* calculation. However, for cases where these conditions are not met, then a new attained subdivision index *A* should be calculated.

**Regulation 7.2**

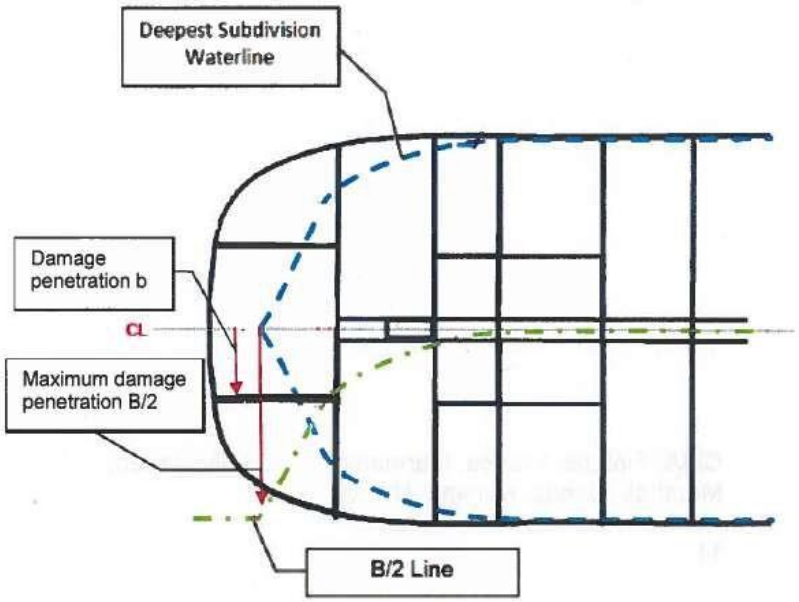
When additional calculations of *A* are performed for different trims, for a given set of calculations the difference between trim values for $d_s$, $d_p$ and $d_l$ may not exceed 1% *L*.

**Regulation 7.5**

1 With the same intent as wing tanks, the summation of the attained index *A* should reflect effects caused by all watertight bulkheads and flooding boundaries within the damaged zone. It is not correct to assume damage only to one half of the ship's breadth *B* and ignore changes in subdivision that would reflect lesser contributions.

2 In the forward and aft ends of the ship where the sectional breadth is less than the ship's breadth *B*, transverse damage penetration can extend beyond the centreline bulkhead. This application of the transverse extent of damage is consistent with the methodology to account for the localized statistics which are normalized on the greatest moulded breadth *B* rather than the local breadth.

3 Where, at the extreme ends of the ship, the subdivision exceeds the waterline at the deepest subdivision draught, the damage penetration *b* or *B*/2 is to be taken from centreline. The figure below illustrates the shape of the *B*/2 line.




4 Where longitudinal corrugated bulkheads are fitted in wing compartments or on the centreline, they may be treated as equivalent plane bulkheads provided the corrugation depth is of the same order as the stiffening structure. The same principle may also be applied to transverse corrugated bulkheads.

**Regulation 7.6**

Refer to the explanatory notes for regulation 7-2.2 for the treatment of free surfaces during all stages of flooding.

**Regulation 7.7**

1 Pipes and valves directly adjacent or situated as close as practicable to a bulkhead or to a deck can be considered to be part of the bulkhead or deck, provided the separation distance on either side of the bulkhead or deck is of the same order as the bulkhead or deck stiffening structure. The same applies for small recesses, drain wells, etc.

2 For ships up to $L$ = 150 m the provision for allowing "minor progressive flooding" should be limited to pipes penetrating a watertight subdivision with a total cross-sectional area of not more than 710 $mm^2$ between any two watertight compartments. For ships of $L$ = 150 m and upwards the total cross-sectional area of pipes should not exceed the cross-sectional area of one pipe with a diameter of $L$/5000 m.

**REGULATION 7-1 – CALCULATION OF THE FACTOR $p_i$**

**General**

1 The definitions below are intended to be used for the application of part B-1 only.

2 In regulation 7-1, the words "compartment" and "group of compartments" should be understood to mean "zone" and "adjacent zones".

3 Zone – a longitudinal interval of the ship within the subdivision length.

4 Room – a part of the ship, limited by bulkheads and decks, having a specific permeability.

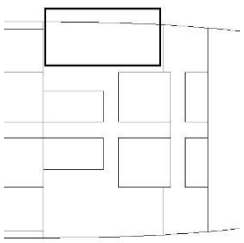
5 Space – a combination of rooms.

6 Compartment – a space within watertight boundaries.

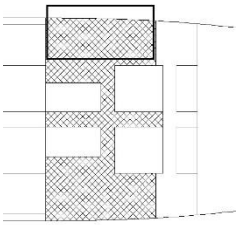
7 Damage – the three-dimensional extent of the breach in the ship.

8 For the calculation of $p$, $v$, $r$ and $b$ only the damage should be considered, for the calculation of the $s$-value the flooded space should be considered. The figures below illustrate the difference.

Damage shown as the bold square:



Flooded space shown below:



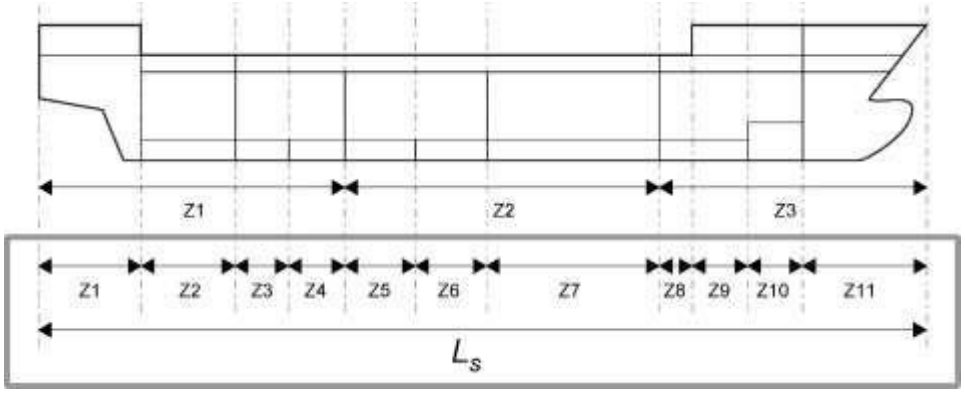
**Regulation 7-1.1.1**

1 The coefficients $b_{11}$, $b_{12}$, $b_{21}$ and $b_{22}$ are coefficients in the bi-linear probability density function on normalized damage length ($J$). The coefficient $b_{12}$ is dependent on whether $L_s$ is greater or less than $L^*$ (i.e. 260 m); the other coefficients are valid irrespective of $L_s$.

**1. Longitudinal subdivision**

2 In order to prepare for the calculation of index $A$, the ship's subdivision length $L_s$ is divided into a fixed discrete number of damage zones. These damage zones will determine the damage stability investigation in the way of specific damages to be calculated.

3 There are no specific rules for longitudinally subdividing the ship, except that the length $L_s$ defines the extremities of the zones. Zone boundaries need not coincide with physical watertight boundaries. However, it is important to consider a strategy carefully to obtain a good result (that is a large attained index $A$). All zones and combination of adjacent zones may contribute to the index $A$. In general it is expected that the more zone boundaries the ship is divided into the higher the attained index will be, but this benefit should be balanced against extra computing time. The figure below shows different longitudinal zone divisions of the length $L_s$.




4 The first example is a very rough division into three zones of approximately the same size with limits where longitudinal subdivision is established. The probability that the ship will survive a damage in one of the three zones is expected to be low (i.e. the $s$-factor is low or zero) and, therefore, the total attained index $A$ will be correspondingly low.

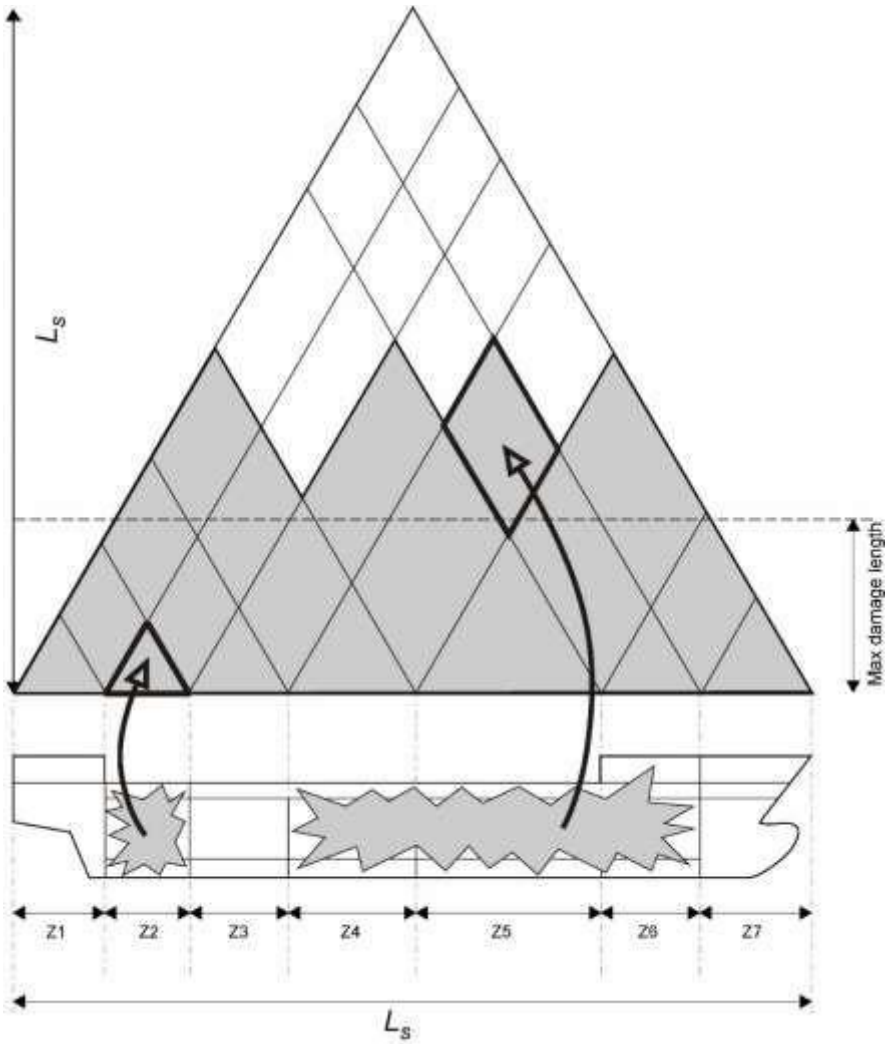
5 In the second example the zones have been placed in accordance with the watertight arrangement, including minor subdivision (as in double bottom, etc.). In this case there is a much better chance of obtaining higher $s$-factors.

6 Where transverse corrugated bulkheads are fitted, they may be treated as equivalent plane bulkheads, provided the corrugation depth is of the same order as the stiffening structure.

7 Pipes and valves directly adjacent or situated as close as practicable to a transverse bulkhead can be considered to be part of the bulkhead, provided the separation distance on either side of the bulkhead is of the same order as the bulkhead stiffening structure. The same applies for small recesses, drain wells, etc.

8 For cases where the pipes and valves cannot be considered as being part of the transverse bulkhead, when they present a risk of progressive flooding to other watertight compartments that will have influence on the overall attained index *A*, they should be handled either by introducing a new damage zone and accounting for the progressive flooding to associated compartments or by introducing a gap.

9 The triangle in the figure below illustrates the possible single and multiple zone damages in a ship with a watertight arrangement suitable for a seven-zone division. The triangles at the bottom line indicate single zone damages and the parallelograms indicate adjacent zones damages.




10 As an example, the triangle illustrates a damage opening the rooms in zone 2 to the sea and the parallelogram illustrates a damage where rooms in zones 4, 5 and 6 are flooded simultaneously.

11 The shaded area illustrates the effect of the maximum absolute damage length. The *p*-factor for a combination of three or more adjacent zones equals zero if the length of the combined adjacent damage zones minus the length of the foremost and the aft most damage zones in the combined damage zone is greater than the maximum damage length. Having this in mind when subdividing $L_s$ could limit the number of zones defined to maximize the attained index *A*.

12 As the *p*-factor is related to the watertight arrangement by the longitudinal limits of damage zones and the transverse distance from the ship side to any longitudinal barrier in the zone, the following indices are introduced:

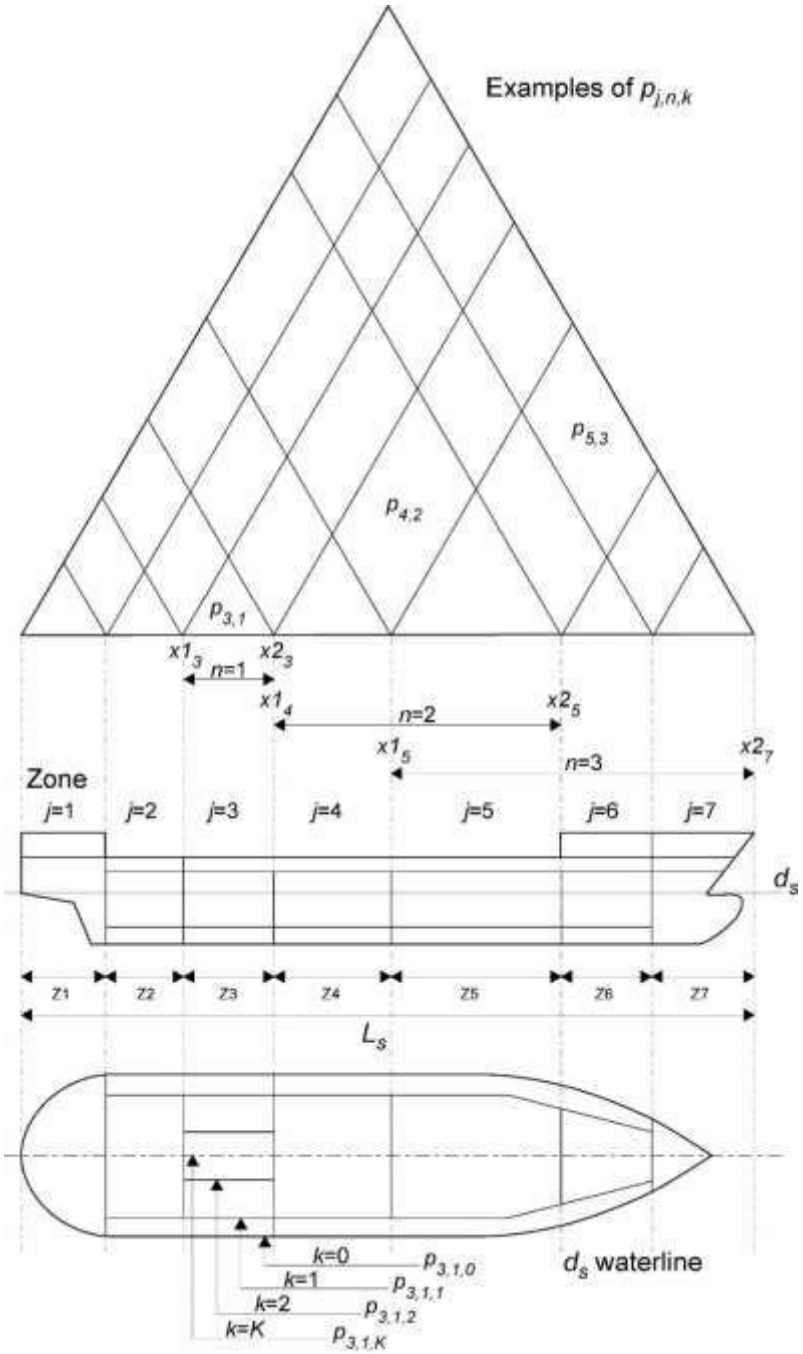
*j*: the damage zone number starting with No.1 at the stern;

*n*: the number of adjacent damage zones in question where *j* is the aft zone;

*k*: the number of a particular longitudinal bulkhead as a barrier for transverse penetration in a damage zone counted from shell towards the centreline. The shell has No. 0;

*K*: total number of transverse penetration boundaries;

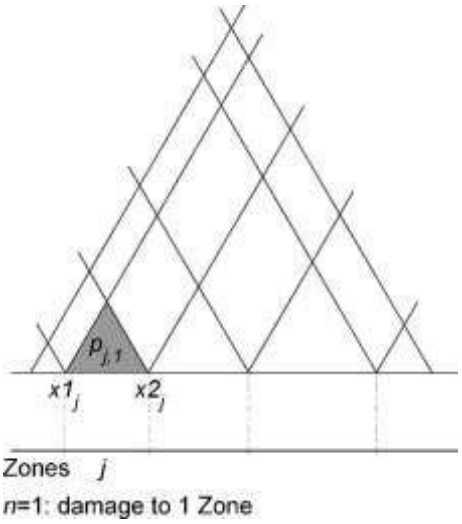
$p_{j,n,k}$: the *p*-factor for a damage in zone *j* and next (*n*-1) zones forward of *j* damaged to the longitudinal bulkhead *k*.



**Pure longitudinal subdivision**

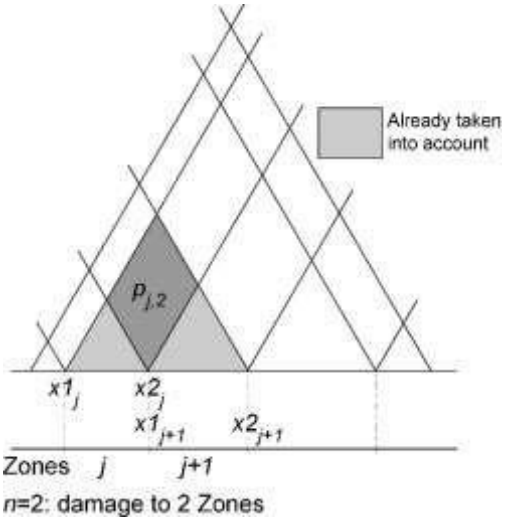
Single damage zone, pure longitudinal subdivision:

$p_{j,1} = p(x1_j, x2_j)$



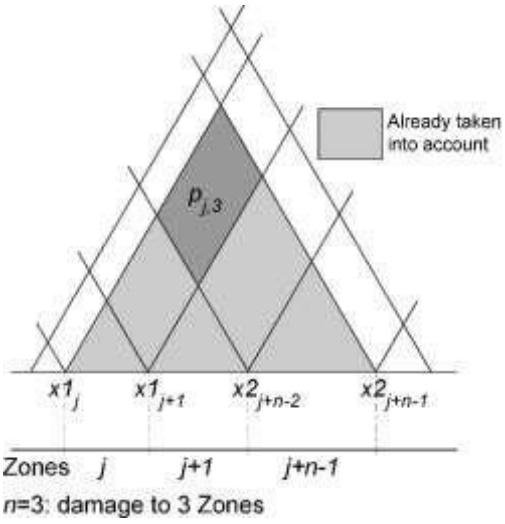

Two adjacent zones, pure longitudinal subdivision:

$p_{j,2} = p(x1_j, x2_{j+1}) - p(x1_j, x2_j) - p(x1_{j+1}, x2_{j+1})$




Three or more adjacent zones, pure longitudinal subdivision:

$p_{j,n} = p(x1_j, x2_{j+n-1}) - p(x1_j, x2_{j+n-2}) - p(x1_{j+1}, x2_{j+n-1}) + p(x1_{j+1}, x2_{j+n-2})$



**Regulation 7-1.1.2**

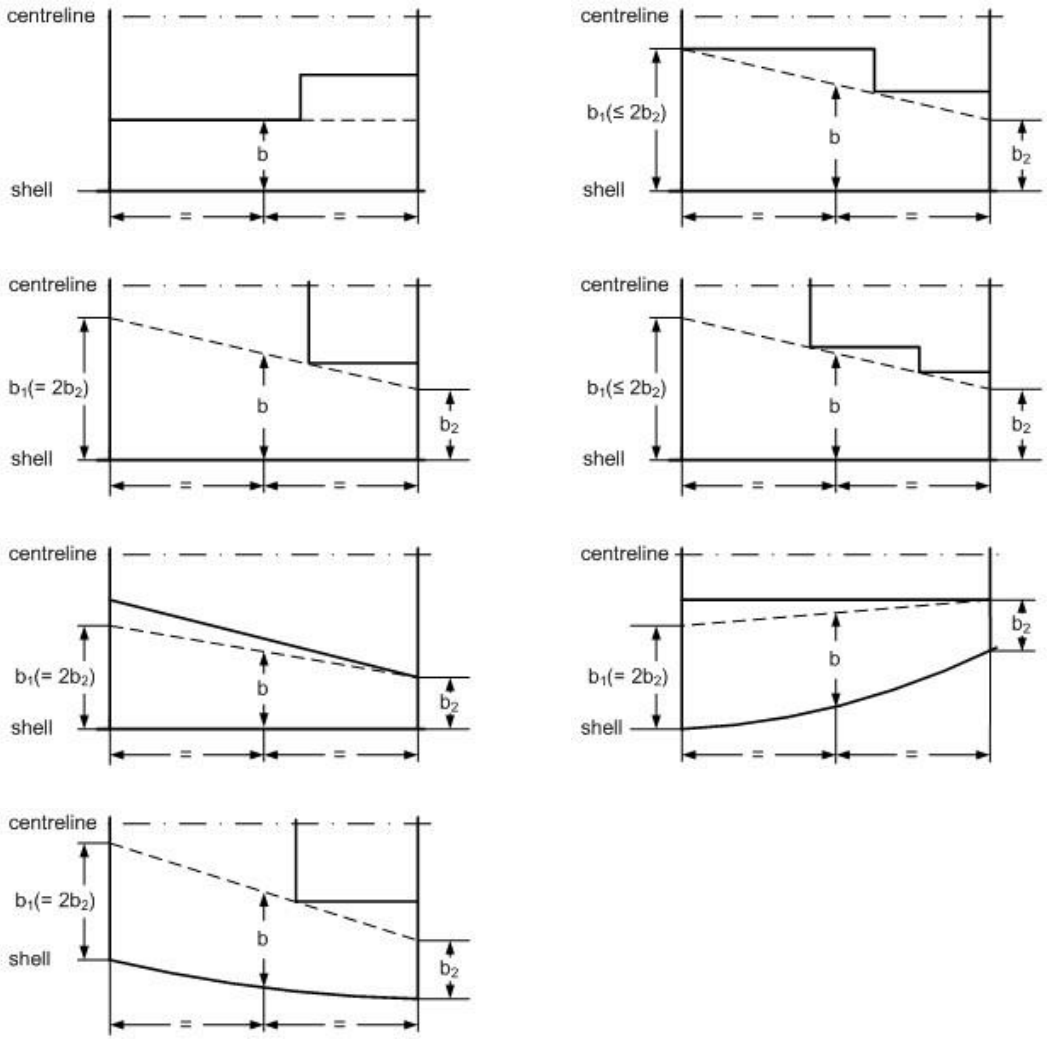
**Transverse subdivision in a damage zone**

1 Damage to the hull in a specific damage zone may just penetrate the ship's watertight hull or penetrate further towards the centreline. To describe the probability of penetrating only a wing compartment, a probability factor *r* is used, based mainly on the penetration depth *b*. The value of *r* is equal to 1, if the penetration depth is *B/2* where *B* is the maximum breadth of the ship at the deepest subdivision draught $d_s$, and *r* = 0 if *b* = 0.

2 The penetration depth *b* is measured at level deepest subdivision draught $d_s$ as a transverse distance from the ship side right-angled to the centreline to a longitudinal barrier.

3 Where the actual watertight bulkhead is not a plane parallel to the shell, *b* should be determined by means of an assumed line, dividing the zone to the shell in a relationship $b_1/b_2$ with $1/2 \leq b_1/b_2 \leq 2$.

4 Examples of such assumed division lines are illustrated in the figure below. Each sketch represents a single damage zone at a water line plane level $d_s$ and the longitudinal bulkhead represents the outermost bulkhead position below $d_s$ + 12.5 m.



4.1 If a transverse subdivision intercepts the deepest subdivision draught waterline within the extent of the zone, *b* is equal to zero in that zone for that transverse subdivision [see figure 1]. A non-zero *b* can be obtained by including an additional zone, see figure 2.

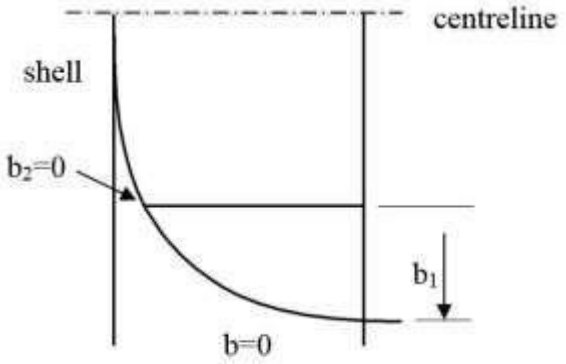



Figure 1

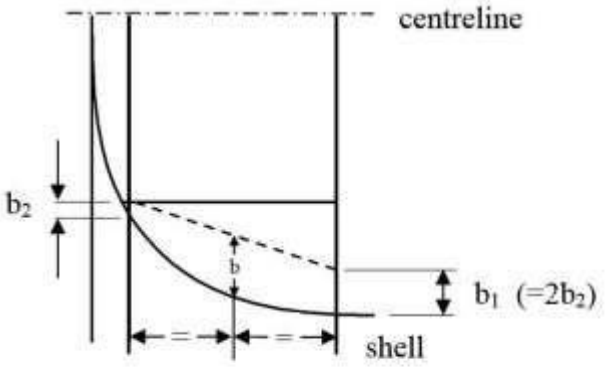



Figure 2

4.2 If the deepest subdivision draught waterline on the side of a single hull ship includes a part where multiple transverse (y) coordinates occur for a longitudinal (x) location, a straightened reference waterline can be used for the calculation of *b*. If this approach is chosen, the original waterline is replaced by an envelope curve including straight parts perpendicular to the centreline where multiple transverse coordinates occur [see figures 1 to 4]. The maximum transverse damage extent *B/2* should then be calculated from waterline or the reference waterline, if applicable, at the deepest subdivision draught.

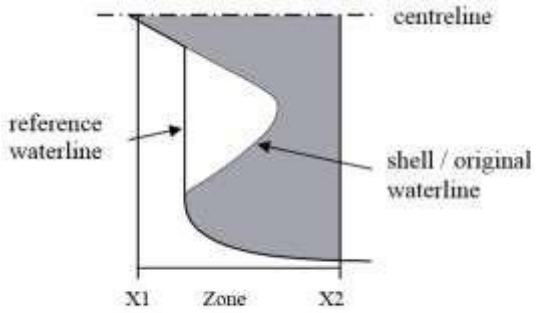



Figure 1

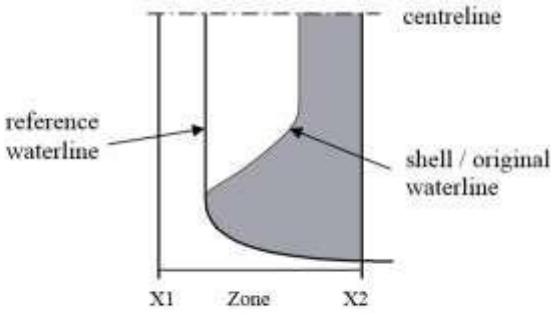



Figure 2

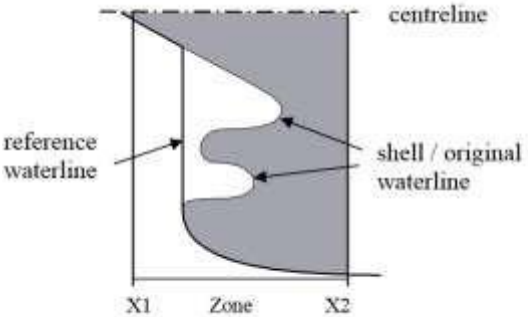



Figure 3

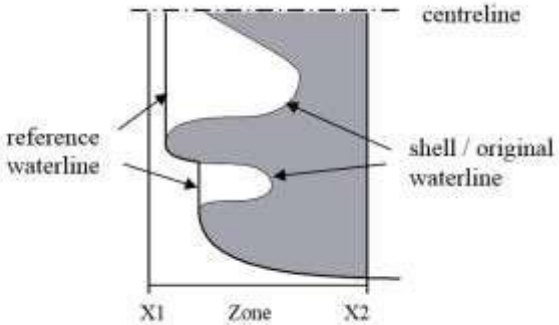



Figure 4

5 In calculating *r*-values for a group of two or more adjacent compartments, the *b*-value is common for all compartments in that group, and equal to the smallest *b*-value in that group:

$b = min\{b_1, b_2, \ldots, b_n\}$

where: $n=$ number of wing compartments in that group;

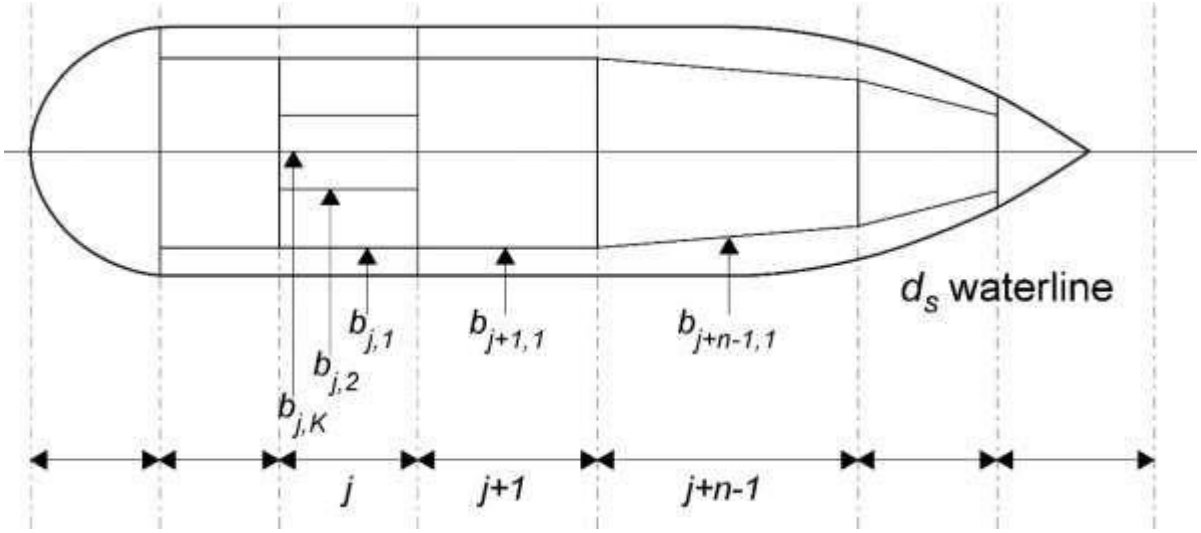
$b_1 b_2, \ldots, b_n =$ mean values of *b* for individual wing compartments contained in the group.

*Accumulating p*

6 The accumulated value of *p* for one zone or a group of adjacent zones is determined by:

$$p_{j,n} = \sum_{k=1}^{k=K_{j,n}} p_{j,n,k}$$

where $K_{j,n} = \sum_{j}^{j+n-1} K_j$ the total number of $b_k$'s for the adjacent zones in question.




7 The figure above illustrates *b*'s for adjacent zones. The zone *j* has two penetration limits and one to the centre, the zone *j+1* has one *b* and the zone *j+n-1* has one value for *b*. The multiple zones will have (2+1+1) four values of *b*, and sorted in increasing order they are:

$(b_{j,1}\ ;\ b_{j+1,1}\ ;\ b_{j+n-1,1}\ ;\ b_{j,2}\ ;\ b_K)$

8 Because of the expression for *r(x1, x2, b)* only one $b_K$ should be considered. To minimize the number of calculations, *b*'s of the same value may be deleted.

As $b_{j,1} = b_{j+1,1}$ the final *b*'s will be $(b_{j,1}\ ;\ b_{j+n-1,1}\ ;\ b_{j,2}\ ;\ b_K)$

**Examples of multiple zones having a different b**

9 Examples of combined damage zones and damage definitions are given in the figures below. Compartments are identified by R10, R12, etc.

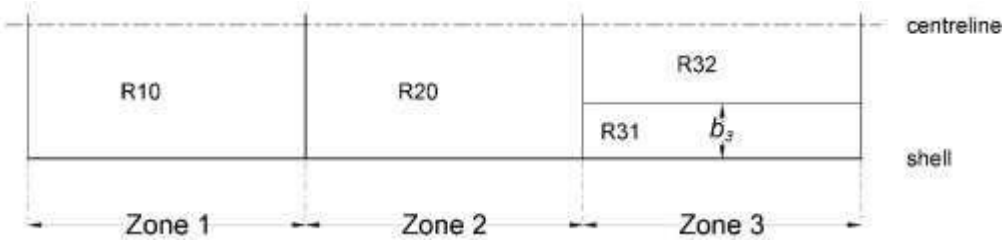



Figure: Combined damage of zones 1 + 2 + 3 includes a limited penetration to $b_3$, taken into account generating two damages:

1) to $b_3$ with R10, R20 and R31 damaged;
2) to *B/2* with R10, R20, R31 and R32 damaged.

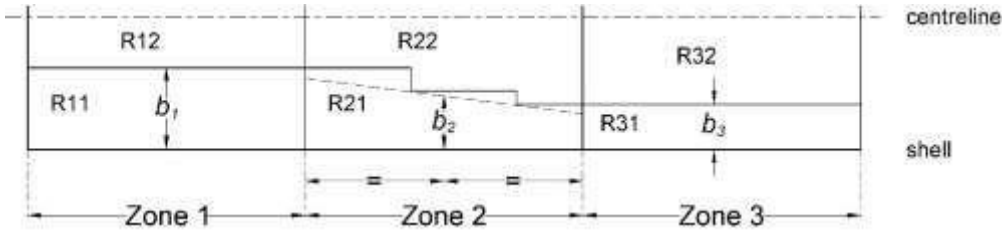



Figure: Combined damage of zones 1 + 2 + 3 includes 3 different limited damage penetrations generating four damages:

1) to $b_3$ with R11, R21 and R31 damaged;
2) to $b_2$ with R11, R21, R31 and R32 damaged;
3) to $b_1$ with R11, R21, R31, R32, and R22 damaged;
4) to *B/2* with R11, R21, R31, R32, R22 and R12 damaged.

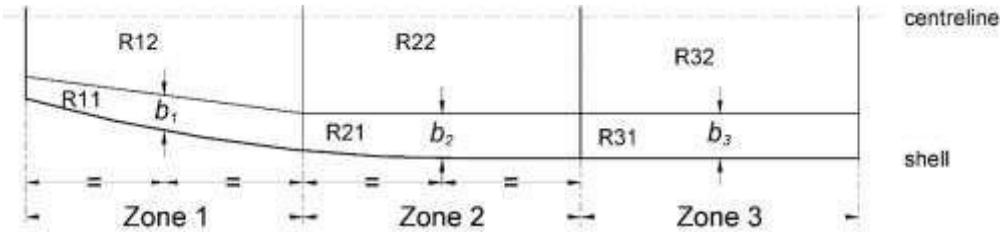
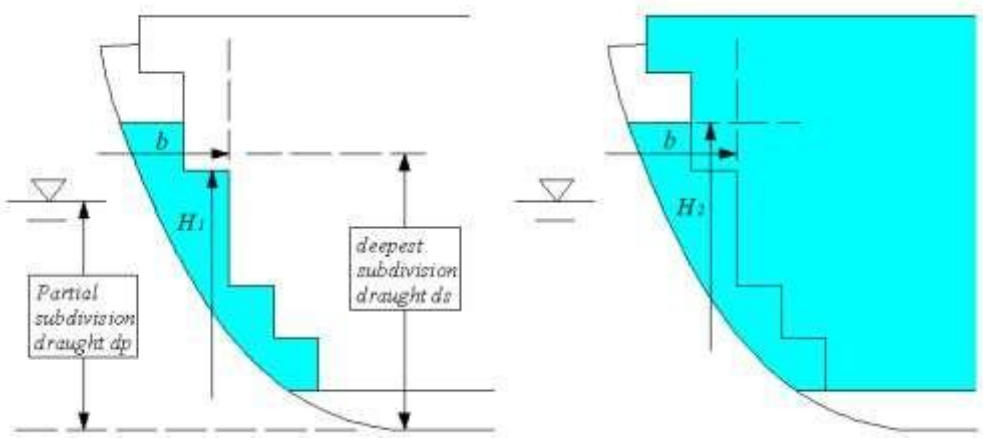



Figure: Combined damage of zone 1 + 2 + 3 including 2 different limited damage penetrations ($b_1 < b_2 = b_3$) generating three damages:

1) to $b_1$ with R11, R21 and R31 damaged;
2) to $b_2$ with R11, R21, R31 and R12 damaged;
3) to *B/2* with R11, R21, R31, R12, R22 and R32 damaged.

10 A damage having a transverse extent *b* and a vertical extent $H_2$ leads to the flooding of both wing compartment and hold; for *b* and $H_1$ only the wing compartment is flooded. The figure below illustrates a partial subdivision draught $d_p$ damage.




11 The same is valid if b-values are calculated for arrangements with sloped walls.

12 Pipes and valves directly adjacent or situated as close as practicable to a longitudinal bulkhead can be considered to be part of the bulkhead, provided the separation distance on either side of the bulkhead is of the same order as the bulkhead stiffening structure. The same applies for small recesses, drain wells, etc.

## REGULATION 7-2 – CALCULATION OF THE FACTOR $s_i$

### General

1 Initial condition – an intact loading condition to be considered in the damage analysis described by the mean draught, vertical centre of gravity and the trim; or alternative parameters from where the same may be determined (e.g. displacement, *GM* and trim). There are three initial conditions corresponding to the three draughts $d_s$, $d_p$ and $d_l$.

2 Immersion limits – immersion limits are an array of points that are not to be immersed at various stages of flooding as indicated in regulations 7-2.5.2 and 7-2.5.3.

3 Openings – all openings need to be defined: both weathertight and unprotected. Openings are the most critical factor to preventing an inaccurate index *A*. If the final waterline immerses the lower edge of any opening through which progressive flooding takes place, the factor "*s*" may be recalculated taking such flooding into account. However, in this case the *s* value should also be calculated without taking into account progressive flooding and corresponding opening. The smallest *s* value should be retained for the contribution to the attained index.

### Regulation 7-2.1

1 In cases where the *GZ* curve may include more than one "range" of positive righting levers for a specific stage of flooding, only one continuous positive "range" of the *GZ* curve may be used within the allowable range/heel limits for calculation purposes. Different stages of flooding may not be combined in a single *GZ* curve.

Figure 1

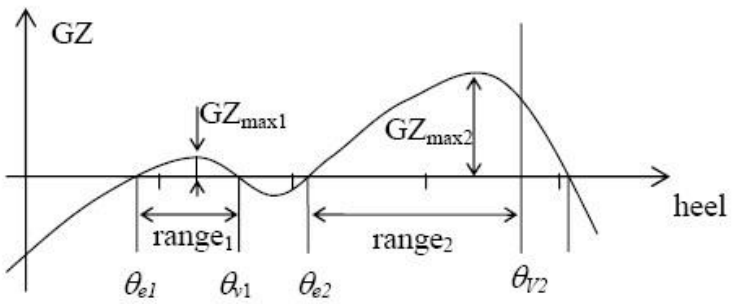
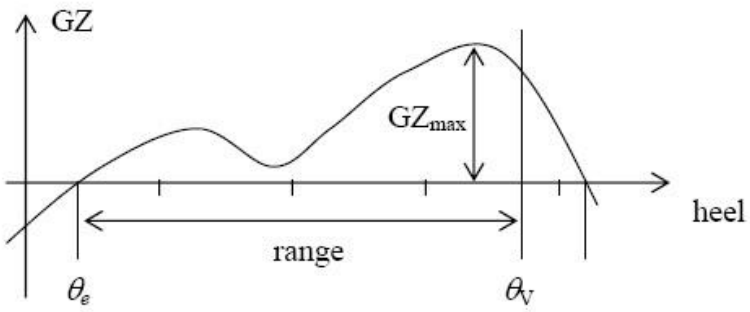



Figure 2




2 In figure 1, the *s*-factor may be calculated from the heel angle, range and corresponding $GZ_{max}$ of the first or second "range" of positive righting levers. In figure 2, only one *s*-factor can be calculated.

**Regulation 7-2.2**

**Intermediate stages of flooding**

1 The case of instantaneous flooding in unrestricted spaces in way of the damage zone does not require intermediate stage flooding calculations. Where intermediate stages of flooding calculations are necessary in connection with progressive flooding, flooding through non-watertight boundaries or cross-flooding, they should reflect the sequence of filling as well as filling level phases. Calculations for intermediate stages of flooding should be performed whenever equalization is not instantaneous, i.e. equalization is of a duration greater than 60 s. Such calculations consider the progress through one or more floodable (non-watertight) spaces, or cross-flooded spaces. Bulkheads surrounding refrigerated spaces, incinerator rooms and longitudinal bulkheads fitted with non-watertight doors are typical examples of structures that may significantly slow down the equalization of main compartments.

**Flooding boundaries**

2 If a compartment contains decks, inner bulkheads, structural elements and doors of sufficient tightness and strength to seriously restrict the flow of water, for intermediate stage flooding calculation purposes it should be divided into corresponding non-watertight spaces. It is assumed that the non-watertight divisions considered in the calculations are limited to "A" class fire-rated bulkheads and decks, and do not apply to "B" class fire-rated bulkheads normally used in accommodation areas (e.g. cabins and corridors). This guidance also relates to regulation 4.5. For spaces in the double bottom, in general, only main longitudinal structures with a limited number of openings have to be considered as flooding boundaries.

**Sequential flooding computation**

3 For each damage scenario, the damage extent and location determine the initial stage of flooding. Calculations should be performed in stages, each stage comprising at least two intermediate filling phases in addition to the full phase per flooded space. Unrestricted spaces in way of damage should be considered as flooded immediately. Every subsequent stage involves all connected spaces being flooded simultaneously until an impermeable boundary or final equilibrium is reached. Unless the flooding process is simulated using time-domain methods, when a flooding stage leads to both a self-acting cross-flooding device and a non-watertight boundary, the self-acting cross-flooding device is assumed to act immediately and occur before the non-watertight boundary is breached. If due to the configuration of the subdivision in the ship it is expected that other intermediate stages of flooding are more onerous, then those should be investigated.

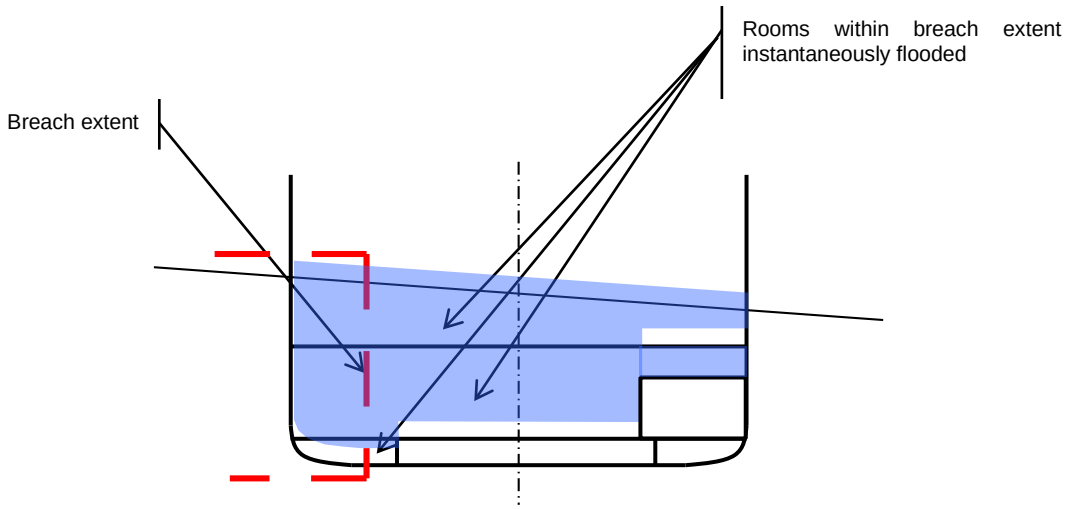
3.1 For each phase of a flooding stage (except the final full phase), the instantaneous transverse moment of this floodwater is calculated by assuming a constant volume of water at each heeling angle. The *GZ* curve is calculated with a constant intact displacement at all stages of flooding. Only one free surface needs to be assumed for water in spaces flooded during the current stage.

3.2 In the final full phase of each stage, the water level in rooms flooded during this stage reaches the outside sea level, so the lost buoyancy method can be used. The same method applies for every successive stage (added volume of water with a constant intact displacement for all phases before the final full phase of the stage in consideration), while each of the previous stages at the final full phase can be calculated with the lost buoyancy method.

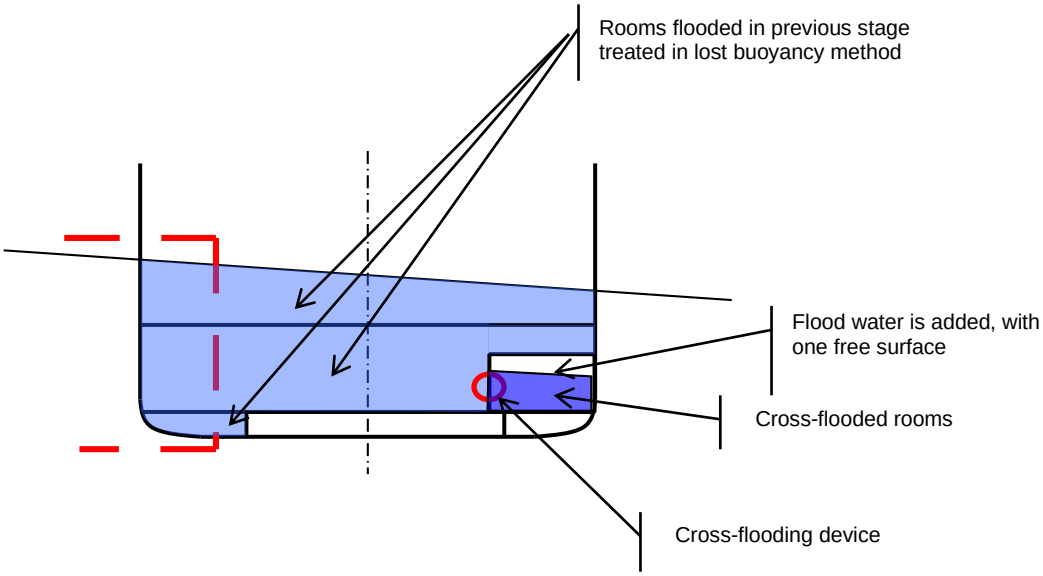
3.3 The examples below present a simplified, sequential approach to intermediate stage down-flooding and cross-flooding. Because simultaneous down-flooding and cross-flooding is not accounted for, any time-to-flood calculated with this sequential approach should be conservative. Alternative approaches, such as time-domain flooding simulation, are also acceptable.

*Example 1: Major damage with cross-flooding device*

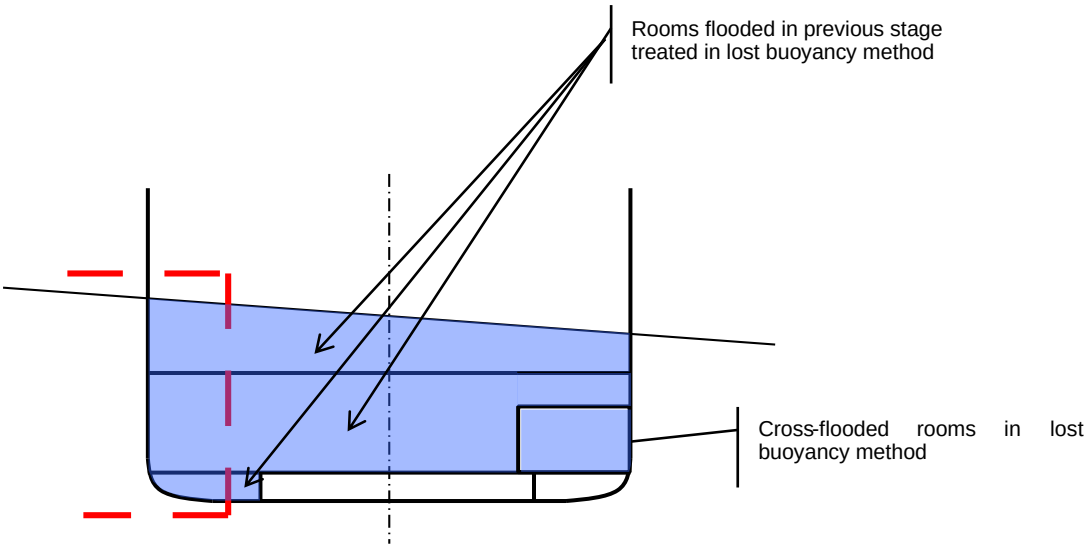
Stage 0: Unrestricted spaces in way of damage should be considered as flooded immediately (intermediate phases are not considered). The lost buoyancy method is applied as this is a full (final) phase. Provided the ship does not capsize and remains at a floating position from which cross-flooding can proceed, stage 0 need not be taken into account for the $s_{factor}$ calculation as the first intermediate stage to be calculated is after 60 s. See cross-flooding/equalization explanatory note 5 below.




**Stage 1: Cross-flooding of opposite room**



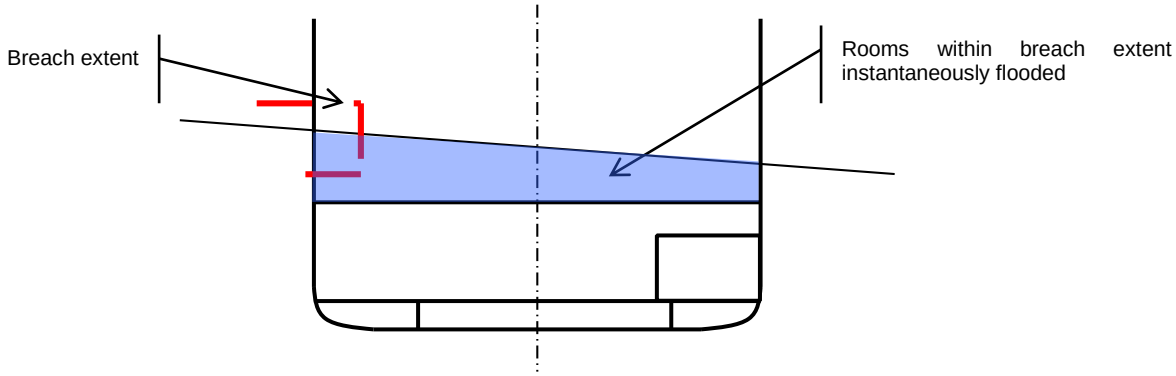

**An intermediate phase**



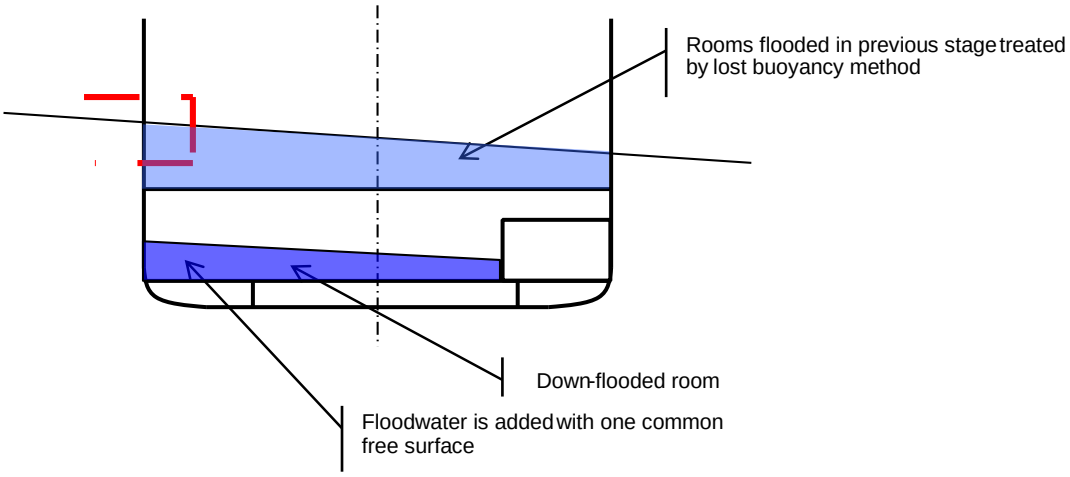

**Full (final) phase of flooding stage 1**

*Example 2: Minor damage with down-flooding and cross-flooding*

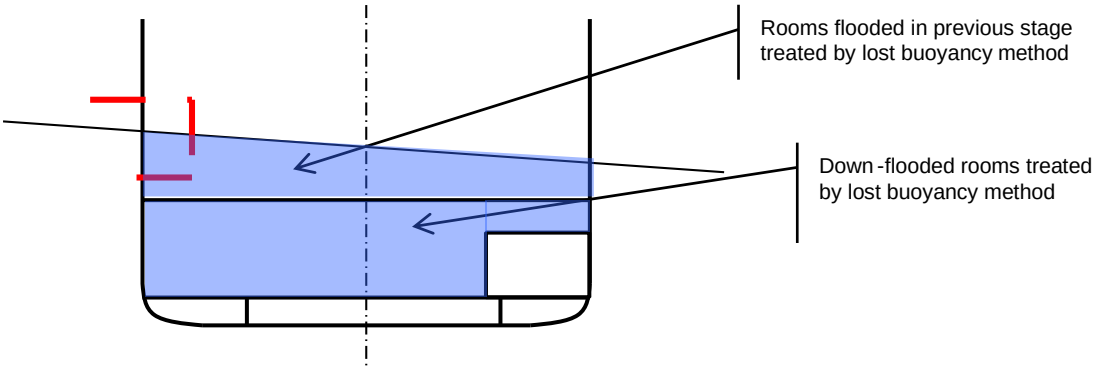
Stage 0: Unrestricted spaces in way of damage should be considered as flooded immediately (intermediate phases are not considered). The lost buoyancy method is applied as this is a full (final) phase. Provided the ship does not capsize and remains at a floating position from which cross-flooding can proceed, stage 0 need not be taken into account for the $s_{factor}$ calculation as the first intermediate stage to be calculated is after 60 s. See cross-flooding/equalization explanatory note 5 below.




**STAGE 1: DOWN-FLOODING THROUGH NON-WATERTIGHT DECK**

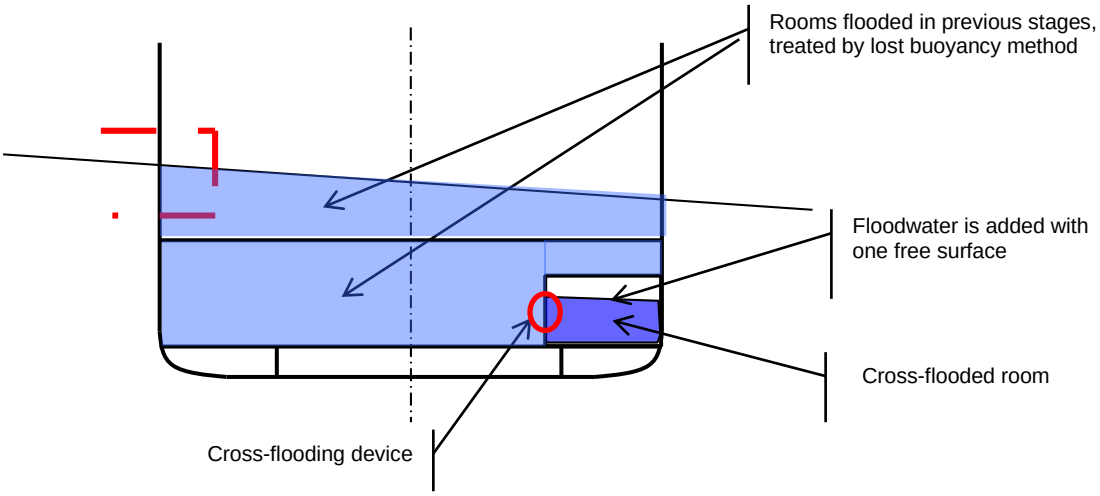



**An intermediate phase**

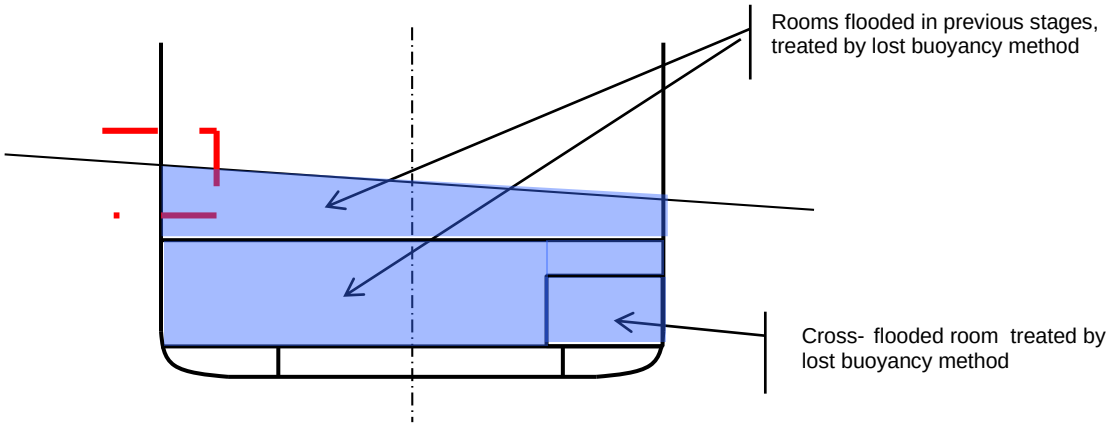



**Final (full) phase of stage 1**

**STAGE 2: CROSS-FLOODING**




**An intermediate phase**




**Full (final) phase of stage 2**

**Cross-flooding/equalization**

4 In general, cross-flooding is flooding of an undamaged space of the ship to reduce the heel in the final equilibrium condition.

5 The cross-flooding time should be calculated in accordance with the *Revised recommendation on a standard method for evaluating cross-flooding arrangements* (resolution MSC.362(92)). If complete fluid equalization occurs in 60 s or less, it should be treated as instantaneous and no further calculations need to be carried out. Additionally, in cases where $s_{final}$ = 1 is achieved in 60 s or less, but equalization is not complete, instantaneous flooding may also be assumed if $s_{final}$ will not become reduced. In any cases where complete fluid equalization exceeds 60 s, the value of $s_{intermediate}$ after 60 s is the first intermediate stage to be considered. Only self-acting open cross-flooding arrangements without valves should be considered effective for instantaneous flooding cases.

6 Provided that the ship has a *GZ* greater than 0 and remains in a position from which cross-flooding can proceed, stage 0 need not be taken into account for the $s_{factor}$ calculation as the first intermediate stage to be calculated is after 60 s.

7 Only cross-flooding devices which are sufficiently submerged below the external waterline at stage 0 are to be used in the calculation for cross-flooding according to resolution MSC.362(92).

8 If complete fluid equalization can be finalized in 10 min or less, the assessment of survivability is carried out using the formula in regulation 7-2.1.1 (i.e. as the smallest value of $s_{intermediate}$ or $s_{final} \cdot s_{mom}$)

9 In case the equalization time is longer than 10 min, $s_{final}$ is calculated for the floating position achieved after 10 min of equalization. This floating position is computed by calculating the amount of flood water according to resolution MSC.362(92) using interpolation, where the equalization time is set to 10 min, i.e. the interpolation of the flood water volume is made between the case before equalization ($T$=0) and the total calculated equalization time. For damage cases involving different cross-flooding devices serving different spaces, when the interpolation between the case before equalization ($T$=*0*) and the total calculated equalization time is needed for flood water volume calculation after 60 s or 10 min, the total equalization time is to be calculated separately for each cross-flooding device.

10 In any cases where complete fluid equalization exceeds 10 min, the value of $s_{final}$ used in the formula in regulation 7-2.1.1 should be the minimum of $s_{final}$ at 10 min or at final equalization.

11 The factor $s_{intermediate,i}$ may be used for cross-flooding stages if they are intermediate stages which are followed by other subsequent flooding stages (e.g. the flooding stages of non-watertight compartments).

**Alternatives**

12 As an alternative to the procedure described above in the explanatory notes for regulation 7-2.2, direct calculation using computational fluid dynamics (CFD), time-domain flooding simulations or model testing may be used to analyse intermediate stages of flooding and determine the time for equalization.

**Regulation 7-2.3**

1 The formulation of $s_{final,i}$ is based on target values for *GZ* and *Range* to achieve $s$ = 1. These values are defined as $TGZ_{max}$ and *TRange*.

2 If ro-ro spaces are damaged there might be the possibility of water accumulation on these deck spaces. To account for this, in any damage case where the ro-ro space is damaged the higher values for $TGZ_{max}$ and *TRange* are to be applied for the calculation of $s_i$.

**Regulation 7-2.4.1.2**

The parameter *A* (projected lateral area) used in this paragraph does not refer to the attained subdivision index.

**Regulation 7-2.5.2.1**

**Unprotected openings**

1 The flooding angle will be limited by immersion of such an opening. It is not necessary to define a criterion for non-immersion of unprotected openings at equilibrium, because if it is immersed, the range of positive *GZ* limited to flooding angle will be zero so "*s*" will be equal to zero.

2 An unprotected opening connects two rooms or one room and the outside. An unprotected opening will not be taken into account if the two connected rooms are flooded or none of these rooms are flooded. If the opening is connected to the outside, it will not be taken into account if the connected compartment is flooded. An unprotected opening does not need to be taken into account if it connects a flooded room or the outside to an undamaged room, if this room will be considered as flooded in a subsequent stage.

**Openings fitted with a weathertight means of closing ("weathertight openings")**

3 The survival "s" factor will be "0" if any such point is submerged at a stage which is considered as "final". Such points may be submerged during a stage or phase which is considered as "intermediate", or within the range beyond equilibrium.

4 If an opening fitted with a weathertight means of closure is submerged at equilibrium during a stage considered as intermediate, it should be demonstrated that this weathertight means of closure can sustain the corresponding head of water and that the leakage rate is negligible.

5 These points are also defined as connecting two rooms or one room and the outside, and the same principle as for unprotected openings is applied to take them into account or not. If several stages have to be considered as "final", a "weathertight opening" does not need to be taken into account if it connects a flooded room or the outside to an undamaged room if this room will be considered as flooded in a successive "final" stage.

**Regulation 7-2.5.2.2**

1 Partial immersion of the bulkhead deck may be accepted at final equilibrium. This provision is intended to ensure that evacuation along the bulkhead deck to the vertical escapes will not be impeded by water on that deck. A "horizontal evacuation route" in the context of this regulation means a route on the bulkhead deck connecting spaces located on and under this deck with the vertical escapes from the bulkhead deck required for compliance with SOLAS chapter II-2.

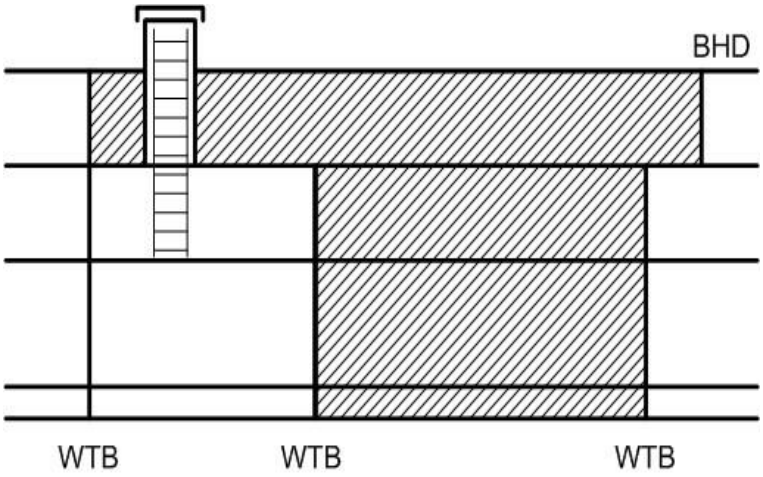
2 Horizontal evacuation routes on the bulkhead deck include only escape routes (designated as category 2 stairway spaces according to SOLAS regulation II-2/9.2.2.3 or as category 4 stairway spaces according to SOLAS regulation II-2/9.2.2.4 for passenger ships carrying not more than 36 passengers) used for the evacuation of undamaged spaces. Horizontal evacuation routes do not include corridors (designated as category 3 corridor spaces according to SOLAS regulation II-2/9.2.2.3 or as category 2 corridor spaces according to SOLAS regulation II-2/9.2.2.4 for passenger ships carrying not more than 36 passengers) or escape routes within a damaged zone. No part of a horizontal evacuation route serving undamaged spaces should be immersed.

3 $s_i = 0$ where it is not possible to access a stair leading up to the embarkation deck from an undamaged space as a result of flooding to the "stairway" or "horizontal stairway" on the bulkhead deck.

**Regulation 7-2.5.3.1**

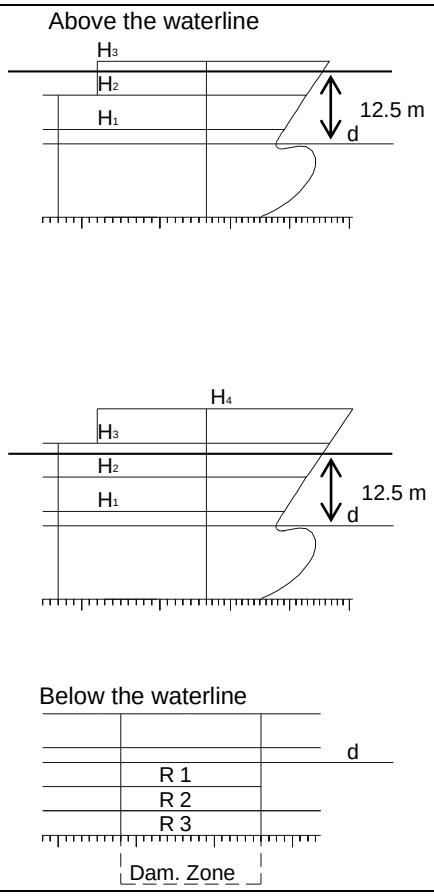
1 The purpose of this paragraph is to provide an incentive to ensure that evacuation through a vertical escape will not be obstructed by water from above. The paragraph is intended for smaller emergency escapes, typically hatches, where fitting of a watertight or weathertight means of closure would otherwise exclude them from being considered as flooding points.

2 Since the probabilistic regulations do not require that the watertight bulkheads be carried continuously up to the bulkhead deck, care should be taken to ensure that evacuation from intact spaces through flooded spaces below the bulkhead deck will remain possible, for instance by means of a watertight trunk.




**Regulation 7-2.6**

The sketches in the figure illustrate the connection between position of watertight decks in the reserve buoyancy area and the use of factor *v* for damages below these decks.




In this example, there are 3 horizontal subdivisions to be taken into account as the vertical extent of damage.

The example shows the maximum possible vertical extent of damage *d* + 12.5 m is positioned between $H_2$ and $H_3$. $H_1$ with factor $v_1$, $H_2$ with factor $v_2 > v_1$ but $v_2 < 1$ and $H_3$ with factor $v_3 = 1$.

The factors $v_1$ and $v_2$ are the same as above. The reserve buoyancy above $H_3$ should be taken undamaged in all damage cases.

The combination of damages into the rooms R1, R2 and R3 positioned below the initial water line should be chosen so that the damage with the lowest *s*-factor is taken into account. That often results in the definition of alternative damages to be calculated and compared. If the deck taken as lower limit of damage is not watertight, down flooding should be considered.

**Regulation 7-2.6.1**

The parameters $x_1$ and $x_2$ are the same as parameters *x1* and *x2* used in regulation 7-1.

**REGULATION 7-3 – PERMEABILITY**

**Regulation 7-3.2**

1 The following additional cargo permeabilities may be used:

| Spaces | Permeability at draught $d_s$ | Permeability at draught $d_p$ | Permeability at draught $d_l$ |
|---|---|---|---|
| Timber cargo in holds | 0.35 | 0.7 | 0.95 |
| Wood chip cargo | 0.6 | 0.7 | 0.95 |

2 Reference is made to MSC/Circ.998 (*IACS unified interpretation regarding timber deck cargo in the context of damage stability requirements*) regarding timber deck cargo.

**Regulation 7-3.3**

1 Concerning the use of other figures for permeability "if substantiated by calculations", such permeabilities should reflect the general conditions of the ship throughout its service life rather than specific loading conditions.

2 This paragraph allows for the recalculation of permeabilities. This should only be considered in cases where it is evident that there is a major discrepancy between the values shown in the regulation and the real values. It is not designed for improving the attained value of a deficient ship of regular type by the modification of chosen spaces in the ship that are known to provide significantly onerous results. All proposals should be considered on a case-by-case basis by the Administration and should be justified with adequate calculations and arguments.

**REGULATION 8 – SPECIAL REQUIREMENTS CONCERNING PASSENGER SHIP STABILITY**

**Regulation 8.1**

This regulation is intended to ensure a sufficient safety level if a large compartment is located aft of the collision bulkhead.

**REGULATION 8-1 – SYSTEM CAPABILITIES AND OPERATIONAL INFORMATION AFTER A FLOODING CASUALTY ON PASSENGER SHIPS**

**Regulation 8-1.2**

1 In the context of this regulation, "compartment" has the same meaning as defined under regulation 7-1 of these Explanatory Notes (i.e. an onboard space within watertight boundaries).

2 The purpose of the paragraph is to prevent any flooding of limited extent from immobilizing the ship. This principle should be applied regardless of how the flooding might occur. Only flooding below the bulkhead deck need be considered.

## REGULATION 9 – DOUBLE BOTTOMS IN PASSENGER SHIPS AND CARGO SHIPS OTHER THAN TANKERS

### Regulation 9.1

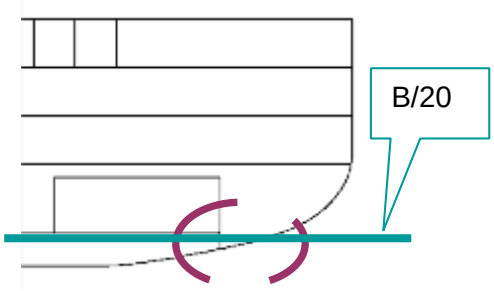
1 This regulation is intended to minimize the impact of flooding from a minor grounding. Special attention should be paid to the vulnerable area at the turn of the bilge. When justifying a deviation from fitting an inner bottom an assessment of the consequences of allowing a more extensive flooding than reflected in the regulation should be provided.

2 The determination regarding the requirement to fit a double bottom "as far as this is practicable and compatible with the design and proper working of the ship" is made, or should be accepted by, the Administration or a recognized organization acting on its behalf.

3 Compliance with the damage stability requirement in regulation 9.8 should not be considered as an equivalent optional requirement to the fitting of a dimensionally compliant double bottom. This is because a flooded watertight compartment, such as an engine-room, that complies with the damage stability requirement in regulation 9.8 is not equivalent to a flooded double bottom below that compartment. Compliance with the damage stability requirement in regulation 9.8 is intended to provide a minimum level of safety in cases when the fitting of a double bottom is not practicable or compatible with the design and proper working of the ship.

### Regulation 9.2

1 Except as provided in regulations 9.3 and 9.4, parts of the double bottom not extended for the full width of the ship as required by regulation 9.2 should be considered an unusual arrangement for the purpose of this regulation and should be handled in accordance with regulation 9.7. An example is provided below.




2 If an inner bottom is located higher than the partial subdivision draught $d_p$, this should be considered an unusual arrangement and is to be handled in accordance with regulation 9.7.

### Regulations 9.3.2.2, 9.6 and 9.7

For cargo ships of less than 80 m in length ($L$), the alternative arrangements to provide a level of safety satisfactory to the Administration should be limited to compartments not having a double bottom, having an unusual bottom arrangement, or having an "other well" extending below the required double bottom height that is greater than the $h/2$ or 500 mm limit indicated in regulation 9.3.2.1. In these cases compliance with the bottom damage standard

in regulation 9.8 should be demonstrated assuming that the damage will only occur between the transverse watertight bulkheads in compartments not having a double bottom, having an unusual bottom arrangement, or having an "other well" extending below the required double bottom height that is greater than the *h*/2 or 500 mm limit indicated in regulation 9.3.2.1.

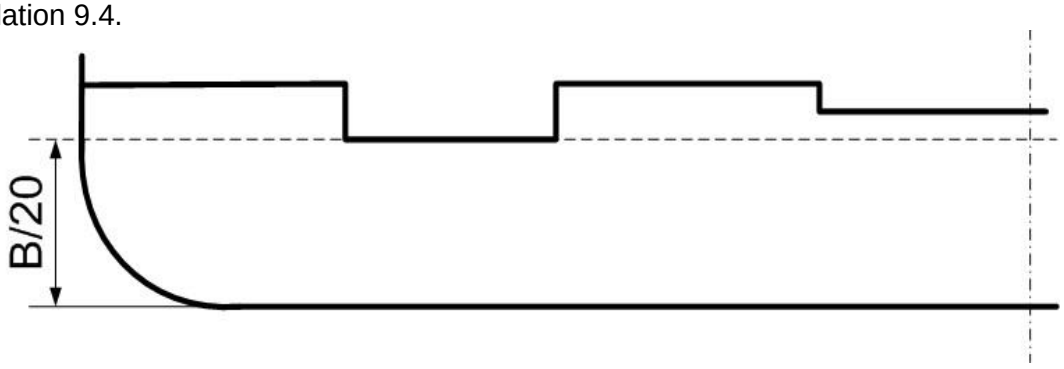
**Regulation 9.6**

1 Any part of a passenger ship or a cargo ship of 80 m in length (*L*) and upwards where a double bottom is omitted in accordance with regulation 9.1, 9.4 or 9.5 shall be capable of withstanding bottom damages, as specified in regulation 9.8. The intent of this provision is to specify the circumstances under which the Administration should require calculations, which damage extents to assume and what survival criteria to apply when double bottoms are not fitted.

2 The definition of "watertight" in regulation 2.17 implies that the strength of inner bottoms and other boundaries assumed to be watertight should be verified if they are to be considered effective in this context.

**Regulation 9.7**

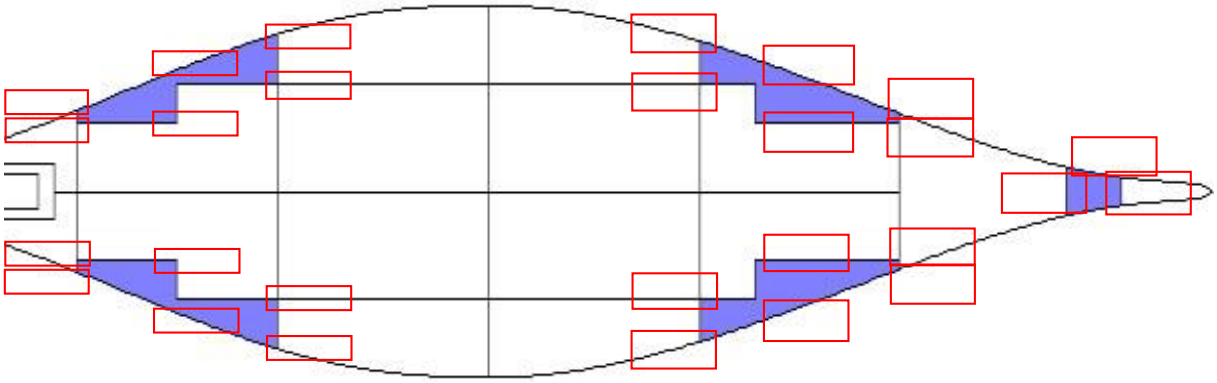
The reference to a "plane" in regulation 9.2 does not imply that the surface of the inner bottom may not be stepped in the vertical direction. Minor steps and recesses need not be considered unusual arrangements for the purpose of this paragraph as long as no part of the inner bottom is located below the reference plane. Discontinuities in way of wing tanks are covered by regulation 9.4.




**Regulation 9.8**

1 For ships to which the probabilistic damage stability requirements of part B-1 apply, the term "all service conditions" used in this paragraph means the three loading conditions with all trims used to calculate the attained subdivision index *A*. For ships not subject to the probabilistic damage stability requirements in part B-1, such as cargo ships that comply with the subdivision and damage stability requirements of other instruments as allowed by regulation II-1/4.2.1.2 and cargo ships of less than 80 m in length (*L*), "all service conditions" means that the limit curves or tables required by regulation 5-1.2.1 should include values calculated for the same draught and trim range(s) as for the other applicable stability requirements.

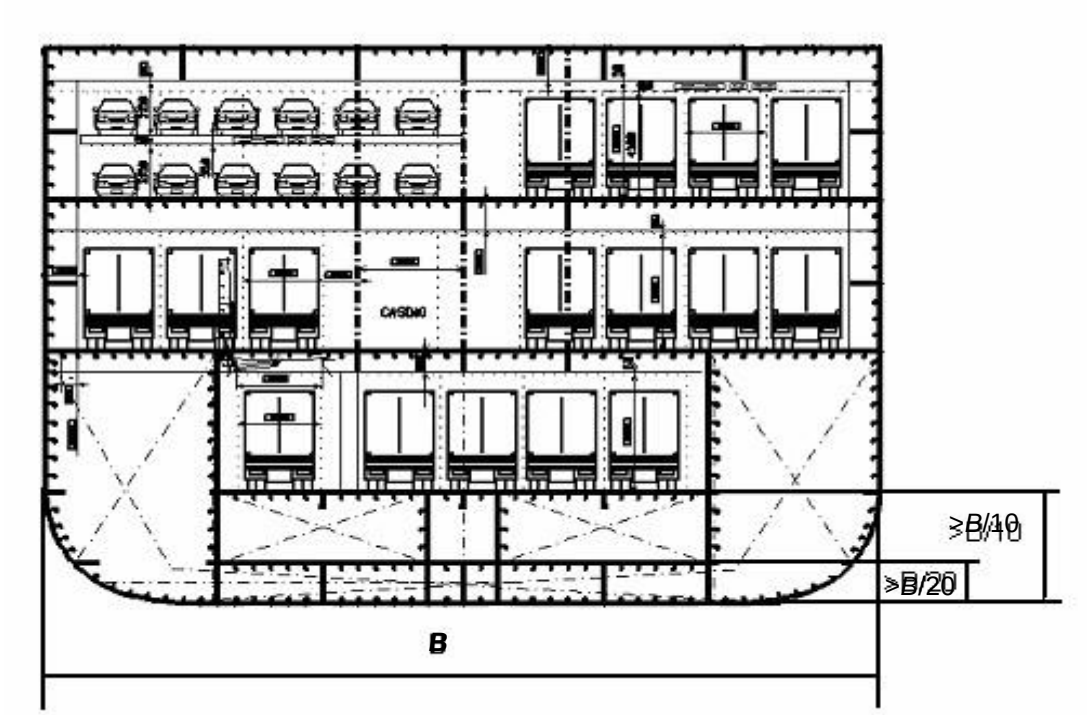
2 The damage extents specified in this paragraph should be applied to all parts of the ship where no double bottom is fitted, as permitted by regulations 9.1, 9.4 or 9.5, and include any adjacent spaces located within the extent of damage. Small wells in accordance with regulation 9.3.1 do not need to be considered damaged even if within the extent of the damage. Possible positions of the damages are shown in an example below (parts of the ship not fitted with a double bottom are shaded; the damages to be assumed are indicated by boxes).



**Regulation 9.9**

1 For the purpose of identifying "large lower holds", horizontal surfaces having a continuous deck area greater than approximately 30% in comparison with the waterplane area at subdivision draught should be taken to be located anywhere in the affected area of the ship. For the alternative bottom damage calculation, a vertical extent of *B*/10 or 3 m, whichever is less, should be assumed.

2 The increased minimum double bottom height of not more than *B*/10 or 3 m, whichever is less, for passenger ships with large lower holds, is applicable to holds in direct contact with the double bottom. Typical arrangements of ro-ro passenger ships may include a large lower hold with additional tanks between the double bottom and the lower hold, as shown in the figure below. In such cases, the vertical position of the double bottom required to be *B*/10 or 3 m, whichever is less, should be applied to the lower hold deck, maintaining the required double bottom height of *B*/20 or 2 m, whichever is less (but not less than 760 mm). The figure below shows a typical arrangement of a modern ro-ro passenger ferry.



## REGULATION 10 – CONSTRUCTION OF WATERTIGHT BULKHEADS

### Regulation 10.1

For the treatment of steps in the bulkhead deck of passenger ships see explanatory notes for regulation 13. For the treatment of steps in the freeboard deck of cargo ships see explanatory notes for regulation 13-1.

## REGULATION 12 – PEAK AND MACHINERY SPACE BULKHEADS, SHAFT TUNNELS, ETC.

### Regulation 12.6.1

For cargo ships, the following figures show examples of suitable butterfly valve arrangements:

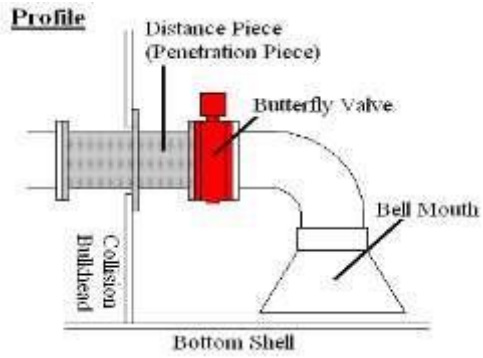



Figure 1

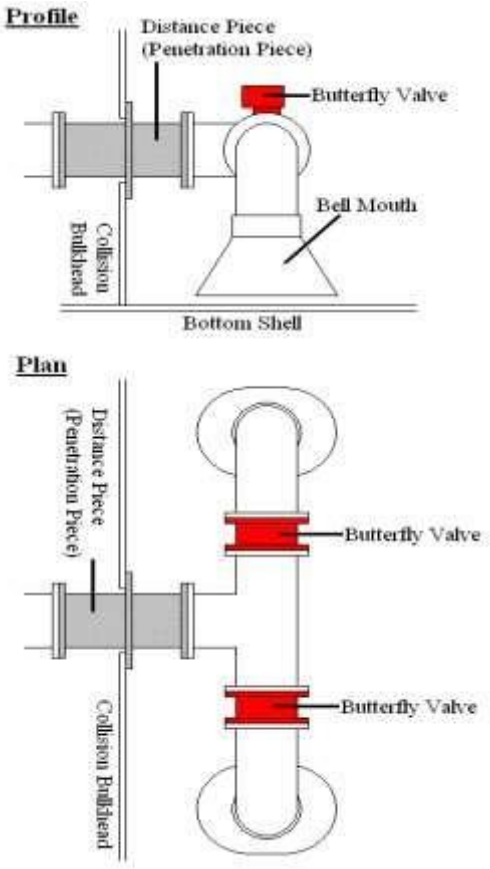



Figure 2

As butterfly valves must be capable of being remotely operated the following shall apply:

.1 the actuator shall be of a double acting type;

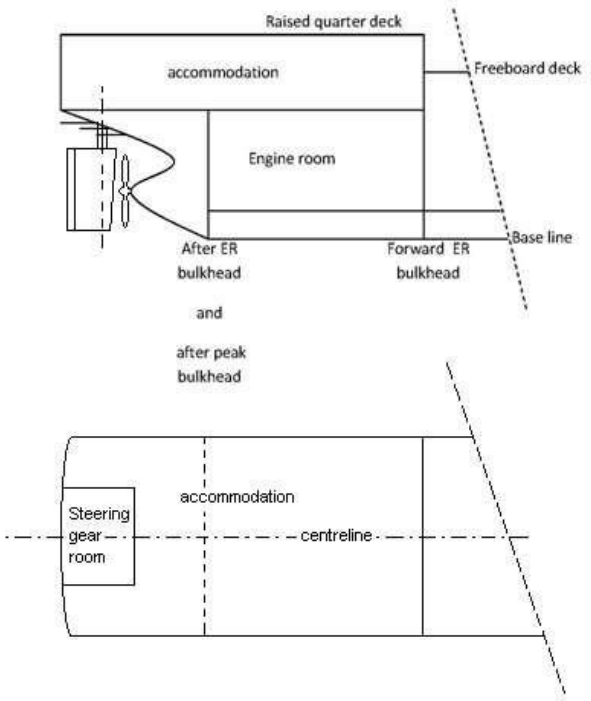
.2 when subject to loss of power, the actuator shall remain in its current position; and

.3 when subject to loss of power, the valve shall be able to be manually operated.

**Regulation 12.10**

1 In cargo ships the after engine-room bulkhead can be regarded as the afterpeak bulkhead provided that the after peak adjoins the engine-room.

2 In cargo ships with a raised quarter deck, it may be impracticable to extend the afterpeak bulkhead to the freeboard deck as the freeboard deck does not extend to the aft perpendicular. Provided that the afterpeak bulkhead extends above the deepest load line, and that all rudderstock bearings are housed in a watertight compartment without open connection to spaces located in front of the afterpeak bulkhead, termination of the afterpeak bulkhead on a watertight deck lower than the freeboard deck can be accepted by the Administration.




**Regulation 12.11**

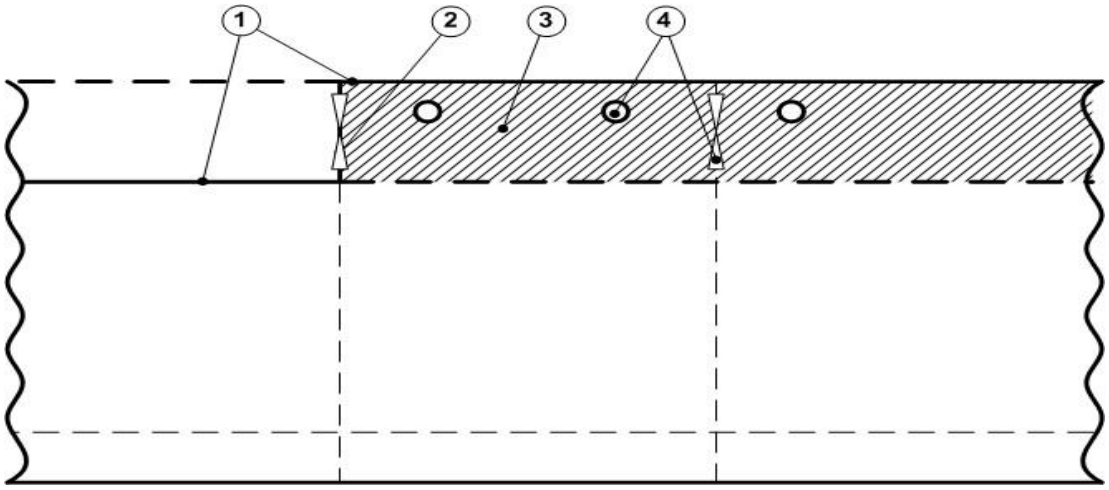
In cargo ships a stern tube enclosed in a watertight space of moderate volume, such as an afterpeak tank, where the inboard end of the stern tube extends through the afterpeak/engine-room watertight bulkhead into the engine-room, is considered to be an acceptable solution satisfying the requirement of this regulation, provided the inboard end of the stern tube is effectively sealed at the afterpeak/engine-room bulkhead by means of an approved watertight/oiltight gland system.

## REGULATION 13 – OPENINGS IN WATERTIGHT BULKHEADS BELOW THE BULKHEAD DECK IN PASSENGER SHIPS

**General – Steps in the bulkhead deck**

1 If the transverse watertight bulkheads in a region of the ship are carried to a higher deck which forms a vertical step in the bulkhead deck, openings located in the bulkhead at the step may be considered as being located above the bulkhead deck. Such openings should then comply with regulation 17 and should be taken into account when applying regulation 7-2.

2 All openings in the shell plating below the upper deck throughout that region of the ship should be treated as being below the bulkhead deck and the provisions of regulation 15 should be applied. See figure below.




1 Bulkhead deck
2 Considered as located above the bulkhead deck
3 Ship's side
4 Considered as located below the bulkhead deck

**Regulation 13.2.3**

1 For closed piping systems compliance with this regulation is achieved if approved pipe penetrations are fitted at the crossing of watertight bulkheads to ensure that heat-sensitive pipes outside the space affected by the fire remain intact, so that any flooding of the fire affected space does not cause progressive flooding through the piping or pipe penetration.

1.1 For open piping systems compliance with this regulation is achieved if approved pipe penetrations are fitted at the crossing of watertight bulkheads as are required for closed piping systems, and additionally each pipe connection to a watertight compartment is fitted with an isolation or non-return valve, as appropriate, to prevent progressive flooding through the piping system after a fire. As an alternative to fitting an isolation or non-return valve, pipes may be routed above the damaged waterline in such a way that progressive flooding is prevented, taking into account the dynamic movements of the ship in a damaged condition.

1.2 However, progressive flooding may be taken into account in accordance with SOLAS regulation 7-2.5.4 instead.

2 For the purpose of this explanatory note the following definitions apply:

A *closed piping system* is a piping system without openings in multiple watertight compartments.

An *open piping system* is a piping system with openings in multiple watertight compartments.

3 Materials used in systems which penetrate watertight bulkheads should be of sufficient strength after exposure to heat or be considered as part of an open piping system.

3.1 Closing devices using intumescent material (swelling when exposed to heat) for open piping systems should not be considered equivalent to the fitting of a valve, since the fire might be located too far from the device to create a watertight seal.

4 Approval of pipe penetrations fitted to ensure the watertight integrity of a bulkhead or deck where heat-sensitive materials are used should include a prototype test of watertightness after having undergone the standard fire test appropriate for the location in which the penetrations are to be installed[2].

4.1 The fire tested pipe penetration should then be tested to a test pressure of not less than 1.5 times the design pressure as defined in regulation 2.18. The pressure should be applied to the same side of the division as the fire test.

4.2 The fire tested pipe penetration should be tested for a period of at least 30 min under hydraulic pressure equal to the test pressure, but minimum 1.0 bar. There should be no leakage during this test.

4.3 The fire tested pipe penetration should continue to be tested for a further 30 min with the test pressure. The quantity of water leakage is not to exceed a total of 1 litre.

4.4 The prototype test should be considered valid only for the pipe typology (e.g. thermoplastic and multilayer), pressure classes, the maximum/minimum dimensions tested, and the type and fire rating of the division tested.

5 The pressure test need not be carried out on the hot penetration arrangement. Ample time may be given to prepare for the pressure test, i.e. dismantling the fire testing equipment and rigging the pressure test equipment.

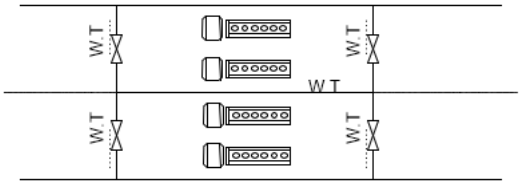
5.1 The pressure test should be carried out with the pipe section used in the fire test still in place.

5.2 Any pipe insulation fitted for the purpose of the fire test may be removed before the pressure test.

5.3 Prototype testing need not be carried out if the pipe penetration is made of steel or equivalent material having a thickness of 3 mm or greater and a length of not less than 900 mm (preferably 450 mm on each side of the division), and there are no openings. Such penetrations shall be suitably insulated by extension of the insulation at the same level of the division. See also regulation II-2/9.3.1 with respect to piping. However, the penetration must still comply with the watertight integrity requirement in regulation 2.17.

**Regulation 13.4**

In cases where main and auxiliary propulsion machinery spaces, including boilers serving the needs for propulsion, are divided by watertight longitudinal bulkheads in order to comply with redundancy requirements (e.g. according to regulation 8-1.2), one watertight door in each watertight bulkhead may be permitted, as shown in the figure below.




[2] Refer to the requirements for A-class division set out in part 3 of annex 1 to the 2010 FTP Code.

## REGULATION 13-1 – OPENINGS IN WATERTIGHT BULKHEADS AND INTERNAL DECKS IN CARGO SHIPS

### Regulation 13-1.1

1 If the transverse watertight bulkheads in a region of the ship are carried to a higher deck than in the remainder of the ship, openings located in the bulkhead at the step may be considered as being located above the freeboard deck.

2 All openings in the shell plating below the upper deck throughout that region of the ship should be treated as being below the freeboard deck, similar to the bulkhead deck for passenger ships (see relevant figure under regulation 13 above), and the provisions of regulation 15 should be applied.

## REGULATION 15 – OPENINGS IN THE SHELL PLATING BELOW THE BULKHEAD DECK OF PASSENGER SHIPS AND THE FREEBOARD DECK OF CARGO SHIPS

### General – Steps in the bulkhead deck and freeboard deck

For the treatment of steps in the bulkhead deck of passenger ships see explanatory notes for regulation 13. For the treatment of steps in the freeboard deck of cargo ships see explanatory notes for regulation 13-1.

## REGULATION 15-1 – EXTERNAL OPENINGS IN CARGO SHIPS

Regulations 15-1.1 to 15-1.3 apply to cargo ships which are subject to the damage stability analysis required in part B-1 or other IMO instruments.

### Regulation 15-1.1

With regard to air-pipe closing devices, they should be considered weathertight closing devices (not watertight). This is consistent with their treatment in regulation 7-2.5.2.1. However, in the context of regulation 15-1, "external openings" are not intended to include air-pipe openings.

## REGULATION 16 – CONSTRUCTION AND INITIAL TESTS OF WATERTIGHT CLOSURES

### General

These requirements are only to establish a general design standard for watertight closures. They are not intended to require any non-watertight hatches to be watertight, nor do they override the requirements of the International Convention on Load Lines.

### Regulation 16.2

Large doors, hatches or ramps on passenger and cargo ships, of a design and size that would make pressure testing impracticable, may be exempted from regulation 16.2, provided it is demonstrated by calculations that the doors, hatches or ramps maintain watertightness at design pressure with a proper margin of resistance. Where such doors utilize gasket seals, a prototype pressure test to confirm that the compression of the gasket material is capable of accommodating any deflection, revealed by the structural analysis, should be carried out. After installation every such door, hatch or ramp should be tested by means of a hose test or equivalent.

***Note***: See explanatory notes for regulation 13 for additional information regarding the treatment of steps in the bulkhead deck of passenger ships. See explanatory notes for regulation 13-1 for additional information regarding the treatment of steps in the freeboard deck of cargo ships.

## REGULATION 17 – INTERNAL WATERTIGHT INTEGRITY OF PASSENGER SHIPS ABOVE THE BULKHEAD DECK

### General – Steps in the bulkhead deck

For the treatment of steps in the bulkhead deck of passenger ships see explanatory notes for regulation 13.

### Regulation 17.1

1 Sliding watertight doors with a reduced pressure head that are located above the bulkhead deck and which are immersed in the final or during any intermediate stage of flooding should comply fully with the requirements of regulation 13. These types of sliding watertight doors tested with reduced pressure head must not be immersed at any stage of flooding by a head of water higher than the tested pressure head. See figure 1 below. These sliding watertight doors shall be kept closed during navigation in compliance with the requirements of regulation 22 and this should be clearly indicated in the damage control information required by regulation 19.

2 If watertight doors are located above the worst final and above the worst intermediate waterline in damage cases contributing to the attained subdivision index *A*, but within the area where the door becomes intermittently immersed (fully or partly) at angles of heel in the required range of positive stability beyond the equilibrium position, such doors are to be power-operated and remotely controlled sliding semi-watertight doors complying with the requirements of regulation 13, except that the scantlings and sealing requirements could be reduced to the maximum head of water caused by the waterline being intermittently immersed (see figure 1 below). These doors should be closed in case of damage and this should be clearly indicated in the damage control information required by regulation 19.

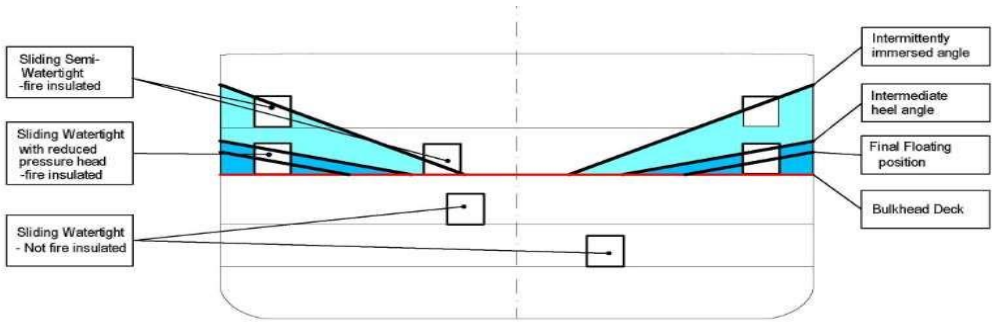



**Figure 1**

3 The use of watertight sliding doors above the bulkhead deck affects the escape provisions of regulation II-2/13. When such doors are used above the bulkhead deck, there should be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces, at least one of which should be independent of watertight doors and at least one of which should give access to a stairway forming a vertical escape. Sliding watertight doors that will be used frequently by passengers must not create a tripping hazard.

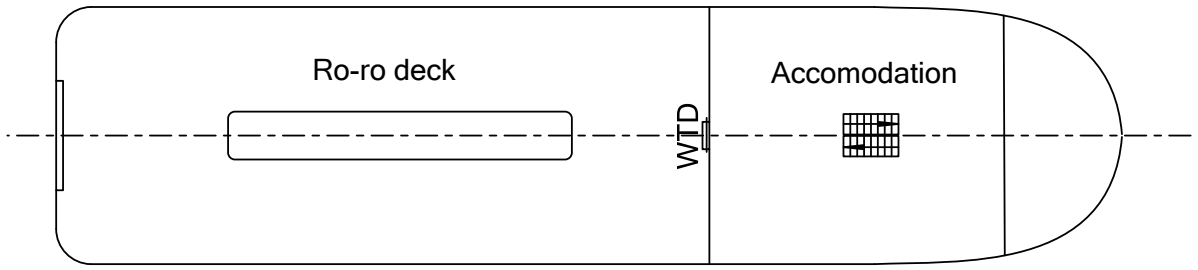
4 Doors fitted above the bulkhead deck which are required to meet both fire protection and watertight requirements should comply with the fire requirements in regulation II-2/9.4.1.1 and the watertight requirements in paragraphs 1 and 2 above. Notwithstanding the ultimate sentence of regulation II-2/9.4.1.1.2, watertight doors fitted above the bulkhead deck should be insulated to the standard required by table 9.1 and regulation II-2/9.2.2.1.1.1 or by table 9.3 and regulation II-2/9.2.2.1.1.2 as appropriate. The door must be capable of operation using both the remote fire door control circuit and the remote watertight door control circuit. If two doors are fitted, they must be capable of independent operation. The operation of either door separately must not preclude closing of the other door. Both doors must be capable of being operated from either side of the bulkhead.

**Regulation 17.3**

This paragraph is intended to ensure that progressive flooding through air pipes of volumes located above a horizontal division in the superstructure, which is considered as a watertight boundary when applying regulation 7-2.6.1.1, will be taken into consideration if a side or bottom damage would cause flooding via tanks or spaces located below the waterline.

**REGULATION 17-1 – INTEGRITY OF THE HULL AND SUPERSTRUCTURE, DAMAGE PREVENTION AND CONTROL ON RO-RO PASSENGER SHIPS**

Regulations 17-1.1.1 and 17-1.1.3 apply only to direct accesses from a ro-ro space to spaces located below the bulkhead deck. The operation of doors in bulkheads separating a ro-ro space and other spaces should be limited to compliance with regulation 23.3.




**REGULATION 22 – PREVENTION AND CONTROL OF WATER INGRESS, ETC.**

The word "port" used in this regulation includes all berths and sheltered locations where loading and/or discharging may take place.

APPENDIX

# GUIDELINES FOR THE PREPARATION OF SUBDIVISION AND DAMAGE STABILITY CALCULATIONS

## GENERAL

### 1.1 Purpose of the Guidelines

1.1.1 These Guidelines serve the purpose of simplifying the process of the damage stability analysis, as experience has shown that a systematic and complete presentation of the particulars results in considerable saving of time during the approval process.

1.1.2 A damage stability analysis serves the purpose of providing proof of the damage stability standard required for the respective ship type. At present, two different calculation methods, the deterministic concept and the probabilistic concept are applied.

### 1.2 Scope of analysis and documentation on board

1.2.1 The scope of subdivision and damage stability analysis is determined by the required damage stability standard and aims at providing the ship's master with clear intact stability requirements. In general, this is achieved by determining *KG*-respective *GM*-limit curves, containing the admissible stability values for the draught range to be covered.

1.2.2 Within the scope of the analysis thus defined, all potential or necessary damage conditions will be determined, taking into account the damage stability criteria, in order to obtain the required damage stability standard. Depending on the type and size of ship, this may involve a considerable amount of analyses.

1.2.3 Referring to SOLAS chapter II-1, regulation 19, the necessity to provide the crew with the relevant information regarding the subdivision of the ship is expressed, therefore plans should be provided and permanently exhibited for the guidance of the officer in charge. These plans should clearly show for each deck and hold the boundaries of the watertight compartments, the openings therein with means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, Damage Control Booklets containing the aforementioned information should be available.

## DOCUMENTS FOR SUBMISSION

### 2.1 Presentation of documents

The documentation should begin with the following details: principal dimensions, ship type, designation of intact conditions, designation of damage conditions and pertinent damaged compartments, *KG*-respective *GM*-limit curve.

## 2.2 General documents

For the checking of the input data, the following should be submitted:

.1 main dimensions;

.2 lines plan, plotted or numerical;

.3 hydrostatic data and cross curves of stability (including drawing of the buoyant hull);

.4 definition of sub-compartments with moulded volumes, centres of gravity and permeability;

.5 layout plan (watertight integrity plan) for the sub-compartments with all internal and external opening points including their connected sub-compartments, and particulars used in measuring the spaces, such as general arrangement plan and tank plan. The subdivision limits, longitudinal, transverse and vertical, should be included;

.6 light service condition;

.7 load line draught;

.8 coordinates of opening points with their level of tightness (e.g. weathertight, unprotected);

.9 watertight door location with pressure calculation;

.10 side contour and wind profile;

.11 cross and down flooding devices and the calculations thereof according to resolution MSC.362(92) with information about diameter, valves, pipe lengths and coordinates of inlet/outlet;

.12 pipes in damaged area when the destruction of these pipes results in progressive flooding; and

.13 damage extensions and definition of damage cases.

## 2.3 Special documents

The following documentation of results should be submitted.

### 2.3.1 Documentation

2.3.1.1 Initial data:

.1 subdivision length $L_s$;

.2 initial draughts and the corresponding *GM*-values;

.3 required subdivision index *R*; and

.4 attained subdivision index *A* with a summary table for all contributions for all damaged zones.

2.3.1.2 Results for each damage case which contributes to the index *A*:

.1 draught, trim, heel, *GM* in damaged condition;

.2 dimension of the damage with probabilistic values *p*, *v* and *r*;

.3 righting lever curve (including $GZ_{max}$ and range) with factor of survivability *s*;

.4 critical weathertight and unprotected openings with their angle of immersion; and

.5 details of sub-compartments with amount of in-flooded water/lost buoyancy with their centres of gravity.

2.3.1.3 In addition to the requirements in paragraph 2.3.1.2, particulars of non-contributing damages ($s_i = 0$ and $p_i > 0.00$) should also be submitted for passenger ships and ro-ro ships fitted with long lower holds including full details of the calculated factors.

### 2.3.2 Special consideration

For intermediate conditions, as stages before cross-flooding or before progressive flooding, an appropriate scope of the documentation covering the aforementioned items is needed in addition.

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# ANNEX 14

# DRAFT AMENDMENTS TO SOLAS CHAPTERS II-1 AND III*

## CHAPTER II-1
## CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

### PART A-1
### STRUCTURE OF SHIPS

### Regulation 2 – Definitions

1 The following new paragraphs are added after existing paragraph 29:

"30 *Lifting appliance* means any load-handling ship's equipment:

.1 used for cargo loading, transfer or discharge;

.2 used for raising and lowering hold hatch covers or moveable bulkheads;

.3 used as engine-room cranes;

.4 used as stores cranes;

.5 used as hose handling cranes;

.6 used for launch and recovery of tender boats and similar applications; and

.7 used as personnel handling cranes.

31 *Anchor handling winch* means any winch for the purpose of deploying, recovering and repositioning anchors and mooring lines in subsea operations.

32 *Loose gear* means an article of ship's equipment by means of which a load can be attached to a lifting appliance or an anchor handling winch but which does not form an integral part of the appliance or load.

33 The expression *appliances installed on or after [date]*, as provided in regulation 3-13 means:

.1 for ships the keel of which is laid or which is at a similar stage of construction on or after [*date*], appliances on board those ships; or

.2 for ships other than those specified in .1, including those constructed before 1 January 2009, appliances having a contractual delivery date to the ship on or after [*date+ six months*] or, in the absence of a contractual delivery date to the ship, actually delivered to the ship on or after [*date+ 4 years*]."

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* Modifications to existing text is shown in grey shading. Draft amendments to regulations 2 and 3-13 of SOLAS chapter II-1 were approved in principle by the Committee and they will be circulated for adoption in conjunction with the approval of the associated draft guidelines for lifting appliances and the draft guidelines for anchor handling winches, once finalized.

2 The following new regulation is added after existing regulation II-1/3-12, together with the associated footnotes:

"**Regulation 3-13**
*Lifting appliances and anchor handling winches*

**1 Application**

1.1 Unless expressly provided otherwise, this regulation shall apply to lifting appliances and anchor handling winches, and loose gear utilized with the lifting appliances and the anchor handling winches.

1.2 Notwithstanding the above, this regulation does not apply to:

.1 lifting appliances on ships certified as MODUs;[1]

.2 lifting appliances used on offshore construction ships, such as pipe/cable laying/repair or offshore installation vessels, including ships for decommissioning work, which comply with standards acceptable to the Administration;

.3 integrated mechanical equipment for opening and closing hold hatch covers; and

.4 life-saving launching appliances complying with the LSA Code.

1.3 The Administration shall determine to what extent the provisions of regulations 3-13.2.1 and 3-13.2.4 do not apply to lifting appliances which have a safe working load below 1,000 kg.

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1 Ships certified as MODUs are those subject to the MODU Code and which carry a MODU Code Certificate on board issued by the Administration or a recognized organization. The carriage of this certificate includes authorized electronic versions available on board.

**2 Design, construction and installation**

2.1 Lifting appliances installed on or after [*date*] shall be:

.1 designed, constructed and installed in accordance with the requirements of a classification society which is recognized by the Administration in accordance with the provisions of regulation XI-1/1 or standards acceptable to the Administration which provide an equivalent level of safety; and

.2 load tested and thoroughly examined after installation and before being taken into use for the first time and after repairs, modifications or alterations of major character.

2.2 Anchor handling winches installed on or after [*date*] shall be designed, constructed, installed and tested to the satisfaction of the Administration, based on the Guidelines developed by the Organization.[2]

2.3 Lifting appliances installed on or after [*date*] shall be permanently marked and provided with documentary evidence for the safe working load (SWL).

2.4 Lifting appliances installed before [*date*] shall be tested and thoroughly examined, based on the Guidelines developed by the Organization[3] and comply with regulation 3-13.2.3 no later than the date of the first renewal survey on or after [*date*].

2.5 Anchor handling winches installed before [*date*] shall be tested and thoroughly examined, based on the Guidelines developed by the Organization[2] no later than the date of the first renewal survey on or after [*date*].

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2 Refer to the *Guidelines for anchor handling winches* (MSC.1/Circ.[…]).

## 3 Maintenance, operation, inspection and testing

All lifting appliances and anchor handling winches, regardless of installation date, and all loose gear utilized with any lifting appliances and anchor handling winches, shall be operationally tested, thoroughly examined, inspected, operated and maintained, based on the Guidelines developed by the Organization.[3]

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3 Refer to the *Guidelines for lifting appliances* (MSC.1/Circ.[…]).

## 4 Inoperative lifting appliances and anchor handling winches

Except as provided in regulations I/11(c), while all reasonable steps shall be taken to maintain lifting appliances, anchor handling winches and loose gear to which this regulation applies in working order, malfunctions of that equipment shall not be assumed as making the ship unseaworthy or as a reason for delaying the ship in ports, provided that action has been taken by the master to take the inoperative lifting appliance or anchor handling winch into account in planning and executing a safe voyage. [2 3"]

**PART B-4**
**STABILITY MANAGEMENT**

3 The following new regulation 25-1 is added after existing regulation 25 with the associated footnote:

**"Regulation 25-1**

**Water level detectors on multiple hold cargo ships other than bulk carriers and tankers**

1 Multiple hold cargo ships other than bulk carriers and tankers constructed on or after [1 January 2024] shall be fitted with water level detectors* in each cargo hold intended for dry cargoes. Water level detectors are not required for cargo holds located entirely above the freeboard deck.

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* Refer to the *Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers* (resolution MSC.188(79)).

2 The water level detectors required by paragraph 1 shall:

.1 give audible and visual alarms at the navigation bridge, one when the water level above the bottom of the cargo hold reaches a height of not less than 0.3 m, and another at a height not less than 15% of the depth of the cargo hold but not more than 2 m; and

.2 be fitted in the aft end of the cargo holds. For cargo holds which are occasionally used for water ballast, an alarm overriding device may be installed. The visual alarms shall clearly discriminate between the two different water levels detected in each hold.

3 As an alternative to the water level detector at a height of not less than 0.3 m, a bilge level alarm sensor may be fitted, located in the cargo hold bilge wells or other suitable location in the aft end of the cargo holds, serving the bilge pumping arrangements required by regulation 35-1 and giving audible and visual alarms at the navigation bridge."

## CHAPTER III
## LIFE-SAVING APPLIANCES AND ARRANGEMENTS

**PART B**
**REQUIREMENTS FOR SHIPS AND LIFE-SAVING APPLIANCES**

**Regulation 33 – Survival craft embarkation and launching arrangements**

4 Paragraph 33.2 is replaced, as follows:

".2 On cargo ships of 20,000 gross tonnage and upwards, davit-launched lifeboats shall be capable of being launched, where necessary utilizing painters, with the ship making headway at speeds up to 5 knots in calm water."

***

# ANNEX 15

# DRAFT AMENDMENTS TO THE 2011 ESP CODE*

## THE INTERNATIONAL CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS, 2011 (2011 ESP CODE)

## ANNEX B

## CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS

## PART A

## CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF DOUBLE-HULL OIL TANKERS

1 The column entitled "Renewal Survey No.1" in annex 2 of part A of annex B of the 2011 ESP Code, as amended by resolution MSC.461(101), is amended as follows:

"1 ~~One section of deck plating for the full beam of the ship within the cargo area~~

~~2 Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1~~

~~3~~ Suspect areas"

***

* Tracked changes are created using "strikeout" for deleted text and "grey shading" to highlight all modifications and new insertions, including deleted text.

**ANNEX 16**

**DRAFT AMENDMENTS TO THE 1988 LL PROTOCOL***

1 Regulation 27(13)(a) is replaced by the following:

"(13) The condition of equilibrium after flooding shall be regarded as satisfactory provided:

(a) the final waterline after flooding, taking into account sinkage, heel and trim, is below the lower edge of any opening through which progressive downflooding may take place. Such openings shall include air pipes, ventilators (even if they comply with regulation 19(4)) and openings which are closed by means of weathertight doors (even if they comply with regulation 12) or hatch covers (even if they comply with regulation 16(1) through (5)), and may exclude those openings closed by means of manhole covers and flush scuttles (which comply with regulation 18), cargo hatch covers of the type described in regulation 27(2), *remotely operated sliding watertight doors*, hinged watertight access doors with open/closed indication locally and at the navigation bridge, of the quick-acting or single-action type that are normally closed at sea, hinged watertight doors that are permanently closed at sea, and sidescuttles of the non-opening type (which comply with regulation 23). ~~However,~~ ~~i~~In the case of doors separating a main machinery space from a steering gear compartment, watertight doors may be of a hinged, quick-acting type kept closed at sea whilst not in use, provided also that the lower sill of such doors is above the summer load waterline."

***

* Tracked changes are indicated using "strikeout" for deleted text and "grey shading" to highlight all modifications and new insertions, including deleted text.

# ANNEX 17

# DRAFT AMENDMENTS TO THE IBC CODE*

## CHAPTER 2

## SHIP SURVIVAL CAPABILITY AND LOCATION OF CARGO TANKS

1 The existing paragraph 2.9.2.1 is replaced by the following:

"2.9.2 In any stage of flooding:

.1 the waterline, taking into account sinkage, heel and trim, shall be below the lower edge of any opening through which progressive flooding or downflooding may take place. Such openings shall include air pipes and openings which are closed by means of weathertight doors or hatch covers and may exclude those openings closed by means of watertight manhole covers and watertight flush scuttles, small watertight cargo tank hatch covers which maintain the high integrity of the deck, remotely operated sliding watertight ~~sliding~~ doors, hinged watertight access doors with open/closed indication locally and at the navigation bridge, of the quick-acting or single-action type that are normally closed at sea, hinged watertight doors that are permanently closed at sea, and sidescuttles of the non-opening type;"

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* Tracked changes are indicated using "strikeout" for deleted text and "grey shading" to highlight all modifications and new insertions, including deleted text.

# ANNEX 18

# DRAFT AMENDMENTS TO THE IGC CODE*

## CHAPTER 2

## SHIP SURVIVAL CAPABILITY AND LOCATION OF CARGO TANKS

1 The existing text of paragraph 2.7.1.1 is replaced by the following:

"**2.7.1 In any stage of flooding:**

.1 the waterline, taking into account sinkage, heel and trim, shall be below the lower edge of any opening through which progressive flooding or downflooding may take place. Such openings shall include air pipes and openings that are closed by means of weathertight doors or hatch covers and may exclude those openings closed by means of watertight manhole covers and watertight flush scuttles, small watertight cargo tank hatch covers that maintain the high integrity of the deck, remotely operated sliding watertight ~~sliding~~ doors, hinged watertight access doors with open/closed indication locally and at the navigation bridge, of the quick-acting or single-action type that are normally closed at sea, hinged watertight doors that are permanently closed at sea, and sidescuttles of the non-opening type;"

***

* Tracked changes are indicated using "strikeout" for deleted text and "grey shading" to highlight all modifications and new insertions, including deleted text.

**ANNEX 19**

**RESOLUTION MSC.62(67)/Rev.1**
**(adopted on 9 November 2020)**

**REVISED GUIDELINES FOR SAFE ACCESS TO TANKER BOWS**

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 it adopted, by resolution MSC.57(67), regulation II-1/3-3 of the International Convention for the Safety of Life at Sea, 1974, which requires that all tankers, including gas carriers and chemical tankers, shall be provided with means, based on guidelines developed by the Organization, to enable the crew to gain safe access to the bow even in severe weather conditions,

NOTING that it adopted, by resolution MSC.62(67), *Guidelines for safe access to tanker bows*, which provide guidance for tankers on how to ensure that the crew can gain safe access to the bow even in severe weather conditions,

HAVING CONSIDERED, at its 102nd session, the recommendation made by the Sub-Committee on Ship Design and Construction at its seventh session,

1 ADOPTS the *Revised guidelines for safe access to tanker bows*, set out in the annex to the present resolution;

2 RECOMMENDS that all Governments concerned take appropriate steps to implement the Revised Guidelines;

3 REVOKES resolution MSC.62(67).

ANNEX

# REVISED GUIDELINES FOR SAFE ACCESS TO TANKER BOWS

## Gangway and access

1 Tankers, including oil tankers as defined in SOLAS regulation II-1/2.12, chemical tankers as defined in regulation VII/8.2 and gas carriers as defined in regulation VII/11.2, should be provided with means to enable the crew to gain safe access to the bow even in severe weather conditions. For tankers constructed on or after 1 July 1998, the access should be by means of either a walkway on the deck or a permanently constructed gangway of substantial strength at or above the level of the superstructure deck, or at the first tier of a deckhouse, which should:

.1 be not less than 1 m in width, situated on or as near as practicable to the centreline of the ship and located so as not to hinder easy access across working areas of the deck;

.2 be fitted at each side throughout its length with a foot-stop and guard rails supported by stanchions. Such rails should consist of no less than three courses, the lowest being not more than 230 mm and the uppermost being at least 1 m above the gangway or walkway, and no intermediate opening should be more than 380 mm in height. Stanchions should be at intervals of not more than 1.5 m. A permanent walkway located at the freeboard deck level, on or as near as practicable to the centreline of the ship, need not be fitted with foot-stops;

.3 be constructed of fire resistant and non-slip material;

.4 have openings, with ladders where appropriate, to and from the deck. Openings should not be more than 40 m apart;

.5 if the length of exposed deck to be traversed exceeds 70 m, have shelters of substantial construction set in way of the gangways or walkways at intervals not exceeding 45 m. Every such shelter should be capable of accommodating at least one person and be so constructed as to afford weather protection on the forward, port and starboard sides; and

.6 if obstructed by pipes or other fittings of a permanent nature, be provided with means of passage over such obstruction.

2 The Administration may accept alternative or modified arrangements for tankers with space constraint, such as small tankers, or tankers with large freeboard, such as gas carriers, provided that such alternative or modified arrangements achieve an equivalent level of safety for access to the bow.

3 Arrangements already approved by the Administration for tankers constructed before 1 July 1998 may be accepted, provided that such existing arrangements achieve an equivalent level of safety for access to the bow.

***

# ANNEX 20

# DRAFT AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)

## CHAPTER 9
## FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS

### 2 Engineering specifications

### 2.1 General requirements

1 The following new paragraph 2.1.8 is inserted after existing paragraph 2.1.7:

"2.1.8 In cargo ships and on passenger ship cabin balconies, where an individually identifiable system is fitted, notwithstanding the provisions in paragraph 2.1.6.1, isolator modules need not be provided at each fire detector if the system is arranged in such a way that the number and location of individually identifiable fire detectors rendered ineffective due to a fault would not be larger than an equivalent section in a section identifiable system, arranged in accordance with paragraph 2.4.1."

***

# ANNEX 21*

# DRAFT AMENDMENTS TO THE INTERNATIONAL LIFE-SAVING APPLIANCES CODE (LSA CODE)

## CHAPTER IV
## SURVIVAL CRAFT

### 4.4 General requirements for lifeboats

1 Paragraph 4.4.1.3.2 is replaced as follows:

".2 except for free-fall lifeboats, be capable of being launched and towed when the ship is making headway at ~~a~~ speeds of up to 5 knots in calm water."

***

* Grey shading highlights new or amended text.

# ANNEX 22

## DRAFT MSC RESOLUTION

## 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 (MSC.81(70))*, set out in the annex to the present resolution;

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

* Shaded strikeouts denote deleted text and shading highlights new or amended text.

ANNEX

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

**Part 2 – Production and installation tests**

## 5 SURVIVAL CRAFT

### 5.4 Launch test

1 Paragraph 5.4 is replaced, as follows:

"Except in the case of a free-fall lifeboat, it ~~I~~t should be demonstrated that the fully equipped lifeboat on cargo ships of 20,000 gross ~~tons or more~~ tonnage and upwards and rescue boat can be launched from a ship proceeding ahead at a speed of not less than 5 knots in calm water and on an even keel. There should be no damage to the lifeboat or the rescue boat or their equipment as a result of this test."

***

**ANNEX 23**

**RESOLUTION MSC.481(102)**
**(adopted on 9 November 2020)**

**REVISED RECOMMENDATION ON THE USE AND FITTING OF RETRO-REFLECTIVE MATERIALS ON LIFE-SAVING APPLIANCES**

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.658(16), whereby the Assembly promulgated the *Recommendation on the use and fitting of retro-reflective materials on life-saving appliances* and the *Technical specification for retro-reflective materials for use on life-saving appliances* and requested the Maritime Safety Committee to keep this recommendation under review and to report as necessary to the Assembly,

RECALLING FURTHER that the Assembly, at its thirty-first session, invited the Maritime Safety Committee to consider proposals to amend resolution A.658(16), with a view to facilitating the consistent and global implementation of the provisions regarding accelerated weather testing and to reissue a revised Recommendation as an MSC resolution, given its technical nature and in order to facilitate future revisions,

MINDFUL of resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards and technical specifications, as well as amendments thereto, should be performed by the Maritime Safety Committee on behalf of the Organization,

CONSIDERING that under the provisions of paragraph 1.2.2.7 of the LSA Code life-saving appliances shall be fitted with retro-reflective material where it will assist in detection and in accordance with the recommendations of the Organization,

1 ADOPTS the *Revised recommendation on the use and fitting of retro-reflective materials on life-saving appliances* and the *Technical specification for retro-reflective materials for use on life-saving appliances*, set out in annexes 1 and 2, respectively, to the present resolution;

2 RECOMMENDS Contracting Governments to the International Convention for the Safety of Life at Sea, 1974, as amended, to make arrangements to ensure that life-saving appliances are fitted with retro-reflective materials in the manner set out in annex 1 to the present resolution or in such other manner as is considered by the Administration to be substantially equivalent;

3 RECOMMENDS that the *Technical specification for retro-reflective materials for use on life-saving appliances* set out in annex 2 to the present resolution be considered by Administrations as a standard for retro-reflective materials, the application of which will contribute to keeping life-saving appliances at the high level of quality required;

4 AGREES that the Administration may accept life-saving appliances already fitted with retro-reflective materials in accordance with resolution A.658(16);

5 INVITES the Assembly to revoke resolution A.658(16) and endorse the action taken by the Maritime Safety Committee.

ANNEX 1

**REVISED RECOMMENDATION ON THE USE AND FITTING OF RETRO-REFLECTIVE MATERIALS ON LIFE-SAVING APPLIANCES**

## 1 Lifeboats and rescue boats

Retro-reflective materials should be fitted on top of the gunwale as well as on the outside of the boat as near the gunwale as possible. The materials should be sufficiently wide and long to give a minimum area of 150 $cm^2$ and should be spaced at suitable intervals (approximately 80 cm from centre to centre). If a canopy is fitted, it should not be allowed to obscure the materials fitted on the outside of the boat, and the top of the canopy should be fitted with retro-reflective materials similar to those mentioned above and spaced at suitable intervals (approximately 80 cm centre to centre). In the case of partially enclosed or totally enclosed lifeboats, such materials should be placed, as follows:

.1 for detection by horizontal light beams - at suitable intervals at half the height between the gunwale and the top of the fixed cover;

.2 for detection by vertical light beams (e.g. from helicopters) - at suitable intervals around the outer portion of the horizontal (or comparable) part of the top of the fixed cover; and

.3 on the bottom of lifeboats and rescue boats which are not self-righting.

## 2 Liferafts

2.1 Retro-reflective materials should be fitted around the canopy of the liferaft. The materials should be sufficiently wide and long to give a minimum area of 150 $cm^2$ and should be spaced at suitable intervals (approximately 80 cm from centre to centre) at a suitable height above the waterline, doorways included, if suitable. On inflatable liferafts, retro-reflective materials should also be fitted to the underside of the floor, cross-shaped in the centre. The dimension of the cross should be half the diameter of the liferaft, and a similar cross should be applied to the top of the canopy.

2.2 On liferafts which are not equipped with canopies, materials which should be sufficiently wide and long (to give a minimum area of 150 $cm^2$) should be attached to the buoyancy chamber at suitable intervals (approximately 80 cm from centre to centre), in such a manner that they are visible both from the air and from a ship.

## 3 Lifebuoys

Retro-reflective materials of a sufficient width (approximately 5 cm) should be applied around or on both sides of the body of the lifebuoy at four evenly-spaced points.

## 4 Buoyant apparatus

Buoyant apparatus should be fitted with retro-reflective materials in the same manner as liferafts without canopies, always depending on the size and shape of the object. Such materials should be visible both from the air and from a ship.

## 5 Lifejackets

Lifejackets should be fitted with patches of retro-reflective materials with a total area of at least 400 $cm^2$ distributed so as to be useful for search from air and surface craft from all directions. In the case of a reversible lifejacket, the arrangement should be complied with no matter which way the lifejacket is put on. Such materials should be placed as high up on the lifejacket as possible.

## 6 Immersion suits

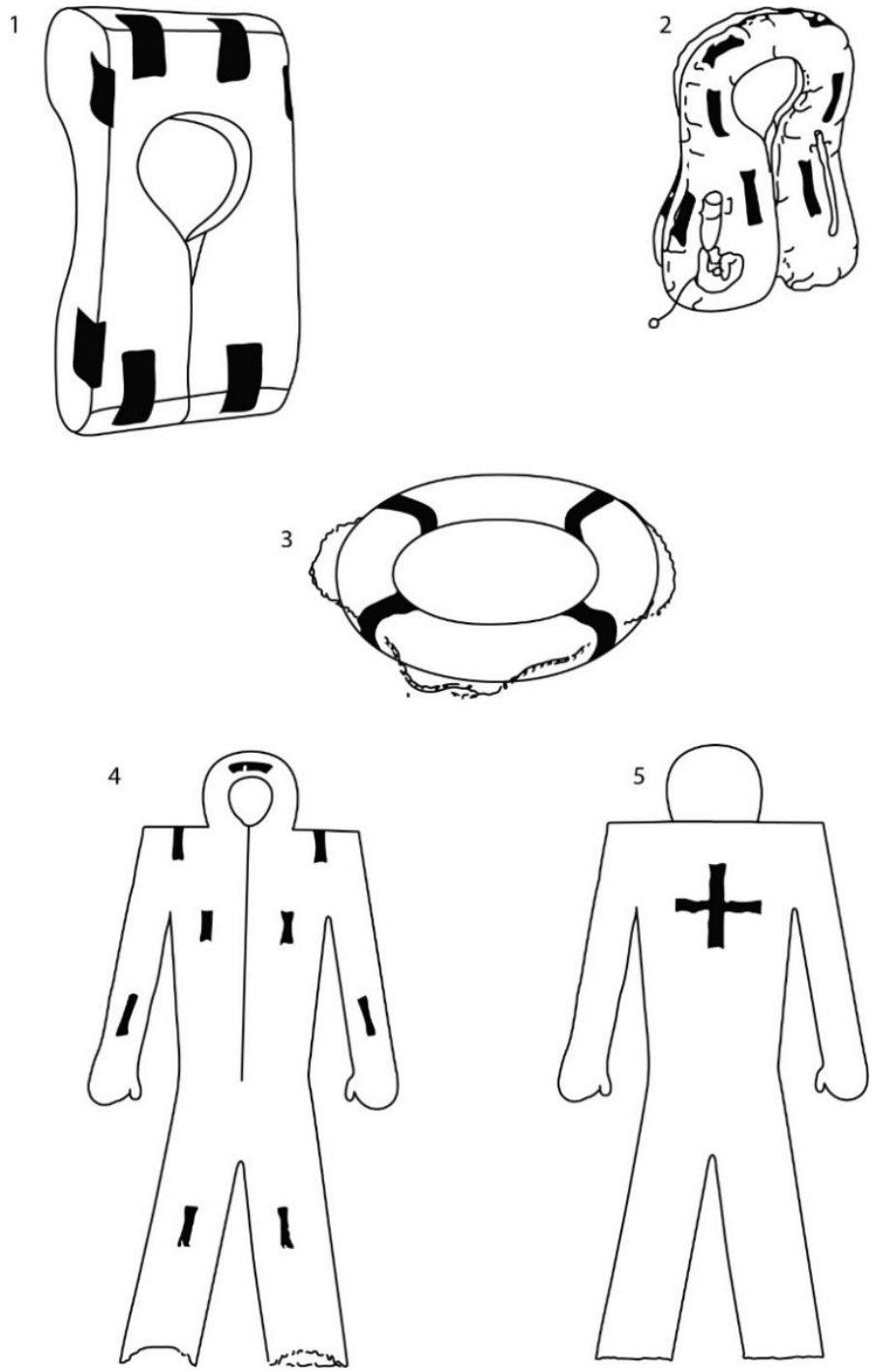
6.1 Immersion suits should be fitted with patches of retro-reflective material with a total area of at least 400 $cm^2$ distributed so as to be useful for search from air and surface craft from all directions.

6.2 For an immersion suit that does not automatically turn the wearer face up, the back of the suit should be fitted with retro-reflective material with a total area of at least 100 $cm^2$.

## 7 General remarks

.1 Retro-reflective materials should be such as will meet the minimum technical specification given in annex 2.

.2 The illustrations reproduced in this annex are intended to provide Administrations with examples from which guidance may be taken when fitting retro-reflective materials in accordance with these recommendations.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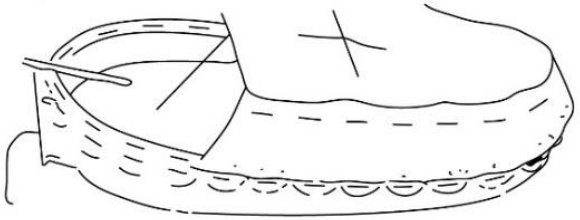

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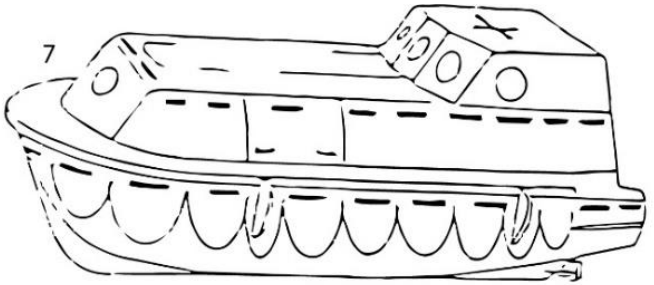

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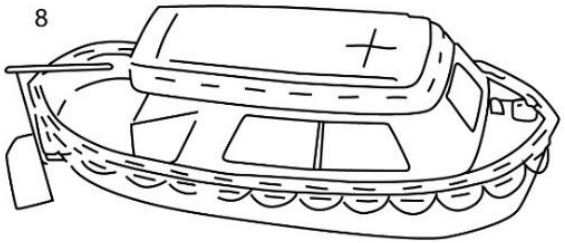

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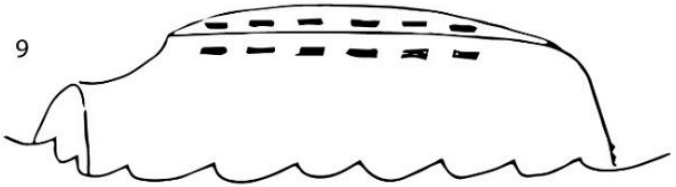

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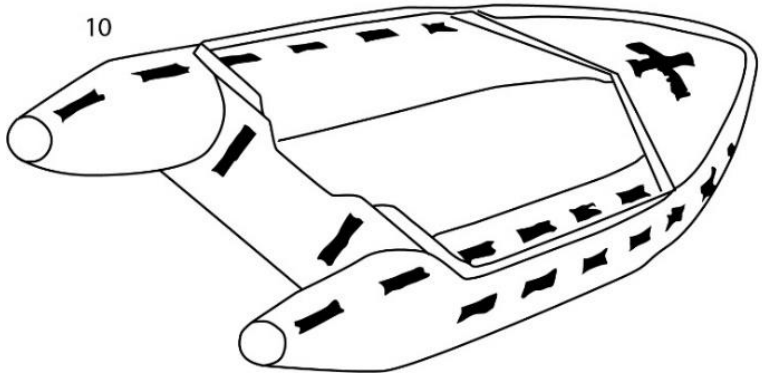

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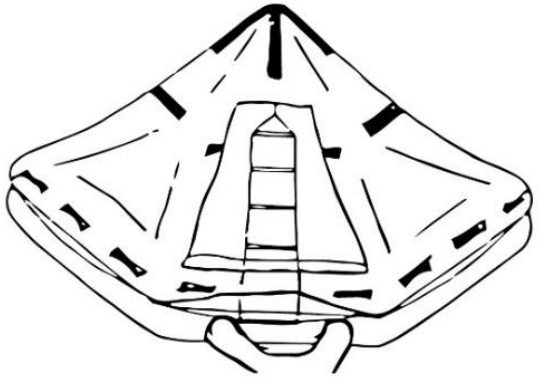

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ANNEX 2

**TECHNICAL SPECIFICATION FOR RETRO-REFLECTIVE MATERIALS FOR USE ON LIFE-SAVING APPLIANCES**

## 1 Scope

The present specification describes retro-reflective materials for application to the flexible or rigid surfaces of life-saving appliances to assist in their detection.

## 2 Classification

Type I: Flexible materials not for continuous outdoor exposure.

Type II: Highly weather-resistant materials for continuous outdoor exposure.

## 3 Performance requirements

### 3.1 *Photometric requirements*

The minimum coefficient of retro-reflection (R') when illuminated by CIE Standard Illuminant A (colour temperature 2856 K) should be as specified in table 3.1 for the retro-reflective areas of new and dry material when tested as described in section 4.2. The brightness of the retro-reflective material, when tested as described in section 4.9, should be not less than 80% of the table 3.1 values.

**Table 3.1**
**Minimum coefficient of retro-reflection R' in cd•lx $^{-1}$•m$^{-2}$**

| Entrance angle $B_1$ ($B_2$=0) | Observation angles | | | |
|---|---|---|---|---|
| | 0.1° | 0.2° | 0.5° | 1° |
| 5 | 180 | 175 | 72 | 14 |
| 30 | 140 | 135 | 70 | 12 |
| 45 | 85 | 85 | 48 | 9.4 |

### 3.2 *Accelerated weathering*

Applied to an aluminium test panel, the material should show no significant discoloration, cracking, blistering or dimensional change, and should have not less than 80% of the specified minimum reflective intensity values in table 3.1, when tested as described in section 4.10.

### 3.3 *Seawater immersion*

Where tested as described in section 4.3, the material should show no evidence of blistering, delamination or subsurface corrosion. The material should show no evidence of "whitening" and its retro-reflective intensity should not be reduced below the retro-reflective values in table 3.1, except within 5 mm of each side of the required cuts.

### 3.4 *Flexibility*

There should be no cracking of the retro-reflective material, after conditioning for 4 hours at -30° C, when bent around a 3.2 mm mandrel and tested as described in section 4.4.

### 3.5 *Tensile strength*

Tensile strength N (newton) per 25 mm width:

| | |
|---|---|
| material without support | ≥16 N |
| material with support | ≥330 N longitudinal |
| for mechanical fastening | ≥200 N transverse, |

when tested as described in section 4.5.

### 3.6 *Adhesive strength*

For adhesive-backed material only. The adhesive strength should be not less than 16 N per 25 mm width when tested as described in section 4.6.

### 3.7 *Blocking*

The material should show no blocking when tested as described in section 4.7.

### 3.8 *Salt spray resistance*

The material should show no evidence of corrosion or degradation that would impair its effectiveness or reduce the coefficient of retro-reflection below the values in table 3.1 after exposure to a saline mist for 120 hours followed by cleaning with a dilute neutral detergent solution as described in section 4.8.

### 3.9 *Temperature resistance*

The material should show no evidence of cracking, distortion, or loss of coefficient of retro-reflection below the values in table 3.1 after exposure, in a dry atmosphere, for 24 hours to a temperature of 65 ± 2°C and subsequent exposure for 24 hours to a temperature of -30 ± 2°C.

### 3.10 *Fungus resistance*

Applied to an aluminium test panel, the material should not support fungus growth, should show no loss of coefficient of retro-reflection below the levels in table 3.1, and should not be removable from the test panel without damage, when tested as described in section 4.11.

### 3.11 *Abrasion resistance*

Applied to an aluminium test panel, the material should not have less than 50% of the specified minimum reflective intensity values in table 3.1, when tested as described in section 4.12.

### 3.12 *Soil resistance and cleanability*

Applied to an aluminium test panel, the material should not have any significant visible damage or permanent soiling when tested as described in section 4.13.

## 4 Test methods and interpretation of test results

### 4.1 *Test conditions and number of samples*

Test specimens should be conditioned for 24 hours at a temperature of 23 ± 1°C and 50 ± 5% relative humidity before being tested. All test results should be interpreted as the average obtained from testing at least three specimens.

### 4.2 *Photometric performance*

The photometric performance should be measured using the general procedure recommended by CIE Report No.54, 1982. The sample dimensions should be 150 mm by 150 mm. Entrance and observation angles should be as specified in table 3.1. Readings should be taken at not greater than 30° increments as the observation half-plane is rotated about the reference axis (i.e. at rotation angles (ε) of 0°, 30°, 60°, 90°,120°, 150° and 180°). Each measured value should be the average of the readings for all of the required samples.

### 4.3 *Seawater immersion*

4.3.1 Prepare a 75 mm x 150 mm test panel.

(A) material without support: After removing protective liner paper, apply specimens to a clean aluminium panel surface, using a hand-roller for application.

(B) material with support for mechanical fastening: Tape edges of test specimens to a clean aluminium panel.

4.3.2 The retro-reflective material on each test panel is cut with a sharp knife from each corner diagonally opposite so that an "X" is formed. The cuts must be made completely through the material to the metal panel.

4.3.3 Immerse the test panels to half-length in a 4% (by weight) saltwater solution (4 g NaCl dissolved in 96 ml distilled water) at 25°C, using a glass beaker covered by a glass plate. After a 16-hour immersion period, remove the panels from the beaker, rinse salt deposits from the panels, and examine the sample following a 10-minute recovery period and again after 4 hours for compliance with the requirements described in section 3.3.

### 4.4 *Flexibility*

4.4.1 Condition test specimen for 4 hours in a cold chamber at -30°C. A 3.2 mm mandrel should be conditioned at the same temperature. The sample should be bent over the free-standing mandrel, gently applying gloved finger pressure.

4.4.2 For material without support, remove protective liner and talc the adhesive to prevent sticking.

### 4.5 Tensile strength

Prepare three test samples 25 mm in width and 150 mm in length. Insert samples into the grips or jaws of the testing machine so that the load is distributed evenly across the width of the samples and the initial test length is 100 mm. Determine tensile strength at a speed of 300 mm per minute. Record average tensile strength at break in newtons per 25 mm width for all three test samples. For material without support, remove protective liner paper before inserting samples in the tensile tester.

### 4.6 *Adhesive strength (for material without support only)*

4.6.1 Prepare three test samples 25 mm in width and 200 mm in length for each type of surface to which the material is to be applied. Remove protective liner paper for 80 mm in length and apply test specimens to the test surfaces. Test surfaces should be aluminium, GRP, each type of lifejacket and lifebuoy that the material is to be used on, and inflatable liferaft buoyancy tube material. Test surfaces should be 50 mm in width, 90 mm in length, and of the thickness normally used and should be properly cleaned by wiping the surface with a suitable solvent.

4.6.2 Apply test specimens with a solid brass roller, 80 mm in diameter and 40 mm in width covered with rubber approximately 6 mm thick and having a hardness of 80 ± 1 RHD and a total mass of approximately 2 kg. Use three passes for roller application and allow to have a 120 mm free overlap strip to be used for inserting into the jaw clamp of the testing instrument. One test panel should be immersed in distilled water in a covered container for 16 hours before adhesive strength testing and the other test panel should be immersed in salt water (4% NaCl by weight) in a covered container for 16 hours before adhesive strength testing (this test method is required only for retro-reflective material that is designed for use with an adhesive. If a particular test panel used in testing results in a test failure, the retro-reflective material should not be approved for attachment to material of the type used in the test panel). Peel back at an angle of 180° at a speed of 300 mm per minute. Record adhesive strength in newtons per 25 mm width. Repeat the adhesive strength tests on samples subjected to the weathering test in section 4.10.

### 4.7 *Blocking*

Stack two 100 mm x 100 mm pieces of material, retro-reflective face to retro-reflective face, between two pieces of glass plate 3 mm thick of the same size as the samples and place in an air-circulating oven operating at 65°C. Place an 18 kg weight centrally on the top glass plate and close the oven. After 8 hours, remove the test assembly from the oven, take the retro-reflective material from between the plates and cool for 5 min. Separate the two pieces of retro-reflective material and examine for evidence of adhering or peeling of the surface.

### 4.8 *Salt spray resistance*

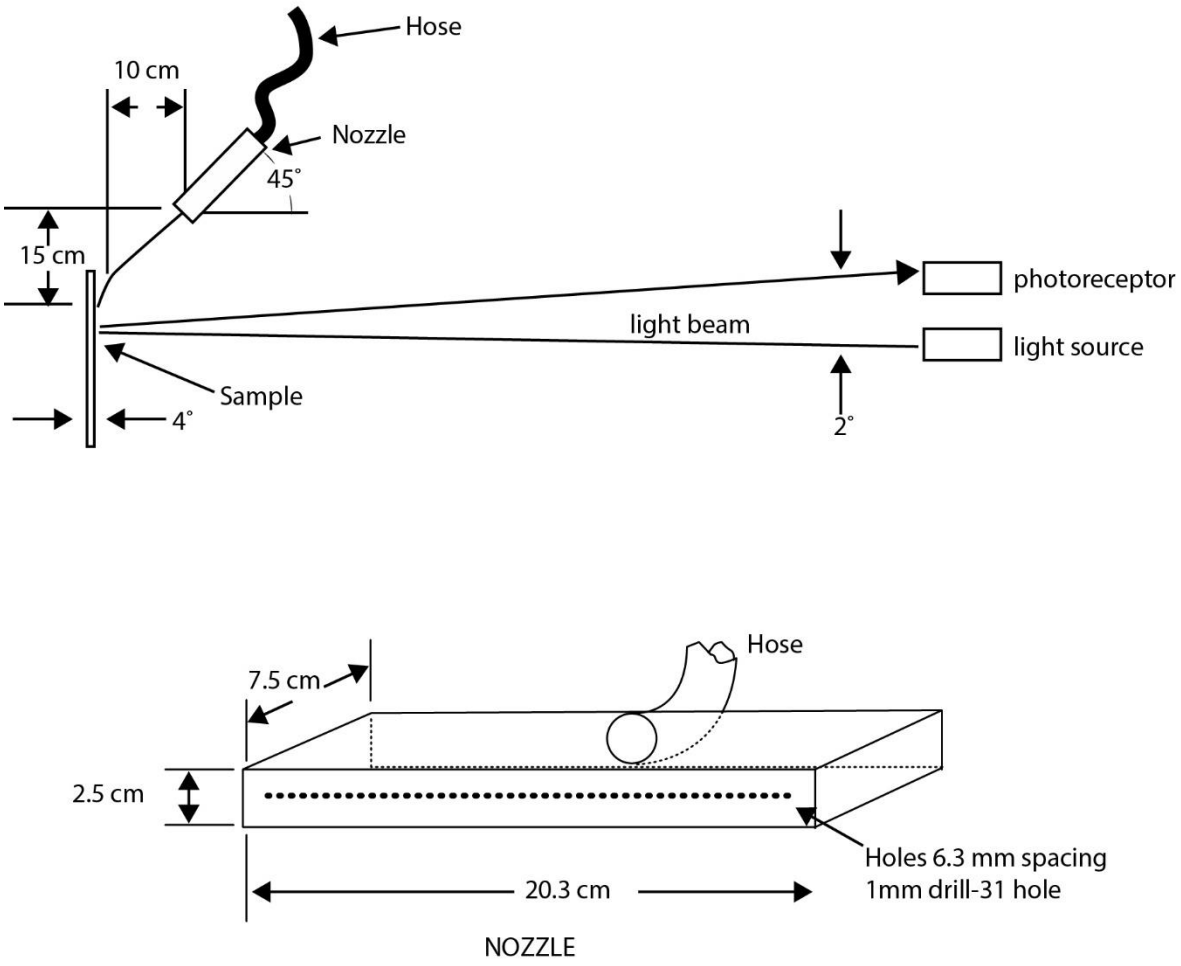
4.8.1 Prepare test specimens as described in section 4.3 (A) and (B), respectively, and expose them to a salt spray chamber.

4.8.2 The test should consist of five periods of 22 hours' exposure each, separated by an interval of 2 hours during which samples are allowed to dry. The saline mist should be produced by atomizing, at a temperature of 35 ± 2°C, a saline solution obtained by dissolving five parts of NaCl in 95 parts of water, containing not more than 0.2% of impurities.

### 4.9 *Photometric performance when wet*

An unweathered 150 mm x 75 mm specimen should be mounted in a vertical plane, with the 150 mm dimension oriented horizontally. Apply sufficient water so that the entire specimen surface is covered by a continuous moving film of water. Measure the coefficient of retro-reflection at 0.2° observation angle and 5° entrance angle. An example of an appropriate test apparatus is shown in figure 1.

Figure 1




Suggested Wet Test Apparatus

**4.10** ***Accelerated weathering***

4.10.1 The photometric performance of the material should be determined according to section 4.2 after the material has been exposed in a sunshine carbon arc weatherometer for the following periods:

Type I material: 750 h
Type II material: 1,500 h

4.10.2 Alternative light sources other than a carbon arc may be used and exposure times for such sources should give an equivalent degree of accelerated weathering. Accelerated weathering should follow the test methodology in accordance with an international standard acceptable to the Organization.*

4.10.3 After exposure, the material should be examined for the requirements and characteristics in section 3.2.

### 4.11 *Fungus resistance*

4.11.1 Prepare three 75 mm x 75 mm test panels as described in section 4.3 (A). Prepare three additional test panels as described in section 4.3 (B), using non-rusting, non-staining clips or fasteners (in lieu of tape) to hold the material flat. Expose the panels to mildew, using the soil burial method, for a period of 2 weeks. The microbial activity of the soil should be verified by exposing untreated cotton fabric of 400 g/m$^2$ to 475 g/m$^2$ to the soil bed for the first 5 days. The soil should be considered to be satisfactory if this control sample loses not less than 50% of its original tensile strength during this exposure.

4.11.2 At the end of the exposure period, the test panels should be removed from the soil bed, gently washed to remove soil, and wiped with a soft cloth wet with a 70% ethanol solution. Condition the panels under standard conditions for 48 hours. Test the photometric performance of the specimens as described in section 4.2 and, when finished, attempt to remove the material from the test panel.

### 4.12 *Abrasion resistance*

4.12.1 An apparatus is required which should consist of an electric motor mounted on a flat metal plate, and a mechanism through which the motor will impart a reciprocating motion to a brush lengthwise across the full length of a test panel clamped to the plate. Prepare one test panel 150 mm wide x 425 mm long, as described in section 4.3 (A). Mount the panel firmly on the test apparatus and place the brush on the panel.

4.12.2 The block of the brush should be aluminium, 90 mm long x 40 mm wide and 12.5 mm thick. The brush stock should be stiff, black, butt-cut Chinese hog bristle. There should be 60 holes on the block, 4 mm in diameter, solidly filled with bristle. The bristles should extend 20 mm beyond the block to form an abrading surface as nearly planar as possible. The total weight of the brush should be 450 ± 15 g. Weights may be fastened to the top of the brush to attain this weight.

4.12.3 Start the motor. The apparatus should be adjusted so that the brush travels at a rate of 37 ± 2 cycles (74 ± 4 strokes) per minute. Remove the panel after 1,000 brush strokes and wipe with a clean, soft cloth. Test the photometric performance of the material, as described in section 4.2.

### 4.13 *Soil resistance and cleanability*

Prepare a test panel 150 mm x 150 mm, as described in section 4.3 (A). Soil the panel by applying a film, 90 mm wide x 0.075 mm thick, of thoroughly mixed soiling medium across the middle of the test panel. The soiling medium should consist of a mixture of 8 g carbon black, 60 g mineral oil and 32 g odourless mineral spirits. Cover the soiled area for 24 hours with a

* Refer to the recommendations by the International Organization for Standardization, in particular ISO 4892-1:2016, and ISO 4892-2:2013 or ISO 4892-3:2016 or ISO 4892-4:2013.

laboratory watch glass or similar device. Uncover the material and wipe off the soiling medium with a clean, dry, soft cloth. Wet the material with mineral spirits and wipe with a cloth soaked in mineral spirits. Wash with a 1% (by weight) solution of detergent in warm water, rinse, and dry with a clean, dry, soft cloth. Examine the sample for compliance with section 3.12.

***

# ANNEX 24

## PROPOSED RELOCATION OF OUTPUTS

| Reference to SD, if applicable | Previous output number | New[1] output number | Description | Target completion year | Parent organ(s) | Associate organ(s) | Coord. organ(s) |
|---|---|---|---|---|---|---|---|
| SD 1 Improve Implementation | OW 28 and OW 29 | 1… | Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures[2] | 2021 | MSC | NCSR | |
| | OW 38 | 1…[3] | Review of the Model Agreement for the authorization of recognized organizations acting on behalf of the Administration | 2020 | MSC / MEPC | III | |
| SD 2 Integrate new and advancing technologies into the regulatory framework | OW 8 | 2… | Review of FSA studies by the FSA Experts' Group | Continuous | MSC | | |
| | OW 35 | 2… | Amendments to the IGC and IGF Codes to include high manganese austenitic steel and related guidance for approving alternative metallic material for cryogenic service | 2021 | MSC | CCC | |
| SD 5 Enhance global facilitation and security of international trade | OW 44 | 5…[4] | IMO's contribution to addressing unsafe mixed migration by sea | 2021 | MSC / FAL / LEG | | |

1 The Council is invited to allocate new numbers.

2 The Committee approved the consolidation and renaming of outputs OW 28 (Further development of the provision of global maritime SAR services) and OW 29 (Guidelines on harmonized aeronautical and maritime search and rescue procedures, including SAR training matters).

3 Subject to concurrent decision by MEPC.

4 Subject to concurrent decision by FAL and LEG.

| Reference to SD, if applicable | Previous output number | New[1] output number | Description | Target completion year | Parent organ(s) | Associate organ(s) | Coord. organ(s) |
|---|---|---|---|---|---|---|---|
| SD 6 Ensure regulatory effectiveness | OW 1 | 6… | Amendments to the IAMSAR Manual | Continuous | MSC | NCSR | |
| | OW 2 | 6… | Amendments to the 2011 ESP Code | Continuous | MSC | SDC | |
| | OW 3 | 6… | Revision of the *Revised recommendations for entering enclosed spaces aboard ships* (resolution A.1050(27)) | 2020 | MSC | CCC | |
| | OW 4 | 6… | Routeing measures and mandatory ship reporting systems | Continuous | MSC | NCSR | |
| | OW 5 | 6… | Updates to the LRIT system | Continuous | MSC | NCSR | |
| | OW 6 | 6.2[5] | Updating of the GMDSS Master Plan and guidelines on MSI (maritime safety information) | Continuous | MSC | NCSR | |
| | OW 7 | 6… | Verified goal-based new ship construction standards for tankers and bulk carriers | Continuous | MSC | | |
| | OW 9 | 6… | Amendments to the International Code for the Safe Carriage of Grain in Bulk (resolution MSC.23(59)) to introduce a new class of loading conditions for special compartments | 2021 | MSC | CCC | |

[5] The Committee approved the consolidation of output OW 6 "Updating of the GMDSS Master Plan and guidelines on maritime safety information (MSI)" with the renamed output 6.2 “Developments in GMDSS services, including guidelines on maritime safety information (MSI)”.

| Reference to SD, if applicable | Previous output number | New[1] output number | Description | Target completion year | Parent organ(s) | Associate organ(s) | Coord. organ(s) |
|---|---|---|---|---|---|---|---|
| | OW 10 | 6… | Amendments to SOLAS chapter III, LSA Code and resolution MSC.81(70) to remove the applicability of the requirements to launch free-fall lifeboats with the ship making headway at speeds up to 5 knots in calm water | 2020[6] | MSC | SSE | |
| | OW 14 | 6… | Reports on unlawful practices associated with certificates of competency | Annual | MSC | HTW | |
| | OW 15 | 6… | Reports to MSC on information communicated by STCW Parties | Annual | MSC | | |
| | OW 16 | 6…[7] | Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC) | Annual | MSC / MEPC | III | |
| | OW 19 | 6…[8] | 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 |
| | OW 27 | 6… | Amendments to chapter 9 of the FSS Code for fault isolation | 2020[9] | MSC | SSE | |

6 Completed by SSE 7. The Council is invited to take it into account that this item is completed when allocating the new number.

7 Subject to concurrent decision by MEPC.

8 Subject to concurrent decision by MEPC.

9 Completed by SSE 7. The Council is invited to take it into account that this item is completed when allocating the new number.

| Reference to SD, if applicable | Previous output number | New[1] output number | Description | Target completion year | Parent organ(s) | Associate organ(s) | Coord. organ(s) |
|---|---|---|---|---|---|---|---|
| | | | requirements for cargo ships and passenger ship cabin balconies fitted with individually identifiable fire detector systems | | | | |
| | OW 30 | 6… | Development of amendments to SOLAS chapter II-1 to include requirements for water level detectors on non-bulk carrier cargo ships with multiple cargo holds | 2021[10] | MSC | SSE | SDC |
| | OW 31 | 6… | Mandatory application of the Performance standard for protective coatings for void spaces on bulk carriers and oil tankers | 2021 | MSC | SDC | |
| | OW 32 | 6… | Performance standard for protective coatings for void spaces on all types of ships | 2021 | MSC | SDC | |
| | OW 33 | 6… | Finalization of a non-mandatory instrument on regulations for non-convention ships | 2022 | MSC | III | |
| | OW 34 | 6… | Requirements for onboard lifting appliances and anchor handling winches | 2020 | MSC | HTW | SSE |
| | OW 36 | 6… | Review of SOLAS chapter II-2 and associated codes to minimize the incidence and consequences of | 2021 | MSC | HTW / SDC | SSE |

[10] Completed by SDC 7. The Council is invited to take it into account that this item is completed when allocating the new number.

| Reference to SD, if applicable | Previous output number | New[1] output number | Description | Target completion year | Parent organ(s) | Associate organ(s) | Coord. organ(s) |
|---|---|---|---|---|---|---|---|
| | | | fires on ro-ro spaces and special category spaces of new and existing ro-ro passenger ships | | | | |
| | OW 39 | 6… | Amendments to Guidelines for the approval of fixed dry chemical powder fire-extinguishing systems for the protection of ships carrying liquefied gases in bulk (MSC.1/Circ.1315) | 2021 | MSC | SSE | |
| | OW 40 | 6… | Safety measures for non-SOLAS ships operating in polar waters | 2021 | MSC | NCSR | SDC |
| | OW 41 | 6… | Amendments to the Explanatory Notes to SOLAS chapter II-1 subdivision and damage stability regulations (resolution MSC.429(98)) | 2020[11] | MSC | SDC | |
| | OW 42 | 6… | New requirements for ventilation of survival craft | 2021 | MSC | SSE | |
| | OW 43 | 6… | Consequential work related to the new International Code for Ships Operating in Polar Waters | 2021 | MSC | NCSR / SSE | SDC |

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[11] Completed by SDC 7. The Council is invited to take it into account that this item is completed when allocating the new number.

# ANNEX 25

## BIENNIAL STATUS REPORTS OF THE SUB-COMMITTEES

| SUB-COMMITTEE ON CARRIAGE OF CARGOES AND CONTAINERS (CCC) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Reference to SD, if applicable** | **Output number** | **Description** | **Target completion year** | **Parent organ(s)** | **Associated organ(s)** | **Coordinating organ** | **Status of output for Year 1** | **Status of output for Year 2** | **References** |
| 1. Improve implementation | 1.3 | Validated model training courses | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | No work requested | | MSC 100/20, paragraphs 10.3 to 10.6 and 17.28; CCC 6/14, sections 2 and 13 |
| 1. Improve implementation | 1.13 | Review of mandatory requirements in the SOLAS, MARPOL and Load Line Conventions and the IBC and IGC Codes regarding watertight doors on cargo ships | 2021 | MSC / MEPC | CCC | SDC | No work requested | | MSC 101/24, paragraph 21.25; MSC 102/24, paragraph 17.28; MSC 101/24, paragraph 20.7 |
| 1. Improve implementation | 1.30 | Revision of the Inspection programmes for cargo transport units carrying dangerous goods (MSC.1/Circ.1442, as amended by MSC.1/Circ.1521) | 2021 | MSC | CCC | | Extended | | MSC 100/20, paragraph 17.16; CCC 6/14, section 10 |
| Notes**:** Due to the postponement of CCC 7 to 2021, following the COVID19 pandemic, the target completion year has been extended to 2021. | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.3 | Amendments to the IGF Code and development of guidelines for low-flashpoint fuels | Continuous | MSC | HTW / PPR / SDC / SSE | CCC | Ongoing | | MSC 94/21, paragraphs 18.5 and 18.6; MSC 96/25, paragraphs 10.1 to 10.3; MSC 97/22, paragraph 19.2; PPR 6/20, paragraph3.39; MSC 102/24, paragraph 21.4; CCC 6/14, section 3 |
| Notes: MSC 102 approved changing the target completion year to "continuous". | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 2. Integrate new and advancing technologies in the regulatory framework | 2.22 | Amendments to the IGC and IGF Codes to include high manganese austenitic steel and related guidance for approving alternative metallic material for cryogenic service | 2021 | MSC | CCC | | Extended | | MSC 96/25 paragraph 23.4; MSC 98/23, annex 38; MSC 102/24, paragraph 21.6; CCC 6/14, section 4 |
| Notes: MSC 102 agreed the new target completion year 2021. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.1 | 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, paragraph 20.3; MSC 78/26, paragraph 22.12; CCC 6/14, section 8 |
| Notes: A 28 expanded the output to include all proposed unified interpretations to provisions of IMO safety, security, and environment-related Conventions. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.10 | Amendments to the IMDG Code and supplements | Continuous | MSC | CCC | | Ongoing | | CCC 6/14, section 6 |
| 6. Ensure regulatory effectiveness | 6.13 | Amendments to the IMSBC Code and supplements | Continuous | MSC | CCC | | Ongoing | | CCC 6/14, section 5 |
| 6. Ensure regulatory effectiveness | 6.15 | Role of the human element | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | No work requested | | MSC 89/25, para 22.39; MSC 100/20, paragraph 17.28 |
| 6. Ensure regulatory effectiveness | 6.23 | Revision of the Revised recommendations for entering enclosed spaces aboard ships (resolution A.1050(27)) | 2021 | MSC | CCC | | Extended | | MSC 101/24, paragraph 21.48; MSC 101/24, paragraph 20.7 |
| Notes: Target completion year has been adjusted due to postponement of CCC 7. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.27 | Amendments to the International Code for the Safe Carriage of Grain in Bulk (resolution MSC.23(59)) to introduce a new class of loading conditions for special compartments | 2021 | MSC | CCC | | | | MSC 101/24, paragraph 20.7 |

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|---|---|---|---|---|---|---|---|---|---|
| Notes: Due to the postponement of CCC 7 to 2021, following the COVID19 pandemic, the work will be initiated by CCC 7 in 2021. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.31 | 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 6/14, section 9 |

| SUB-COMMITTEE ON HUMAN ELEMENT, TRAINING AND WATCHKEEPING (HTW) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Reference to SD, if applicable | Output number | Description | Target completion year | Parent organ(s) | Associated organ(s) | Coordinating organ | Status of output for Year 1 | Status of output for Year 2 | References |
| 1. Improve implementation | 1.3 | Validated model training courses | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | | | MSC 100/20, paragraphs 10.3 to 10.6 and 17.28; HTW 6/13, section 3 |
| 1. Improve implementation | 1.11 | Measures to harmonize port State control (PSC) activities and procedures worldwide | Continuous | MSC / MEPC | HTW / PPR / NCSR | III | | | |
| 1. Improve implementation | 1.16 | Development of measures to facilitate mandatory seagoing service required under the STCW Convention | 2021 | MSC | III | HTW | | | |
| 1. Improve implementation | 1.22 | Comprehensive review of the 1995 STCW-F Convention | 2021 | MSC | HTW | | | | MSC 95/22, paragraph 19.3 and 19.4; MSC 96/25, paragraph 12.3; HTW 6/13, section 6 |
| 1. Improve implementation | 1.26 | 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 | 2021 | MEPC | III / HTW | PPR | | | MEPC 71/17, paras.14.8 and 14.9; MEPC 72/17, paragraph15.10; MEPC 73/19, paragraph 15.19; PPR 6/20, Section 14; MEPC 74/18, paragraph 14.5 |
| 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". | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 1. Improve implementation | 1.28 | Development of amendments to the Revised guidelines for the development, review and validation of model courses (MSC-MEPC.2/Circ.15/Rev.1) | 2022 | MSC | HTW | | | | MSC 100/20, paragraphs 17.7 and 17.8; HTW 6/13, section 8 |
| Notes: | Target completion year extended to 2022 as a consequence of the postponement of HTW 7 and its planned arrangements. | | | | | | | | |
| 1. Improve implementation | 1.32 | Implementation of the STCW Convention | Continuous | MSC | HTW | | | | MSC 101/24, paragraph 15.7 |
| 1. Improve implementation | 1.33 | Development of training provisions for seafarers related to the BWM Convention | 2021 | MEPC | HTW | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.3 | Amendments to the IGF Code and development of guidelines for low-flashpoint fuels | Continuous | MSC | HTW / PPR / SDC / SSE | CCC | | | MSC 94/21, paragraphs 18.5 and 18.6; MSC 96/25, paragraphs 10.1 to 10.3; MSC 97/22, paragraph 19.2; PPR 6/20, paragraph 3.39; MSC 102/24, paragraph 21.4 HTW 6/13, section 12 |
| Notes: | MSC 102 approved changing the target completion year to "continuous". | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.8 | Development of guidelines for cold ironing of ships and consideration of amendments to SOLAS chapters II-1 and II-2 | 2020 | MSC | III / HTW / SDC | SSE | | | MSC 98/23, paragraph 20.36; SSE 7/21, section 11 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.10 | Revision of SOLAS chapters III and IV for Modernization of the GMDSS, including related and consequential amendments to other existing instruments | 2021 | MSC | HTW / SSE | NCSR | | | MSC 98/23, paragraph 20.27 HTW 6/13, section 2 |
| 4. Engage in ocean governance | 4.3 | Follow-up work emanating from the Action Plan to address marine plastic litter from ships | 2021 | MEPC | III / HTW / PPR | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 5. Enhance global facilitation and security of international trade | 5.6 | Development of amendments to the STCW Convention and Code for the use of electronic certificates and documents of seafarers | 2021 | MSC | III | HTW | | | |
| Notes: | Target completion year extended to 2021 as a consequence of the postponement of HTW 7. | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.15 | Role of the human element | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | | | MSC 89/25, paragraphs 10.10, 10.16 and 22.39 and annex 21; HTW 6/13, section 7 |
| 6. Ensure regulatory effectiveness | 6.16 | Development of measures to ensure quality of onboard training as part of the mandatory seagoing service required by the STCW Convention | 2021 | MSC | HTW | | | | |
| Notes: | Target completion year extended to 2021 as a consequence of the postponement of HTW 7. | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.28 | Reports on unlawful practices associated with certificates of competency | Annual | MSC | HTW | | | | MSC 83/28, paragraph 12.2; HTW 6/13, section 4 |
| 6. Ensure regulatory effectiveness | 6.35 | Requirements for onboard lifting appliances and anchor handling winches | 2022 | MSC | HTW | SSE | | | MSC 89/25, paragraph 22.26; MSC 98/23, annex 38 |
| Notes: | Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.36 | Review of SOLAS chapter II-2 and associated codes to minimize the incidence and consequences of fires on ro-ro spaces and special category spaces of new and existing ro-ro passenger ships | 2021 | MSC | HTW / SDC | SSE | | | MSC 97/22, paragraph 19.19; MSC 98/23, paragraph 12.42 HTW 6/13, section 12 |
| Notes: | Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | |

| SUB-COMMITTEE ON IMPLEMENTATION OF IMO INSTRUMENTS (III) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Reference to SD, if applicable | Output number | Description | Target completion year | Parent organ(s) | Associated organ(s) | Coordinating organ | Status of output for Year 1 | Status of output for Year 2 | References |
| 1. Improve implementation | 1.3 | Validated model training courses | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | | | MSC 100/20, paragraphs 10.3 to 10.6 and 17.28; III 6/15, section 4 |
| 1. Improve implementation | 1.4 | Analysis of consolidated audit summary reports | Annual | Assembly | MSC / MEPC / LEG / TCC / III | Council | | | MEPC 61/24, paragraph 11.14.1; MSC 88/26, paragraph 10.8; C 120/D, paragraphs 7.1 and 7.2; III 6/15, section 7 |
| 1. Improve implementation | 1.5 | Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code) | Annual | MSC / MEPC | III | | | | MEPC 64/23, paragraph 11.49; MSC 91/22, paragraph 10.30; MEPC 52/24, paragraph 10.15; MEPC 72/17, paragraph 2.7.5; and MEPC 74/18, paragraph 11.3; III 6/15, section 9 |
| 1. Improve implementation | 1.11 | Measures to harmonize port State control (PSC) activities and procedures worldwide | Continuous | MSC / MEPC | HTW / PPR / NCSR | III | | | |
| 1. Improve implementation | 1.16 | Development of measures to facilitate mandatory seagoing service required under the STCW Convention | 2021 | MSC | III | HTW | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 1. Improve implementation | 1.26 | 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 | 2021 | MEPC | III / HTW | PPR | | | MEPC 71/17, paras.14.8 and 14.9; MEPC 72/17, paragraph 15.10; MEPC 73/19, paragraph 15.19; PPR 6/20, Section 14; and MEPC 74/18, paragraph 14.5 |
| 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". | | | | | | | | | |
| 1. Improve implementation | 1.35 | Review the Model Agreement for the authorization of recognized organizations acting on behalf of the Administration | 2021 | MSC / MEPC | III | | | | MSC 102/24, paragraph 14.8 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.8 | Development of guidelines for cold ironing of ships and consideration of amendments to SOLAS chapters II-1 and II-2 | 2020 | MSC | III / HTW / SDC | SSE | | | MSC 98/23, paragraph 20.36; SSE 7/21, section 11 |
| 4. Engage in ocean governance | 4.3 | Follow-up work emanating from the Action Plan to address marine plastic litter from ships | 2021 | MEPC | III / HTW / PPR | | | | |
| 5. Enhance global facilitation and security international of trade | 5.6 | Development of amendments to the STCW Convention and Code for the use of electronic certificates and documents of seafarers | 2021 | MSC | III | HTW | | | |
| Notes: Target completion year extended to 2021 as a consequence of the postponement of HTW 7. | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 6. Ensure regulatory effectiveness | 6.1 | 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 | | | | MSC 76/23, paragraph 20.3; MSC 78/26, paragraph 22.12; |
| Notes: A 28 expanded the output to include all proposed unified interpretations to provisions of IMO safety, security, and environment-related Conventions. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.4 | Lessons learned and safety issues identified from the analysis of marine safety investigation reports | Annual | MSC / MEPC | III | | | | MSC 92/26, paragraph 22.29; III 6/15, section 4 |
| 6. Ensure regulatory effectiveness | 6.5 | Identified issues relating to the implementation of IMO instruments from the analysis of PSC data | Annual | MSC / MEPC | III | | | | MSC 96/25, paragraph 23.13; MEPC 69/21, paragraph 19.11; III 6/15, section 6 |
| 6. Ensure regulatory effectiveness | 6.7 | Consideration and analysis of reports on alleged inadequacy of port reception facilities | Annual | MEPC | III | | | | MEPC 69/21, paragraph 19.11; III 5/15, section 3 ; MEPC 73/19, paras. 8.3 and 8.11; MEPC 74/18, paras. 4.33, 4.34 and 8.22; III 6/15, section 3 |
| 6. Ensure regulatory effectiveness | 6.15 | Role of the human element | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | | | MSC 89/25, paragraphs 10.10, 10.16 and 22.39 and annex 21; |
| 6. Ensure regulatory effectiveness | 6.30 | Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC) | Annual | MSC / MEPC | III | | | | MEPC 68/21, paragraphs 14.5 and 14.6; FSI 12/22, paragraph 9.4; MSC 79/23, paragraphs 9.19 |

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|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | and 9.20;<br>MEPC 72/17, paras. 7.4 and 4.24 to 4.33;<br>III 5/15, section 8<br>III 6/15, section 8 |
| 6. Ensure regulatory effectiveness | 6.31 | 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 | | | CCC 6/14, section 9 |
| 6. Ensure regulatory effectiveness | 6.34 | Finalization of a non-mandatory instrument on regulations for non convention-ships | 2022 | MSC | III | | | | MSC 96/25, paragraph 9.4;<br>MSC 101/24, paragraph 21.38;<br>III 6/15, section 11 |

| SUB-COMMITTEE ON NAVIGATION, COMMUNICATIONS AND SEARCH AND RESCUE (NCSR) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Reference to SD, if applicable | Output number | Description | Target completion year | Parent organ(s) | Associated organ(s) | Coordinating organ | Status of output for Year 1 | Status of output for Year 2 | References |
| 1. Improve implementation | 1.3 | Validated model training courses | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | Ongoing | | MSC 100/20, paragraphs 10.3 to 10.6 and 17.28; NCSR 7/23, section 19 |
| 1. Improve implementation | 1.11 | Measures to harmonize port State control (PSC) activities and procedures worldwide | Continuous | MSC / MEPC | HTW / PPR / NCSR | III | No work requested | | |
| 1. Improve implementation | 1.20 | Revision of the Guidelines on places of refuge for ships in need of assistance (resolution A.949(23)) | 2021 | MSC | NCSR | | In progress | | MSC 100/20, paragraph 17.1; NCSR 7/23, section 13 |
| 1. Improve implementation | 1.34 | Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures | 2021 | MSC | NCSR | | In progress | | NCSR 7/23, sections 15 and 16 |
| Notes: Recognizing the importance of considering further development of the Global SAR Plan and to provide an opportunity for further proposals, MSC 101 agreed with the request of NCSR 6 to extend the target completion year for this output to 2021. Furthermore, MSC 102 agreed with the request of NCSR 7 to combine outputs OW 28 "Further development of the provision of global maritime SAR services" and OW 29 "Guidelines on harmonized aeronautical and maritime search and rescue procedures, including SAR training matters" under a new output called "Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures". MSC 102 also agreed to relocate this output under SD 1. | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.1 | Response to matters related to the ITU-R Study Groups and ITU World Radiocommunication Conference | Annual | MSC | NCSR | | Completed | | |

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|---|---|---|---|---|---|---|---|---|---|
| 2. Integrate new and advancing technologies in the regulatory framework | 2.9 | Application of the Indian Regional Navigation Satellite System (IRNSS) in the maritime field and development of performance standards for shipborne IRNSS receiver equipment | 2020 | MSC | NCSR | | Completed | | MSC 98/23, paragraphs 11.8 and 11.9;<br>MSC 99/22, paragraph 12.7;<br>resolution MSC.449(99) |
| Notes: Recognizing that the evaluation of the Indian Regional Navigation Satellite System (IRNSS) had not been completed and that further work was required, MSC 101 agreed with the request of NCSR 6 to extend the target completion year for this output to 2020. | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.10 | Revision of SOLAS chapters III and IV for Modernization of the GMDSS, including related and consequential amendments to other existing instruments | 2021 | MSC | HTW / SSE | NCSR | In progress | | MSC 98/23, paragraph 20.27;<br>NCSR 7/23, section 11 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.11 | Consideration of descriptions of Maritime Services in the context of e-navigation | 2021 | MSC | FAL / NCSR | | In progress | | FAL 43/20, paragraph 7.21;<br>MSC 101/24, paragraphs 11.10 and 11.11;<br>resolution MSC.467(101);<br>MSC.1/Circ.1610;<br>NCSR 7/23, section 8 |
| Notes: Having completed the work on the development of guidance on definition and harmonization of the format and structure of Maritime Services within the context of e-navigation and recognizing the need for a continuous review process of maritime service descriptions and the harmonization of related services, MSC 101 agreed with the request of NCSR 6 to rename the output "Develop guidance on definition and harmonization of the format and structure of Maritime Service Portfolios (MSPs)" as "Consideration of descriptions of Maritime Services in the context of e-navigation" with a target completion year of 2021. MSC 101 also noted the decision of FAL 43 to include the FAL Committee as an associated organ for this output (FAL 43/20, paragraphs 7.21 to 7.23). | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.12 | Recognition of the Japanese regional navigation satellite system Quasi-Zenith Satellite System (QZSS) and development of performance standards for shipborne satellite navigation system receiver equipment | 2021 | MSC | NCSR | | In progress | | MSC 102/24, paragraph 16.6 and resolution MSC.480(102);<br>NCSR 7/23, section 6 and annex 4 |
| 4. Engage in ocean governance | 4.1 | Identification and protection of Special Areas, Emission Control Areas and PSSAs | Continuous | MEPC | NCSR | | No work requested | | |

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|---|---|---|---|---|---|---|---|---|---|
| | | and associated protective measures | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.1 | 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, paragraph 20.3; MSC 78/26, paragraph 22.12; NCSR 7/23, section 18 |
| Notes: A 28 expanded the output to include all proposed unified interpretations to provisions of IMO safety, security, and environment-related Conventions. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.2 | Developments in GMDSS services, including guidelines on maritime safety information (MSI) | Continuous | MSC | NCSR | | Ongoing | | MSC 102/24, paragraphs 16.8 to 16.14; MSC.1/Circ.1364/Rev.2 and MSC.1/Circ.1635; NCSR 7/23, sections 9 and 14 |
| Notes: MSC 102 agreed with the request of NCSR 7 to combine outputs 6.2 "Developments in GMDSS satellite services" and OW 6 "Updating of the GMDSS Master Plan and guidelines on maritime safety information (MSI)", renaming output 6.2 as "Developments in GMDSS services, including guidelines on maritime safety information (MSI)". | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.15 | Role of the human element | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | No work requested | | MSC 89/25, paragraphs 10.10, 10.16 and 22.39 and annex 21; |
| 6. Ensure regulatory effectiveness | 6.18 | Revision of the Guidelines for Vessel Traffic Services (resolution A.857(20)) | 2020 | MSC | NCSR | | Completed | | MSC 102/24, paragraphs 16.7 |
| 6. Ensure regulatory effectiveness | 6.21 | Amendments to the IAMSAR Manual | Continuous | MSC | NCSR | | Ongoing | | NCSR 7/23, section 17 |
| 6. Ensure regulatory effectiveness | 6.24 | Routeing measures and mandatory ship reporting systems | Continuous | MSC | NCSR | | Ongoing | | MSC 102/24, paragraphs 16.2 to 16.4; COLREG.2/Circ.75; SN.1/Circ.339; NCSR 7, section 3 and annexes 1 and 2 |

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| 6. Ensure regulatory effectiveness | 6.25 | Updates to the LRIT system | Continuous | MSC | NCSR | | Ongoing | | NCSR 7/23, section 4 |
| 6. Ensure regulatory effectiveness | 6.38 | Safety measures for non-SOLAS ships operating in polar waters | 2022 | MSC | NCSR | SDC | In progress | | MSC 98/23, paragraphs 10.29, 20.31.1 and 20.31.2, and annex 38;<br>MSC 99/22, paragraphs 7.16 and 20.13.1;<br>MSC 101/24, paragraphs 7.6 and 7.9;<br>MSC 102/24, paragraphs 17.5 to 17.8;<br>NCSR 7/23, section 10 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.40 | Consequential work related to the new International Code for Ships Operating in Polar Waters | 2022 | MSC | NCSR / SSE | SDC | No work requested | | MSC 93/22, paragraphs 10.44, 10.50 and 20.12;<br>MSC 96/25, paragraph 3.77;<br>MSC 97/22, paragraphs 8.32 and 19.25;<br>MSC 101/24, paragraphs 7.9 and 11.18, and annex 31;<br>MSC.1/Circ.1612;<br>MSC 102/24, paragraph 19.3 |
| Notes: Due to the postponement of SSE 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |

| SUB-COMMITTEE ON SHIP DESIGN AND CONSTRUCTION (SDC) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Reference to SD, if applicable** | **Output number** | **Description** | **Target completion year** | **Parent organ(s)** | **Associated organ(s)** | **Coordinating organ** | **Status of output for Year 1** | **Status of output for Year 2** | **References** |
| 1. Improve implementation | 1.3 | Validated model training courses | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | | | MSC 100/20, paragraphs 10.3 to 10.6 and 17.28; |
| 1. Improve implementation | 1.13 | Review of mandatory requirements in the SOLAS, MARPOL and Load Line Conventions and the IBC and IGC Codes regarding watertight doors on cargo ships | 2021 | MSC / MEPC | CCC | SDC | Completed | | MSC 101/24, paragraph 21.25; MSC 102/24, paragraph 17.28; SDC 7/16, paragraph 12.11 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.3 | Amendments to the IGF Code and development of guidelines for low-flashpoint fuels | Continuous | MSC | HTW / PPR / SDC / SSE | CCC | | | MSC 94/21, paragraph 18.6; PPR 6/20, paragraph 3.39; MSC 102/24, paragraph 21.4 |
| Notes: MSC 102 approved changing the target completion year to "continuous". | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.4 | Mandatory instrument and/or provisions addressing safety standards for the carriage of more than 12 industrial personnel on board vessels engaged on international voyages | 2022 | MSC | SDC | | | | MSC 95/22, paragraph 19.25; MSC 102/24, paragraphs 17.10 to 17.20; SDC 7/16, section 6 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |
| 2. Integrate new and advancing technologies in | 2.5 | Safety objectives and functional requirements of the Guidelines on alternative design and | 2022 | MSC | SSE | SDC | | | MSC 82/24, paragraph 3.92; MSC 98/23, annex 38; MSC 102/24, paragraph 19.16. |

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| the regulatory framework | | arrangements for SOLAS chapters II-1 and III | | | | | | | |
| Notes: MSC 101 agreed that the remaining work be limited to SOLAS chapter II-1. Transfer of output from SSE to SDC, requested by SSE 7 (SSE 7/21, paragraph 10.8) and agreed to by MSC 102 (MSC 102/24, paragraph 19.14); Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.6 | Development of Explanatory Notes to the Interim guidelines on second generation intact stability criteria | 2022 | MSC | SDC | | | Extended | MSC 85/26, paragraphs 12.7 and 23.42;<br>MSC 102/24, paragraph 21.20 and annex 26);<br>SDC 7/16, section 5 |
| Notes: With the finalization of the second generation intact stability criteria (MSC.1/Circ.1628), MSC 102 agreed to develop associated Explanatory Notes and to change the output title from "Finalization of second generation intact stability criteria" to "Development of Explanatory Notes to the Interim guidelines on second generation intact stability criteria"; Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.8 | Development of guidelines for cold ironing of ships and consideration of amendments to SOLAS chapters II-1 and II-2 | 2020 | MSC | III / HTW / SDC | SSE | | | MSC 98/23, paragraph 20.36;<br>SSE 7/21, section 11 |
| 6. Ensure regulatory effectiveness | 6.1 | 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 | | | | MSC 76/23, paragraph 20.3;<br>MSC 78/26, paragraph 22.12;<br>SDC 5/15, section 9;<br>SDC 6/13, section 9 |
| Notes: A 28 expanded the output to include all proposed unified interpretations to provisions of IMO safety, security, and environment-related Conventions. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.15 | Role of the human element | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | | | MSC 89/25, paragraphs 10.10, 10.16 and 22.39 and annex 21; |
| 6. Ensure regulatory effectiveness | 6.22 | Amendments to the 2011 ESP Code | Continuous | MSC | SDC | | Ongoing | Ongoing | MSC 92/26, paragraph 13.31;<br>SDC 6/13, section 7;<br>SDC 7/16, section 10 |
| Notes: Regular updates to the 2011 ESP Code agreed by MSC 92 (MSC 92/26, paragraph 13.31). | | | | | | | | | |

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| 6. Ensure regulatory effectiveness | 6.32 | Mandatory application of the Performance standard for protective coatings for void spaces on bulk carriers and oil tankers | 2022 | MSC | SDC | | In progress | | MSC 76/23, paragraph 20.41.2 and 20.48;<br>DE 50/27, section 4;<br>SDC 7/16, section 8 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.33 | Performance standard for protective coatings for void spaces on all types of ships | 2022 | MSC | SDC | | In progress | | MSC 76/23, paragraphs 20.41.2 and 20.48;<br>SDC 7/16, section 9 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.36 | Review of SOLAS chapter II-2 and associated codes to minimize the incidence and consequences of fires on ro-ro spaces and special category spaces of new and existing ro-ro passenger ships | 2021 | MSC | HTW / SDC | SSE | | | MSC 97/22, paragraph 19.19;<br>MSC 98/23, paragraph 12.42 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.38 | Safety measures for non-SOLAS ships operating in polar waters | 2022 | MSC | NCSR | SDC | In progress | | MSC 98/23, paragraphs 10.29, 20.31.1 and 20.31.2, and annex 38;<br>MSC 99/22, paragraphs 7.16 and 20.13.1;<br>MSC 101/24, paragraphs 7.6 and 7.9;<br>MSC 102/24, paragraph 17.8;<br>SDC 7/16, section 4 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.40 | Consequential work related to the new International Code for Ships Operating in Polar Waters | 2022 | MSC | NCSR / SSE | SDC | In progress | | MSC 93/22, paragraphs 10.44, 10.50 and 20.12;<br>MSC 96/25, paragraph 3.77;<br>MSC 97/22, paragraphs 8.32 and 19.25; |

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| | | | | | | | | | MSC 101/24, paragraphs 7.9 and 11.18, and annex 31;<br>MSC.1/Circ.1612;<br>MSC 102/24, paragraph 19.3 |
| Notes: Due to the postponement of SSE 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.43 | Development of amendments to SOLAS chapter II-1 to include requirements for water level detectors on non-bulk carrier cargo ships with multiple cargo holds | 2021 | MSC | SSE | SDC | Completed | | MSC 102/24, paragraph 17.23;<br>SDC 7/16, paragraph 7.10 |
| 6. Ensure regulatory effectiveness | 6.44 | Amendments to the Explanatory Notes to SOLAS chapter II-1 subdivision and damage stability regulations (resolution MSC.429(98)) | 2020 | MSC | SDC | | Completed | | MSC 101/24/Add.1, annex 31, page 23;<br>MSC 102/24, paragraph 17.2;<br>SDC 7/16, section 3 |

| SUB-COMMITTEE ON SHIP SYSTEMS AND EQUIPMENT (SSE) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Reference to SD, if applicable** | **Output number** | **Description** | **Target completion year** | **Parent organ(s)** | **Associated organ(s)** | **Coordinating organ** | **Status of output for Year 1** | **Status of output for Year 2** | **References** |
| 1. Improve implementation | 1.3 | Validated model training courses | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | No work requested | | MSC 100/20, paragraphs 10.3 to 10.6 and 17.28; |
| 1. Improve implementation | 1.27 | Revision of the Standardized Life-Saving Appliance Evaluation and Test Report Forms (MSC/Circ.980 and addenda) | 2020 | MSC | SSE | | Completed | | MSC 99/22, paragraphs 20.29 and 20.32;<br>SSE 7/21, section 13 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.3 | Amendments to the IGF Code and development of guidelines for low-flashpoint fuels | Continuous | MSC | HTW / PPR / SDC / SSE | CCC | No work requested | | MSC 94/21, paragraphs 18.5 and 18.6;<br>MSC 96/25, paragraphs 10.1 to 10.3;<br>MSC 97/22, paragraph 19.2;<br>PPR 6/20, paragraph 3.39;<br>MSC 102/24, paragraph 21.4 |
| Notes: MSC 102 approved changing the target completion year to "continuous". | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.5 | Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III | 2022 | MSC | SSE | SDC | In progress | | MSC 82/24, paragraph 3.92;<br>MSC 98/23, annex 38;<br>MSC 102/24, paragraph 19.16;<br>SSE 6/18, section 3;<br>SSE 7, section 10 |
| Notes: MSC 101 agreed that the remaining work be limited to SOLAS chapter II-1. Transfer of output from SSE to SDC, requested by SSE 7 (SSE 7/21, paragraph 10.8) and agreed to by MSC 102 (MSC 102/24, paragraph 19.14); Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |

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| 2. Integrate new and advancing technologies in the regulatory framework | 2.8 | Development of guidelines for cold ironing of ships and consideration of amendments to SOLAS chapters II-1 and II-2 | 2020 | MSC | III / HTW / SDC | SSE | Completed | | MSC 98/23, paragraph 20.36; SSE 7/21, section 11 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.10 | Revision of SOLAS chapters III and IV for Modernization of the GMDSS, including related and consequential amendments to other existing instruments | 2021 | MSC | HTW / SSE | NCSR | No work requested | | MSC 98/23, paragraph 20.27; SSE 6/18, paragraph 17.8 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.16 | Revision of SOLAS chapter III and the LSA Code | 2024 | MSC | SSE | | In progress | | SSE 7/21, section 5 |
| Notes: To remove gaps, inconsistencies and ambiguities based on the safety objectives, functional requirements and expected performance for SOLAS chapter III. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.1 | 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, paragraph 20.3; MSC 78/26, paragraph 22.12; SSE 7/21, section 16 |
| Notes: A 28 expanded the output to include all proposed unified interpretations to provisions of IMO safety, security, and environment-related Conventions. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.14 | Amendments to paragraph 4.4.7.6.17 of the LSA Code concerning single fall and hook systems with on-load release capability | 2021 | MSC | SSE | | Completed | | SSE 7/21, section 12 |
| 6. Ensure regulatory effectiveness | 6.15 | Role of the human element | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | No work requested | | MSC 89/25, paragraphs 10.10, 10.16 and 22.39 and annex 21; MSC 100/20, paragraph 17.28 |

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| 6. Ensure regulatory effectiveness | 6.17 | Revision of the Guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems (MSC.1/Circ.1318) | 2020 | MSC | SSE | | Completed | | SSE 7/21, section 17 |
| 6. Ensure regulatory effectiveness | 6.19 | Revision of the Code of safety for diving systems (resolution A.831(19)) and the Guidelines and specifications for hyperbaric evacuation systems (resolution A.692(17)) | 2022 | MSC | SSE | | In progress | | MSC 99/22, paragraph 20.26; SSE 7/21, section 14 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.35 | Requirements for onboard lifting appliances and anchor handling winches | 2022 | MSC | HTW | SSE | Extended | | MSC 89/25, paragraph 22.26; MSC 98/23, annex 38; SSE 7/21, section 9 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.36 | Review of SOLAS chapter II-2 and associated codes to minimize the incidence and consequences of fires on ro-ro spaces and special category spaces of new and existing ro-ro passenger ships | 2021 | MSC | HTW / SDC | SSE | In progress | | MSC 97/22, paragraph 19.19; MSC 98/23, paragraph 12.42; SSE 7/21, section 6 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |

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| 6. Ensure regulatory effectiveness | 6.37 | Amendments to Guidelines for the approval of fixed dry chemical powder fire-extinguishing systems for the protection of ship carrying liquefied gases in bulk (MSC.1/Circ.1315) | 2022 | MSC | SSE | | In progress | | MSC 98/23, paragraph 20.37; SSE 7/21, section 7 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.39 | New requirements for ventilation of survival craft | 2022 | MSC | SSE | | In progress | | MSC 97/22, paragraph 19.22; SSE 7/21, section 3 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.40 | Consequential work related to the new International Code for Ships Operating in Polar Waters | 2022 | MSC | NCSR / SSE | SDC | In progress | | MSC 93/22, paragraphs 10.44, 10.50 and 20.12; MSC 102/24, paragraph 19.3; SSE 7/21, section 4 |
| Notes: Due to the postponement of SSE 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.41 | Amendments to SOLAS chapter III, LSA Code and resolution MSC.81(70) to remove the applicability of the requirements to launch free-fall lifeboats with the ship making headway at speeds up to 5 knots in calm water | 2020 | MSC | SSE | | Completed | | SSE 7/21, section 15 |
| 6. Ensure regulatory effectiveness | 6.42 | Amendments to chapter 9 of the FSS Code for fault isolation requirements for cargo ships and passenger ship cabin balconies fitted with individually identifiable fire detector systems | 2020 | MSC | SSE | | Completed | | MSC 98/23, paragraph 20.34; SSE 7/21, section 8 |

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| 6. Ensure regulatory effectiveness | 6.43 | Development of amendments to SOLAS chapter II-1 to include requirements for water level detectors on non-bulk carrier cargo ships with multiple cargo holds | 2021 | MSC | SSE | SDC | No work requested | | MSC 102/24, paragraph 17.23 |
| 6. Ensure regulatory effectiveness | 6.45 | Development of amendments to the LSA Code and resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets | 2023 | MSC | SSE | | Postponed | | MSC 101/24, paragraph 21.6; MSC 102/24, paragraph 21.19; SSE 7/21, paragraph 20.20 |
| Notes: MSC 102 approved the inclusion of this item in the provisional agenda of SSE 8. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.46 | Development of amendments to SOLAS chapter II-2 and MSC.1/Circ.1456 addressing fire protection of control stations on cargo ships | 2023 | MSC | SSE | | Postponed | | MSC 101/24, paragraph 21.3; MSC 102/24, paragraph 21.19; SSE 7/21, paragraphs 20.39 and 20.40. |
| Notes: MSC 102 approved the inclusion of this item in the provisional agenda of SSE 8. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.47 | Development of provisions to prohibit the use of fire-fighting foams containing perfluorooctane sulfonic acid (PFOS) for fire-fighting on board ships | 2022 | MSC | SSE | | Postponed | | MSC 101/24, paragraph 21.27; MSC 102/24, paras 19.31 and 21.19 |
| Notes: MSC 102 included in the provisional agenda of SSE 8 and agreed that other regulations would need to be amended or a new regulation could be necessary instead; and there could be a need for consequential amendments to other instruments e.g. the HSC Code. | | | | | | | | | |

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# ANNEX 26

## PROVISIONAL AGENDAS OF THE SUB-COMMITTEES

## PROVISIONAL AGENDA FOR CCC 7

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 low-flashpoint fuels (2.3)

4 Amendments to the IGC and IGF Codes to include high manganese austenitic steel and related guidance for approving alternative metallic material for cryogenic service (SD 2)*

5 Amendments to the IMSBC Code and supplements (SD 6)*

6 Amendments to the IMDG Code and supplements (SD 6)*

7 Amendments to the International Code for the Safe Carriage of Grain in Bulk (resolution MSC.23(59)) to introduce a new class of loading conditions for special compartments (SD 6)*

8 Revision of the Revised recommendations for entering enclosed spaces aboard ships (resolution A.1050(27)) (SD 6)*

9 Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas (SD 6)*

10 Revision of the Inspection programmes for cargo transport units carrying dangerous goods (MSC.1/Circ.1442, as amended by MSC.1/Circ.1521) (1.30)

11 Unified interpretation of provisions of IMO safety, security, and environment-related conventions (6.1)

12 Biennial status report and provisional agenda for CCC 8

13 Election of Chair and Vice-Chair for 2022

14 Any other business

15 Report to the Committees

* Output number to be confirmed by the Council in due course.

## PROVISIONAL AGENDA FOR HTW 7

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Validated model training courses (1.3)

4 Role of the human element (6.15)

5 Reports on unlawful practices associated with certificates of competency (SD 6)*

6 Implementation of the STCW Convention (1.32)

7 Development of amendments to the Revised guidelines for the development, review and validation of model courses (MSC MEPC.2/Circ.15/Rev.1) (1.28)

8 Comprehensive review of the 1995 STCW-F Convention (1.22)

9 Development of amendments to the STCW Convention and Code for the use of electronic certificates and documents of seafarers (5.6)

10 Development of measures to ensure quality of onboard training as part of the mandatory seagoing service required by the STCW Convention (6.16)

11 Development of measures to facilitate mandatory seagoing service required under the STCW Convention (1.16)

12 Development of training provisions for seafarers related to the BWM Convention (1.33)

13 Biennial status report and provisional agenda for HTW 8

14 Election of Chair and Vice-Chair for 2022

15 Any other business

16 Report to the Maritime Safety Committee

* Output number to be confirmed by the Council in due course.

**PROVISIONAL AGENDA FOR III 7**

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 (6.7)

4 Lessons learned and safety issues identified from the analysis of marine safety investigation reports (6.4)

5 Measures to harmonize port State control (PSC) activities and procedures worldwide (1.11)

6 Identified issues relating to the implementation of IMO instruments from the analysis of PSC data (6.5)

7 Analysis of consolidated audit summary reports (1.4)

8 Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC) (SD 6) *

9 Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code) (1.5)

10 Unified interpretation of provisions of IMO safety, security and environment-related conventions (6.1)

11 Follow-up work emanating from the Action Plan to address marine plastic litter from ships (4.3)

12 Biennial status report and provisional agenda for III 8

13 Election of Chair and Vice-Chair for 2022

14 Any other business

15 Review of the Model Agreement for the authorization of recognized organization acting on behalf of the Administration (SD 1)* ‡

16 Report to the Committees

* Output number to be confirmed by the Council in due course.

‡ Subject to concurrent decision by MEPC.

## PROVISIONAL AGENDA FOR NCSR 8

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Routeing measures and mandatory ship reporting systems (SD 6)*

4 Recognition of the Japanese regional navigation satellite system Quasi-Zenith Satellite System (QZSS) and development of performance standards for shipborne satellite navigation system receiver equipment (2.12)

5 Safety measures for non-SOLAS ships operating in polar waters (SD 6)*

6 Revision of SOLAS chapters III and IV for Modernization of the GMDSS, including related and consequential amendments to other existing instruments (2.10)

7 Response to matters related to the ITU-R Study Groups and ITU World Radiocommunication Conference (2.1)

8 Revision of the Guidelines on places of refuge for ships in need of assistance (resolution A.949(23)) (1.20)

9 Developments in GMDSS services, including guidelines on maritime safety information (MSI) (6.2)

10 Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures (SD 1)*

11 Biennial status report and provisional agenda for NCSR 9

12 Election of Chair and Vice-Chair for 2022

13 Any other business

14 Report to the Maritime Safety Committee

* Output number to be confirmed by the Council in due course.

**PROVISIONAL AGENDA FOR SDC 8**

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Safety measures for non-SOLAS ships operating in polar waters (SD 6)*

4 Mandatory instrument and/or provisions addressing safety standards for the carriage of more than 12 industrial personnel on board vessels engaged on international voyages (2.4)

5 Development of Explanatory Notes to the *Interim guidelines on second generation intact stability criteria* (2.6)

6 Amendments to the 2011 ESP Code (SD 6)*

7 Mandatory application of the Performance standard for protective coatings for void spaces on bulk carriers and oil tankers (SD 6)*

8 Performance standard for protective coatings for void spaces on all types of ships (SD 6)*

9 Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (2.5)

10 Unified interpretation to provisions of IMO safety, security, and environment-related conventions (6.1)

11 Biennial status report and provisional agenda for SDC 9

12 Election of Chair and Vice-Chair for 2023

13 Any other business

14 Report to the Maritime Safety Committee

* Output number to be confirmed by the Council in due course.

## PROVISIONAL AGENDA FOR SSE 8

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 New requirements for ventilation of survival craft (SD 6)*

4 Consequential work related to the new International Code for Ships Operating in Polar Waters (SD 6)*

5 Revision of SOLAS chapter III and the LSA Code (2.16)

6 Review of SOLAS chapter II-2 and associated codes to minimize the incidence and consequences of fires on ro-ro spaces and special category spaces of new and existing ro-ro passenger ships (SD 6)*

7 Amendments to Guidelines for the approval of fixed dry chemical powder fire-extinguishing systems for the protection of ships carrying liquefied gases in bulk (MSC.1/Circ.1315) (SD 6)*

8 Development of amendments to the LSA Code and resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets*

9 Requirements for onboard lifting appliances and anchor handling winches (SD 6)*

10 Development of amendments to SOLAS chapter II-2 and MSC.1/Circ.1456 addressing fire protection of control stations on cargo ships*

11 Development of provisions to prohibit the use of fire-fighting foams containing perfluorooctane sulfonic acid (PFOS) for fire-fighting on board ships*

12 Validated model training courses (1.3)

13 Revision of the Code of safety for diving systems (resolution A.831(19)) and the Guidelines and specifications for hyperbaric evacuation systems (resolution A.692(17)) (6.19)

14 Unified interpretation of provisions of IMO safety, security, and environment-related conventions (6.1)

15 Biennial status report and provisional agenda for SSE 9

16 Election of Chair and Vice-Chair for 2023

17 Any other business

18 Report to the Maritime Safety Committee

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* Output number to be confirmed by the Council in due course.

**ANNEX 27**

**BIENNIAL STATUS REPORT OF THE MARITIME SAFETY COMMITTEE**

| Maritime Safety Committee (MSC) | | | | | | | | | |
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| **Reference to SD, if applicable** | **Output number** | **Description** | **Target completion year** | **Parent organ(s)** | **Associated organ(s)** | **Coordinating organ** | **Status of output for Year 1** | **Status of output for Year 2** | **References** |
| 1. Improve implementation | 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 | | |
| 1. Improve implementation | 1.3 | Validated model training courses | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | Ongoing | | MSC 100/20, paragraphs 10.3 to 10.6 and 17.28 |
| 1. Improve implementation | 1.4 | Analysis of consolidated audit summary reports | Annual | Assembly | MSC / MEPC / LEG / TCC / III | Council | No work requested | | MEPC 61/24, paragraph 11.14.1; MSC 88/26, paragraph 10.8; C 120/D, paragraphs 7.1 and 7.2 |
| 1. Improve implementation | 1.5 | Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code) | Annual | MSC / MEPC | III | | | | MEPC 64/23, paragraph 11.49; MSC 91/22, paragraph 10.30; MEPC 52/24, paragraph 10.15; MEPC 72/17, paragraph 2.7.5; and MEPC 74/18, paragraph 11.3 |

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| 1. Improve implementation | 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 | | No work requested | | |
| 1. Improve implementation | 1.11 | Measures to harmonize port State control (PSC) activities and procedures worldwide | Continuous | MSC / MEPC | HTW / PPR / NCSR | III | Ongoing | | |
| 1. Improve implementation | 1.13 | Review of mandatory requirements in the SOLAS, MARPOL and Load Line Conventions and the IBC and IGC Codes regarding watertight doors on cargo ships | 2021 | MSC / MEPC | CCC | SDC | Completed | | MSC 101/24, paragraph 21.25; MSC 102/24, paragraph 17.28 |
| 1. Improve implementation | 1.16 | Development of measures to facilitate mandatory seagoing service required under the STCW Convention | 2021 | MSC | III | HTW | | | |
| 1. Improve implementation | 1.20 | Revision of the Guidelines on places of refuge for ships in need of assistance (resolution A.949(23)) | 2021 | MSC | NCSR | | In progress | | MSC 100/20, paragraph 17.1 |
| 1. Improve implementation | 1.22 | Comprehensive review of the 1995 STCW-F Convention | 2021 | MSC | HTW | | | | MSC 95/22, paragraph 19.3 and 19.4; MSC 96/25, paragraph 12.3; |

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| 1. Improve implementation | 1.27 | Revision of the Standardized Life-Saving Appliance Evaluation and Test Report Forms (MSC/Circ.980 and addenda) | 2020 | MSC | SSE | | Completed | | MSC 99/22, paragraphs 20.29 and 20.32;<br>SSE 7/21, section 13 |
| 1. Improve implementation | 1.28 | Development of amendments to the Revised guidelines for the development, review and validation of model courses (MSC-MEPC.2/Circ.15/Rev.1) | 2022 | MSC | HTW | | Extended | | MSC 100/20, paragraphs 17.7 and 17.8 |
| Notes: Target completion year extended to 2022 as a consequence of the postponement of HTW 7 and its planned arrangements. | | | | | | | | | |
| 1. Improve implementation | 1.29 | Development of further measures to enhance the safety of ships relating to the use of fuel oil | 2021 | MSC | | | | | MSC 100/20, paragraphs 8.13 and 8.14 |
| 1. Improve implementation | 1.30 | Revision of the Inspection programmes for cargo transport units carrying dangerous goods (MSC.1/Circ.1442, as amended by MSC.1/Circ.1521) | 2021 | MSC | CCC | | Extended | | MSC 100/20, paragraph 17.16 |
| Notes: Due to the postponement of CCC 7 to 2021, following the COVID19 pandemic, the target completion year has been extended to 2021. | | | | | | | | | |
| 1. Improve implementation | 1.32 | Implementation of the STCW Convention | Continuous | MSC | HTW | | Ongoing | | MSC 101/24, paragraph 15.7 |
| 1. Improve implementation | 1.34 | Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures | 2021 | MSC | NCSR | | In progress | | |

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| Notes: Recognizing the importance of considering further development of the Global SAR Plan and to provide an opportunity for further proposals, MSC 101 agreed with the request of NCSR 6 to extend the target completion year for this output to 2021. Furthermore, MSC 102 agreed with the request of NCSR 7 to combine outputs OW 28 "Further development of the provision of global maritime SAR services" and OW 29 "Guidelines on harmonized aeronautical and maritime search and rescue procedures, including SAR training matters" under a new output called "Development of global maritime SAR services, including harmonization of maritime and aeronautical procedures". MSC 102 also agreed to relocate this output under SD 1. | | | | | | | | | |
| 1. Improve implementation | 1.35 | Review the Model Agreement for the authorization of recognized organizations acting on behalf of the Administration | 2021 | MSC / MEPC | III | | In progress | | MSC 102/24, paragraph 14.8 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.1 | Response to matters related to the ITU-R Study Groups and ITU World Radiocommunication Conference | Annual | MSC | NCSR | | Completed | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.3 | Amendments to the IGF Code and development of guidelines for low-flashpoint fuels | Continuous | MSC | HTW / PPR / SDC / SSE | CCC | Ongoing | | MSC 94/21, paragraphs 18.5 and 18.6; MSC 96/25, paragraphs 10.1 to 10.3; MSC 97/22, paragraph 19.2; PPR 6/20, paragraph 3.39; MSC 102/24, paragraph 21.4 |
| Notes: MSC 102 approved changing the target completion year to "continuous". | | | | | | | | | |

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| 2. Integrate new and advancing technologies in the regulatory framework | 2.4 | Mandatory instrument and/or provisions addressing safety standards for the carriage of more than 12 industrial personnel on board vessels engaged on international voyages | 2022 | MSC | SDC | | Extended | | MSC 95/22, paragraph 19.25; MSC 96/25, paragraphs 7.10 and 7.12; MSC 97/22, paragraphs 6.22 and 6.23; MSC 99/22, paragraphs 10.17 and 10.18; MSC 101/24, paragraphs 12.17 to 12.19; MSC 102/24, paragraphs 17.10 to 17.20 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.5 | Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III | 2022 | MSC | SSE | SDC | In progress | | MSC 82/24, paragraph 3.92; MSC 98/23, annex 38; MSC 102/24, paragraph 19.16. |
| Notes: MSC 101 agreed that the remaining work be limited to SOLAS chapter II-1. Transfer of output from SSE to SDC, requested by SSE 7 (SSE 7/21, paragraph 10.8) and agreed to by MSC 102 (MSC 102/24, paragraph 19.14); Due to the postponement of SDC 8 to 2022, following the COVID-19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.6 | Development of Explanatory Notes to the Interim guidelines on second generation intact stability criteria | 2022 | MSC | SDC | | Extended | | MSC 85/26, paragraphs 12.7 and 23.42; MSC 102/24, paragraph 21.20 and annex 26) |

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| Notes: With the finalization of the second generation intact stability criteria (MSC.1/Circ.1628), MSC 102 agreed to develop associated Explanatory Notes and to change the output title from "Finalization of second generation intact stability criteria" to "Development of Explanatory Notes to the Interim guidelines on second generation intact stability criteria"; Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.7 | Regulatory scoping exercise for the use of Maritime Autonomous Surface Ships (MASS) | 2021 | MSC | FAL | | Postponed | | MSC 98/23, paragraph 20.2.11; FAL 43/20, paragraph 17.1 |
| Notes: Due to COVID19, MSC 102 postponed the consideration to MSC 103 in 2021, thus postponed the target completion year to 2021. | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.8 | Development of guidelines for cold ironing of ships and consideration of amendments to SOLAS chapters II-1 and II-2 | 2020 | MSC | III / HTW / SDC | SSE | Completed | | MSC 98/23, paragraph 20.36; SSE 7/21, section 11 |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.9 | Application of the Indian Regional Navigation Satellite System (IRNSS) in the maritime field and development of performance standards for shipborne IRNSS receiver equipment | 2020 | MSC | NCSR | | Completed | | MSC 98/23, paragraphs 11.8 and 11.9; MSC 99/22, paragraph 12.7; resolution MSC.449(99) |
| Notes: Recognizing that the evaluation of the Indian Regional Navigation Satellite System (IRNSS) had not been completed and that further work was required, MSC 101 agreed with the request of NCSR 6 to extend the target completion year for this output to 2020. | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.10 | Revision of SOLAS chapters III and IV for Modernization of the GMDSS, including related and consequential amendments to other existing instruments | 2021 | MSC | HTW / SSE | NCSR | In progress | | MSC 98/23, paragraph 20.27 |

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| 2. Integrate new and advancing technologies in the regulatory framework | 2.11 | Consideration of descriptions of Maritime Services in the context of e-navigation | 2021 | MSC | FAL / NCSR | | In progress | | FAL 43/20, paragraph 7.21; MSC 101/24, paragraphs 11.10 and 11.11; resolution MSC.467(101); MSC.1/Circ.1610 |
| Notes: Having completed the work on the development of guidance on definition and harmonization of the format and structure of Maritime Services within the context of e-navigation and recognizing the need for a continuous review process of maritime service descriptions and the harmonization of related services, MSC 101 agreed with the request of NCSR 6 to rename the output "Develop guidance on definition and harmonization of the format and structure of Maritime Service Portfolios (MSPs)" as "Consideration of descriptions of Maritime Services in the context of e-navigation" with a target completion year of 2021. MSC 101 also noted the decision of FAL 43 to include the FAL Committee as an associated organ for this output (FAL 43/20, paragraphs 7.21 to 7.23). | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.12 | Recognition of the Japanese regional navigation satellite system Quasi-Zenith Satellite System (QZSS) and development of performance standards for shipborne satellite navigation system receiver equipment | 2021 | MSC | NCSR | | In progress | | MSC 102/24, paragraph 16.6 and resolution MSC.480(102) |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.16 | Revision of SOLAS chapter III and the LSA Code | 2024 | MSC | SSE | | In progress | | |
| Notes: To remove gaps, inconsistencies and ambiguities based on the safety objectives, functional requirements and expected performance for SOLAS chapter III | | | | | | | | | |

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| 2. Integrate new and advancing technologies in the regulatory framework | 2.17 | Consideration of development of goal-based ship construction standards for all ship types | 2021 | MSC / MEPC | | | In progress | | MSC 101/24, section 6; MSC 102/24, section 7 |
| Notes: As the Committee reviews, on a regular basis GBS audit reports, this item is quasi-continuous output | | | | | | | | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.21 | Review of FSA studies by the FSA Experts' Group | Continuous | MSC | | | Postponed | | |
| 2. Integrate new and advancing technologies in the regulatory framework | 2.22 | Amendments to the IGC and IGF Codes to include high manganese austenitic steel and related guidance for approving alternative metallic material for cryogenic service | 2021 | MSC | CCC | | Extended | | MSC 96/25 paragraph 23.4; MSC 98/23, annex 38; MSC 100/20 paragraph 17.21; MSC 102/24, paragraph 21.6 |
| Notes: MSC 102 agreed the new target completion year 2021. | | | | | | | | | |
| 4. Engage in ocean governance | 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, section 12; MEPC 73/19, section 13; MEPC 74/18, section 12 |
| 5. Enhance global facilitation and security of international trade | 5.2 | Guidelines and guidance on the implementation and interpretation of SOLAS chapter XI-2 and the ISPS Code | Annual | MSC | | | Postponed | | |

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| 5. Enhance global facilitation and security of international trade | 5.3 | Consideration and analysis of reports on piracy and armed robbery against ships | Annual | MSC | | | Postponed | | |
| 5. Enhance global facilitation and security of international trade | 5.4 | Revised guidance relating to the prevention of piracy and armed robbery to reflect emerging trends and behaviour patterns | Annual | MSC | LEG | | Postponed | | |
| 5. Enhance global facilitation and security of international trade | 5.6 | Development of amendments to the STCW Convention and Code for the use of electronic certificates and documents of seafarers | 2021 | MSC | III | HTW | Postponed | | |
| Notes: Target completion year extended to 2021 as a consequence of the postponement of HTW 7. | | | | | | | | | |
| 5. Enhance global facilitation and security of international trade | 5.13 | IMO's contribution to addressing unsafe mixed migration by sea | 2021 | MSC /FAL / LEG | | | In progress | | FAL 41/17, paragraph 7.15; MSC 98/23, paragraph 16.14; FAL 43, paragraph 10.7; MSC 101/24, paragraph 19.8 |
| 6. Ensure regulatory effectiveness | 6.1 | 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, paragraph 20.3; MSC 78/26, paragraph 22.12 |

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| Notes: A 28 expanded the output to include all proposed unified interpretations to provisions of IMO safety, security, and environment-related Conventions. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.2 | Developments in GMDSS services, including guidelines on maritime safety information (MSI) | Continuous | MSC | NCSR | | Ongoing | | MSC 102/24, paragraphs 16.8 to 16.14; MSC.1/Circ.1364/Rev.2 and MSC.1/Circ.1635 |
| Notes: MSC 102 agreed with the request of NCSR 7 to combine outputs 6.2 "Developments in GMDSS satellite services" and OW 6 "Updating of the GMDSS Master Plan and guidelines on maritime safety information (MSI)", renaming output 6.2 as "Developments in GMDSS services, including guidelines on maritime safety information (MSI)". | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.4 | Lessons learned and safety issues identified from the analysis of marine safety investigation reports | Annual | MSC / MEPC | III | | Completed | | MSC 92/26, paragraph 22.29; III 6/15, section 4 |
| 6. Ensure regulatory effectiveness | 6.5 | Identified issues relating to the implementation of IMO instruments from the analysis of PSC data | Annual | MSC / MEPC | III | | Completed | | MSC 96/25, paragraph 23.13; MEPC 69/21, paragraph 19.11 |
| 6. Ensure regulatory effectiveness | 6.6 | Consideration and analysis of reports and information on persons rescued at sea and stowaways | Annual | MSC / FAL | | | Postponed | | |
| 6. Ensure regulatory effectiveness | 6.10 | Amendments to the IMDG Code and supplements | Continuous | MSC | CCC | | Ongoing | | |
| 6. Ensure regulatory effectiveness | 6.13 | Amendments to the IMSBC Code and supplements | Continuous | MSC | CCC | | Ongoing | | |

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| 6. Ensure regulatory effectiveness | 6.14 | Amendments to paragraph 4.4.7.6.17 of the LSA Code concerning single fall and hook systems with on-load release capability | 2021 | MSC | SSE | | Completed | | SSE 7/21, section 12 |
| 6. Ensure regulatory effectiveness | 6.15 | Role of the human element | Continuous | MSC / MEPC | III / PPR / CCC / SDC / SSE / NCSR | HTW | Ongoing | | MSC 89/25, paragraphs 10.10, 10.16 and 22.39 and annex 21 |
| 6. Ensure regulatory effectiveness | 6.16 | Development of measures to ensure quality of onboard training as part of the mandatory seagoing service required by the STCW Convention | 2021 | MSC | HTW | | Extended | | |
| Notes: Target completion year extended to 2021 as a consequence of the postponement of HTW 7. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.17 | Revision of the Guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems (MSC.1/Circ.1318) | 2020 | MSC | SSE | | Completed | | SSE 7/21, section 17 |
| 6. Ensure regulatory effectiveness | 6.18 | Revision of the Guidelines for Vessel Traffic Services (resolution A.857(20)) | 2020 | MSC | NCSR | | Completed | | |
| 6. Ensure regulatory effectiveness | 6.19 | Revision of the Code of safety for diving systems (resolution A.831(19)) and the Guidelines and specifications for hyperbaric evacuation systems (resolution A.692(17)) | 2022 | MSC | SSE | | In progress | | MSC 99/22, paragraph 20.26 |

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| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.21 | Amendments to the IAMSAR Manual | Continuous | MSC | NCSR | | Ongoing | | |
| 6. Ensure regulatory effectiveness | 6.22 | Amendments to the 2011 ESP Code | Continuous | MSC | SDC | | Ongoing | | MSC 92/26, paragraph 13.31; |
| Notes: Regular updates to the 2011 ESP Code agreed by MSC 92 (MSC 92/26, paragraph 13.31) | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.23 | Revision of the Revised recommendations for entering enclosed spaces aboard ships (resolution A.1050(27)) | 2021 | MSC | CCC | | Extended | | MSC 101/24, paragraph 21.48 |
| Notes: Target completion year has been adjusted due to postponement of CCC 7 | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.24 | Routeing measures and mandatory ship reporting systems | Continuous | MSC | NCSR | | Ongoing | | MSC 102/24, paragraphs 16.2 to 16.4; COLREG.2/Circ.75; SN.1/Circ.339 |
| 6. Ensure regulatory effectiveness | 6.25 | Updates to the LRIT system | Continuous | MSC | NCSR | | Ongoing | | |
| 6. Ensure regulatory effectiveness | 6.26 | Verified goal-based new ship construction standards for tankers and bulk carriers | Continuous | MSC | | | Ongoing | | |

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| 6. Ensure regulatory effectiveness | 6.27 | Amendments to the International Code for the Safe Carriage of Grain in Bulk (resolution MSC.23(59)) to introduce a new class of loading conditions for special compartments | 2021 | MSC | CCC | | Postponed | | |
| Notes: Due to the postponement of CCC 7 to 2021, following the COVID19 pandemic, the work will be initiated by CCC 7 in 2021. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.28 | Reports on unlawful practices associated with certificates of competency | Annual | MSC | HTW | | Postponed | | MSC 83/28, paragraph 12.2; |
| 6. Ensure regulatory effectiveness | 6.29 | Reports to the MSC on information communicated by STCW Parties | Annual | MSC | | | | | |
| 6. Ensure regulatory effectiveness | 6.30 | Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC) | Annual | MSC / MEPC | III | | Completed | | MEPC 68/21, paragraphs 14.5 and 14.6; FSI 12/22, paragraph 9.4; MSC 79/23, paragraphs 9.19 and 9.20; MEPC 72/17, paragraphs 7.4 and 4.24 to 4.33; III 5/15, section 8 and III 6/15, section 8 |

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| 6. Ensure regulatory effectiveness | 6.31 | 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 6/14, section 9 |
| 6. Ensure regulatory effectiveness | 6.32 | Mandatory application of the Performance standard for protective coatings for void spaces on bulk carriers and oil tankers | 2022 | MSC | SDC | | In progress | | MSC 76/23, paragraphs 20.41.2 and 20.48; DE 50/27, section 4 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.33 | Performance standard for protective coatings for void spaces on all types of ships | 2022 | MSC | SDC | | | | MSC 76/23, paragraphs 20.41.2 and 20.48 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.34 | Finalization of a non-mandatory instrument on regulations for non convention-ships | 2022 | MSC | III | | In progress | | MSC 96/25, paragraph 9.4; MSC 101/24, paragraph 21.38 |
| 6. Ensure regulatory effectiveness | 6.35 | Requirements for onboard lifting appliances and anchor handling winches | 2022 | MSC | HTW | SSE | Extended | | MSC 89/25, paragraph 22.26; MSC 98/23, annex 38 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.36 | Review of SOLAS chapter II-2 and associated codes to minimize the incidence and consequences of fires on ro-ro spaces and special category spaces of new and existing ro-ro passenger ships | 2021 | MSC | HTW / SDC | SSE | In progress | | MSC 97/22, paragraph 19.19; MSC 98/23, paragraph 12.42 |

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| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.37 | Amendments to Guidelines for the approval of fixed dry chemical powder fire-extinguishing systems for the protection of ship carrying liquefied gases in bulk (MSC.1/Circ.1315) | 2022 | MSC | SSE | | In progress | | MSC 98/23, paragraph 20.37 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.38 | Safety measures for non-SOLAS ships operating in polar waters | 2022 | MSC | NCSR | SDC | In progress | | MSC 98/23, paragraphs 10.29, 20.31.1 and 20.31.2, and annex 38; MSC 99/22, paragraphs 7.16 and 20.13.1; MSC 101/24, paragraphs 7.6 and 7.9; MSC 102/24, paragraphs 17.5 to 17.8 |
| Notes: Due to the postponement of SDC 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.39 | New requirements for ventilation of survival craft | 2022 | MSC | SSE | | In progress | | MSC 97/22, paragraph 19.22 |
| Notes: Target completion year has been consequentially updated to 2022 due to SSE 8's postponement to 2022. | | | | | | | | | |

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| 6. Ensure regulatory effectiveness | 6.40 | Consequential work related to the new International Code for Ships Operating in Polar Waters | 2022 | MSC | NCSR / SSE | SDC | In progress | | MSC 93/22, paragraphs 10.44, 10.50 and 20.12; MSC 96/25, paragraph 3.77; MSC 97/22, paragraphs 8.32 and 19.25; MSC 101/24, paragraphs 7.9 and 11.18, and annex 31; MSC.1/Circ.1612; MSC 102/24, paragraph 19.3 |
| Notes: Due to the postponement of SSE 8 to 2022, following the COVID19 pandemic, the target completion year has been extended to 2022 | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.41 | Amendments to SOLAS chapter III, LSA Code and resolution MSC.81(70) to remove the applicability of the requirements to launch free-fall lifeboats with the ship making headway at speeds up to 5 knots in calm water | 2020 | MSC | SSE | | Completed | | SSE 7/21, section 15 |
| 6. Ensure regulatory effectiveness | 6.42 | Amendments to chapter 9 of the FSS Code for fault isolation requirements for cargo ships and passenger ship cabin balconies fitted with individually identifiable fire detector systems | 2020 | MSC | SSE | | Completed | | MSC 98/23, paragraph 20.34; SSE 7/21, section 8 |

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| 6. Ensure regulatory effectiveness | 6.43 | Development of amendments to SOLAS chapter II-1 to include requirements for water level detectors on non-bulk carrier cargo ships with multiple cargo holds | 2021 | MSC | SSE | SDC | Completed | | MSC 102/24, paragraph 17.23 |
| 6. Ensure regulatory effectiveness | 6.44 | Amendments to the Explanatory Notes to SOLAS chapter II-1 subdivision and damage stability regulations (resolution MSC.429(98)) | 2020 | MSC | SDC | | Completed | | MSC 101/24/Add.1, annex 31, page 23; MSC 102/24, paragraph 17.2 |
| 6. Ensure regulatory effectiveness | 6.45 | Development of amendments to the LSA Code and resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets | 2023 | MSC | SSE | | Postponed | | MSC 101/24, paragraph 21.6; MSC 102/24, paragraph 21.19 |
| Notes: MSC 102 approved the inclusion of this item in the provisional agenda of SSE 8. | | | | | | | | | |
| 6. Ensure regulatory effectiveness | 6.46 | Development of amendments to SOLAS chapter II-2 and MSC.1/Circ.1456 addressing fire protection of control stations on cargo ships | 2023 | MSC | SSE | | Postponed | | MSC 101/24, paragraph 21.3; MSC 102/24, paragraph 21.19 |
| Notes: MSC 102 approved the inclusion of this item in the provisional agenda of SSE 8. | | | | | | | | | |

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| 6. Ensure regulatory effectiveness | 6.47 | Development of provisions to prohibit the use of fire-fighting foams containing perfluorooctane sulfonic acid (PFOS) for fire-fighting on board ships | 2022 | MSC | SSE | | Postponed | | MSC 101/24, paragraph 21.27; MSC 102/24, paragraphs 19.31 and 21.19 |
| Notes: MSC 102 included in the provisional agenda of SSE 8 and agreed that other regulations would need to be amended or a new regulation could be necessary instead; and there could be a need for consequential amendments to other instruments e.g. the HSC Code. | | | | | | | | | |
| 7. Ensure organizational effectiveness | 7.1 | 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 | | |
| 7. Ensure organizational effectiveness | 7.9 | Revised documents on organization and method of work, as appropriate | 2021 | Council | MSC/MEPC / FAL / LEG / TCC | | In progress | | |
| OW. Other work | OW 13 | Endorsed proposals for new outputs for the 2020-2021 biennium as accepted by the Committees | Annual | Council | MSC/MEPC / FAL / LEG / TCC | | No work requested | | |
| OW. Other work | OW 23 | Cooperate with the United Nations on matters of mutual interest, as well as provide relevant input/guidance | 2021 | Assembly | MSC/MEPC / FAL / LEG / TCC | Council | In progress | | C 120/D, paragraphs 17(a).1-17(a).5 |

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| OW. Other work | OW 24 | Cooperate with other international bodies on matters of mutual interest, as well as provide relevant input/guidance | 2021 | Assembly | MSC/MEPC / FAL / LEG / TCC | Council | In progress | | C 120/D, paragraphs 17(a).1-17(a).5 |

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# ANNEX 28

## POST-BIENNIAL AGENDA OF THE MARITIME SAFETY COMMITTEE

| Maritime Safety Committee (MSC) | | | | | | | | |
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| **Number** | **Biennium (when the output was placed on the post-biennial agenda)** | **Reference to Strategic Direction, if applicable** | **Description** | **Parent organ(s)** | **Associated organs(s)** | **Coordinating organ(s)** | **Timescale (sessions)** | **References** |
| 172 | 2018-2019 | 1 | 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)) | MSC | NCSR | | 2 | MSC 101/24, paragraph21.33 |
| 145 | 2016-2017 | 2 | Amendments to the IMDG Code related to portable tanks with shells made of Fibre Reinforced Plastics (FRP) for multimodal transportation of dangerous goods | MSC | CCC | | 2 | MSC 98/23, paragraph 20.11 |
| 152 | 2016-2017 | 2 | Guidelines for use of Fibre Reinforced Plastics (FRP) within ship structures | MSC | SDC | | 2 | MSC 98/23, paragraph10.22 |
| 170 | 2018-2019 | 2 | Development of SOLAS amendments for mandatory carriage of electronic inclinometers on container ships and bulk carriers | MSC / NCSR | NCSR | | 1 | MSC 101/24, paragraph 21.20 |

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|---|---|---|---|---|---|---|---|---|
| 173 | 2018-2019 | 2 | Development of amendments to VDR performance standards and carriage requirements | MSC | III | NCSR | 2 | MSC 101/24, paragraph 21.30 |
| 156 | 2018-2019 | 6 | Development of amendments to the LSA Code to revise the lowering speed of survival craft and rescue boats for cargo ships | MSC | SSE | | 2 | MSC 99/22, paragraph 20.15 |
| 158 | 2018-2019 | 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 | MSC | SSE | | 2 | MSC 99/22, paragraphs 20.22 and 20.23 |
| 164 | 2018-2019 | 6 | Revision of ECDIS Guidance for good practice (MSC.1/Circ.1503/Rev.1) and amendments to ECDIS performance standards (resolution MSC.232(82)) | MSC | III | NCSR | 2 | MSC 100/20, paragraph 17.9; MSC 102/24, paragraph 21.14 |
| 169 | 2018-2019 | 6 | 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 | MSC | | SSE | 2 | MSC 101/24, paragraph 21.15 |
| 9 | 2012-2013 | OW | Revision of the provisions for helicopter facilities in SOLAS and the MODU Code | MSC | SSE | | 1 | MSC 86/26, paragraph 23.39 |

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|---|---|---|---|---|---|---|---|---|
| 163 | 2018-2019 | OW | Guidance on the training on and operation of Emergency Personal Radio Devices in multiple casualty situations | MSC | NCSR | | 1 | MSC 100/20, paragraph 17.5 |
| 168 | 2018-2019 | OW | Development of amendments to paragraph 8.3.5 and annex 1 of the 1994 and 2000 HSC Codes | MSC | | SSE | 1 | MSC 101/24, paragraph 21.9 |
| 32 | 2012-2013 | OW | Recommendations related to navigational sonar on crude oil tankers | MSC | SDC | | 1 | MSC 91/22, paragraph 19.23 |
| 42 | 2012-2013 | OW | Review of the 2009 Code on Alerts and Indicators | MSC | NCSR | SSE | 2 | MSC 89/25, paragraph 22.25 |
| 65 | 2012-2013 | OW | Application of amendments to SOLAS and related codes and guidelines | MSC | | | 2 | MSC 91/22, paragraphs 3.16 to 3.35 |
| 90 | 2014-2015 | OW | Amendments to the LSA Code for thermal performance of immersion suits | MSC | SSE | | 2 | MSC 92/26, paragraph 13.34 |

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**ANNEX 29**

**SUBSTANTIVE ITEMS FOR INCLUSION IN THE AGENDAS FOR MSC 103 AND MSC 104**

**103rd session of the Committee (5 to 14 May 2021)**

Decisions of other IMO bodies

Consideration and adoption of amendments to mandatory instruments

Capacity-building for the implementation of new measures

Regulatory scoping exercise for the use of Maritime Autonomous Surface Ships (MASS)

Development of further measures to enhance the safety of ships relating to the use of fuel oil

Goal-based new ship construction standards

Measures to improve domestic ferry safety

Measures to enhance maritime security

Piracy and armed robbery against ships

Unsafe mixed migration by sea

Formal safety assessment

Human element, training and watchkeeping (urgent matters emanating from the seventh session of the Sub-Committee)

Navigation, communications and search and rescue[1]

Ship design and construction[2]

Application of the Committee's method of work

Work programme

Election of Chair and Vice-Chair for 2021

Any other business

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[1] To consider proposals concerning spread of cost of dissemination of MSI and/or elimination of shore-to-ship charge for MSI; and draft amendments to IAMSAR Manual, as finalized by the ICAO/IMO Joint Working Group.

[2] To approve draft MSC circulars on *Guidelines for fishing vessels of 24 m in length and over operating in polar waters* and *Guidelines for pleasure yachts operating in polar waters*; and consideration of further polar guidelines.

**104th session of the Committee (October 2021)[3]**

Decisions of other IMO bodies

[Regulatory scoping exercise for the use of Maritime Autonomous Surface Ships (MASS)]

Measures to improve domestic ferry safety

Development of further measures to enhance the safety of ships relating to the use of fuel oil

Goal-based new ship construction standards

Human element, training and watchkeeping (report of the seventh session of the Sub-Committee)

Navigation, communications and search and rescue (report of the eighth session of the Sub-Committee)

Implementation of IMO instruments (report of the seventh session of the Sub-Committee)

Measures to enhance maritime security

Piracy and armed robbery against ships

Unsafe mixed migration by sea

Formal safety assessment

Application of the Committee's method of work

Work programme

Election of Chair and Vice-Chair for 2022

Any other business

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[3] The list of items for MSC 104 is indicative only and depends on the outcome of MSC 103.

# ANNEX 30

## STATEMENTS BY DELEGATIONS AND OBSERVERS*

### AGENDA ITEM 1

#### Statement by the delegation of Malaysia

"First of all, Malaysia would like to express our sincere condolences to Mr. William A. O'Neil, Secretary-General Emeritus of the International Maritime Organization (IMO) remaining family on his passing. His dedication towards IMO will always be remembered. His actions and initiatives had a great and lasting impact on the work of the Organization.

We also wish to express our solidarity with the People and Government of Greece and Turkey in the recent aftermath of the Magnitude 7.0 earthquake off the Aegean Sea. The present pandemic and this catastrophic event bear very strong implications, and to that, we wish to express our words of encouragement and prayers.

We also wish to inform this Committee that on the 27 October 2020 at approximately 0630am Malaysian Time, MV Dayang Topaz (an offshore support vessel) made contact with an oil platform, Baram Bravo, some 9.9 nautical miles of the coast of Sarawak Malaysia. The incident had occurred during heavy weather in consequence to a Typhoon "Molave" aka Typhoon Quinto in the South China Sea.

A total of 187 personnel was on board the vessel when the incident occurred. There are two fatalities reported, and Malaysian Search and Rescue Teams have rescued the rest of the crew and personnel. Sir, we wish to express our appreciation to the members of OCIMF and IMCA for their prompt response during the incident. We also want to express our appreciation to the Government of Brunei Darus Salam for their assistance. The incident is being investigated, and we will revert with our findings once the investigation is concluded.

Our meeting today could not be at a more crucial time. Nations across the globe are facing an unprecedented pandemic and we are not excluded from the dangers of COVID-19. As governments, we are confronting a combination of a health and economic crisis head-on. For people around the world, more than a quarter have been confined to their homes due to various levels of movement restrictions imposed by their Governments. Borders are closed, and businesses are shut. This is a new normal we must get used to. These are extraordinary times, and we need to think out of the box for a solution that will get us through these uncharted waters. A coherent, multi-sectoral, multi- stakeholder, global approach is critical in ensuring our timely and effective response to this pandemic.

On addressing challenges faced by seafarers, Malaysia would like to echo IMO Secretary-General in his opening remarks that we all need to work together as we all depend on seafarers. They should not be the collateral victims in this pandemic. Seafarers deliver for us - and now we need to deliver for them.

Let me assure you, that Malaysia stands ready and resolute with other countries to combat this pandemic together. I am confident that with solidarity, vision and leadership we can unite and

* 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).

get through these dark times together. We have faced multiple crises before this and I believe we will once again overcome this and emerge stronger than ever. God-Willing."

**Statement by the delegation of Thailand**

"I request to take the floor at this opportunity to report to the Committee an incident of a ferry name **Seatran Ferry 12** in the South China Sea. The vessel was on route from Japan to Thailand in light weather conditions and provisionally registered under a foreign flag. The ship sank on 23 October near the coast of Kaohsiung in the Taiwan Strait. Ten Thai nationals were serving on board, five were rescued in good time, and the other five are still missing.

In this regard, the Thai delegation would like to express our heartfelt gratitude to the coastal State and the relevant authorities for their tremendous efforts in search and rescue operations offered to our nationals – to rescue and continue searching for the 5 missing seafarers."

**Statement by the delegation of Singapore**

"Singapore would like to express our deep appreciation to the parties that came to the aid of the Singapore-registered tanker **Torm Alexandra** which was boarded by unknown perpetrators in the Gulf of Guinea on Saturday, 7 November 2020. The swift co-operation among the parties prevented the ship from being taken over by the perpetrators, and we are pleased to report that the crew and the ship are now safe.

Singapore would like to first thank the authorities from Benin and Nigeria for their support and close communications. We would also like to thank the Maritime Domain Awareness for Trade, Gulf of Guinea (MDAT-GOG) for their assistance. In particular, we would like to express our thanks to the Commander and crew of the frigate **Federico Martinengo F596** from the Italian Navy. The swift and decisive action of the frigate, including the dispatching of a helicopter, caused the perpetrators to flee from **Torm Alexandra**. The intervention of the frigate **Martinengo** was timely and is the reason the seafarers onboard the tanker **Torm Alexandra** are safe today.

Mr Chairman, an effective response against threats such as piracy and armed robbery against ships requires close co-operation and co-ordination from all stakeholders. The actions of the parties that I have highlighted exemplify the strong co-operation needed. We would like to express again our deep appreciation to all involved."

**Statement by the delegation of the Marshall Islands**

"The Marshall Islands delegation would like to draw further attention to the continued attacks endured by merchant vessels and their crews in the Gulf of Guinea. Four of these attacks have occurred on Marshall Islands flag tankers in the past month. This week alone, Motor Tanker **La Boheme** was attacked on Monday, 9 November and as recently as this morning, the Motor Tanker **Jane** also evaded attack. In both incidents this week, the attacks were aborted after the vessels took evasive manoeuvres, and the ships and crew are reported to be safe. This is not an acceptable situation.

Following our statement earlier this week, this delegation recognizes the importance of multi-stake holder cooperation to develop options for the near-term mitigation of these threats and ultimately the eradication of these unnecessary stresses on shipping and, again more importantly, on our crews and we hope that security can be a priority item for MSC 103."

**AGENDA ITEM 7**

**Statement by the observer from IACS**

"The second GBS maintenance verification audit was carried out in 2019 and reported to MSC 102 in document MSC 102/7/2. IACS appreciates the well-established dialogue between IMO auditors, IMO Secretariat and IACS team when addressing the part of the submission package related to Common Structural Rules.

The audit identified two non-conformities for IACS developed part of the rule submission package. To rectify those findings, back in May IACS produced its corrective action plans. In that connection, IACS would recall that earlier Plans for the past non-conformities were submitted to MSC for information of the Committee and Member States as the demonstration of IACS commitment to its proactive adherence to the IMO GBS scheme. This time, due to circumstances beyond our control, we were not in a position to do the same for new non-conformities, but nevertheless felt obliged to offer the confidence to Member States in IACS Members' response. If the Committee considers it helpful to Member States to see the corrective action plans, then those can be made available to the Committee.

IACS would appreciate it if the Committee could note the existence of the reported Corrective Action Plans for the two non-conformities, the verification of which will form part of the new rectification audit."

**AGENDA ITEM 14**

**Statement by the delegation of the Netherlands**

"The Netherlands can surely support the approval of the report in general, however before you close this agenda item I would like to shortly inform the Committee on the publication of an investigation report that is very important to this delegation and very relevant for the III Sub-Committee, in particular its annual Correspondence and Working Group on Analysis of Marine Safety Investigation Reports.

In this respect I would like to emphasize that the incident investigation report on the very serious casualty with the ultra large container ship **MSC Zoe** has been uploaded in the GISIS module on Marine Casualties and Incidents, and is available for delegates to consider. As you may recall, the **MSC Zoe** lost 342 containers during a storm along the Dutch and German coast in January 2019, resulting in severe damage to the environment.

The report accurately addresses the causes that led to the casualty, and ends with a list of recommendations, of which a considerable number refers to the work of the Organization. A report by the Dutch Safety Board, who has collaborated with PMA from Panama and BSU from Germany on the incident investigation report, will also be uploaded to the GISIS module.

Last weekend, regretfully another 33 containers were lost from a container feeder North of Scotland, luckily enough only one of which was loaded with goods. But this incident and that of MSC Zoe are no isolated cases. In the recent period, the loss of containers from ships into the sea seems to become more regular, and apart from the simple fact that they don't belong there, they are hazardous to the navigation of ships and detrimental to the marine environment and ecology.

In anticipation of the investigation report on the **MSC Zoe** incident, the Dutch government has investigated the behaviour of different types of containerships in adverse weather conditions, and we will share the report therefrom with this Organization in due course. It concerns a ULCS

similar to the **MSC Zoe**, Panamax type and feeder type, and reveals that all three types are vulnerable to the loss of containers in weather conditions that are not necessarily rare and can occur in many sea areas across the world.

Having said this the Netherlands kindly invites both the co-ordinator of the correspondence group and the chair of the III WG on Analysis of Marine Casualty Investigation Reports to carefully review the incident investigation report on the **MSC Zoe** casualty and, with the participation of interested delegates, to provide the Organization with relevant findings and lessons learned."

**AGENDA ITEM 15**

**Statement by the observer from FAO**

"The FAO, including the Secretariat of the International Plant Protection Convention (IPPC), would like to highlight the progress made by the Sub-Committee on Carriage of Cargoes and Containers on the revision of the Inspection programmes for cargo transport units carrying dangerous goods (MSC.1/Circ.1442, as amended by MSC.1/Circ.1521), in particular with regard to the inclusion of CTU Cleanliness among the Selection Criteria for CTU Inspection Programmes. As issues of CTU cleanliness are recognized as integral to the CTU Code by all stakeholders, and considering that the recommendations from the IPPC Sea Containers Task Force on ways to manage the pest risks associated with the movement of CTUs are to be reported to the Commission on Phytosanitary Measures in 2022, we would like to:

1 Support the work undertaken by the Sub-Committee on Carriage of Cargoes and Containers and the Correspondence Group;

2 Encourage Member States, IMO and industry organizations to carry out joint actions, with a view to improving management of contamination of CTUs and their cargoes;

3 Support the IMO Secretariat involvement in FAO/IPPC Secretariat work regarding managing the pest risks associated with the movement of CTUs and their cargoes;

4 Support the IMO Secretariat’s participation as a member in the IPPC Sea Container Task Force; and

5 Encourage Member States and industry to undertake CTU inspections in accordance with document MSC.1/Circ.1442, as amended by document MSC.1/Circ.1521 and report their findings to the Organization (paragraph 10.14)."

**AGENDA ITEM 16**

**Statement by the delegation of Indonesia**

"Indonesia would like to take this opportunity to comment on document MSC 102/16/2 on the Philippines' designation of Archipelagic Sea Lanes.

In principle, Indonesia conveys its support on the full designation of the Philippines Archipelagic Sea Lanes as put forward in this agenda. As the first archipelagic state to do so, Indonesia understands the importance to designate Archipelagic Sea Lanes to exercise its rights under the 1982 United Nations Convention on the Law of the Sea, while ensuring the safe passage for ships when passing through the archipelagic waters.

In this regard, we ask the Philippines delegation to also adhere to the General Provisions for the Adoption, designation and substitution of Archipelagic Sea Lanes as adopted by resolution

MSC.71(69) on 19 May 1998. The General Provisions states that the Government of an archipelagic State considering proposing Archipelagic Sea Lanes should consult at an early stage with other user Governments and the IMO, and that its proposal shall include all normal passage routes and navigational channels as required by UNCLOS.

The proposed Archipelagic Sea Lanes should also provide sea lanes suitable for the continuous and expeditious passage of foreign ships and aircraft in the normal mode through or over the archipelagic waters and the adjacent territorial sea. With regard to the representation on charts, the General Provisions requires that such a proposal be shown on charts, including a listing of geographical co-ordinates with geodetic datum that define axis turning points, and any prescribed traffic separation schemes. However, this Delegation has not seen such coordinates in the Philippines' proposal and would like to ask when it will be made available.

This Delegation could also see in their proposal that there is a crossed-junction between the proposed ASL 2 and ASL 3, and would like to suggest that the Philippines could further designate ship routing measures to ensure safety of navigation in that junction. To conclude, Indonesia will continue to follow this discussion closely, and reiterate our support on the Philippines' proposal."

**Statement by the delegation of Brazil**

"Regarding the oil spill incident that occurred on the Brazilian coast in August 2019, I would like to inform the distinguished delegates that Brazil has completed the first phase of the investigation to gather the facts and find those responsible.

The investigation has found that about 5,000 tonnes of crude oil were discharged into the sea by one or more ships at a distance of 700 km from the coast, contaminating an extension of about 2,250 km of our coastline and causing environmental pollution and socio-economic damage to about 130 Brazilian coastal cities. The measures taken by the Brazilian government involved around 16,000 people, 200 ships, aircrafts and ground vehicles at a cost of 40 million dollars.

Based on the lessons learned from the first phase of the investigation and considering that similar incidents could happen again to any coastal state, Brazil intends to submit a proposal to amend Chapter V of the SOLAS Convention to MSC 103, in order to allow coastal states to receive the LRIT information from ships transiting their Search and Rescue Area. The purpose is to allow coastal states to be able to react more quickly and efficiently upon the occurrence of events that threaten the safety of human life at sea and/or cause environmental pollution."

**AGENDA ITEM 17**

**Statement by the observer from IACS**

"We note that the draft amendments are in front of this Committee for approval - that is a step before adoption at a future session. IACS has carefully studied the outcome from the SDC Sub-Committee and an additional proposal by the United States and Belgium in their document MSC 102/17/1, and we have a few comments and proposals. Those are split in two groups: on the draft regulatory text, and on the need to revise Performance Standards. Would you like me to introduce both or take the draft regulation first?

Firstly, IACS suggests that in paragraph 2.1 of the draft regulation 25-1 contained in Annex 6 of document SDC 7/16, the reference to the cargo hold is slightly revised to read "the" cargo hold instead of "any" cargo hold. The reason for that suggestion is the need to be specific to the flooded hold, and to clarify that the tolerances specified for the water level detectors are specific

for the cargo hold in which the detectors are fitted. If your Committee would like to see them on paper, we would be happy to arrange that.

As regards new paragraph 3 of the draft regulation, proposed by the United States and Belgium in document MSC 102/17/1, IACS thanks the submitters of the paper and appreciates the proposal to try and make the technical installation simpler. However, IACS has some concerns and comments on this proposal. In IACS' opinion, the purpose of the water level detectors and a bilge level alarm sensor is different; similarly, the typical installation height of the two sensors is different. This leads to the following two concerns:

Firstly, the alternative in the US/Belgium document makes the lower level height of 0.3m for water detection irrelevant, because level detectors may be fitted at any level lower than 0.3 m and termed as a bilge level alarm sensors.

Secondly, the place of detection could be a compromise which would mean that a correct alarm would be more unlikely or delayed. There is some possibility that the bilge level alarm may be more easily overridden by the crew due to its early and frequent detection of water in bilge wells.

As with the earlier mentioned change, we have a proposal of the modification to the text of new paragraph 3. IACS intends to submit both proposals to MSC 103 unless your Committee prefers a different approach.

And lastly, the Committee may wish to consider the question of applicability of the regulation to certain types of ships within the scope of the draft regulation, for example specialised reefer ships carrying ultra-frozen tuna at temperatures below -50C, where such water level detectors in the insulated cargo holds may not operate.

Group 2 is on the Performance Standards in resolution MSC.188(79). Specifically, in IACS' understanding the Standards do not cover detectors for multiple hold cargo ships, as the current provisions are written to be pertinent to arrangements installed for compliance with chapter XII and regulation II-1/23-3.

Secondly, we believe that clarification will be needed on the measurement of distances when the cargo hold has a lining. Similarly, clarification would be needed regarding installation of the water detection system being intrinsically safe with appropriate group rating and temperature class, and the protection of the detection system from mechanical damage.

As such, IACS is of the opinion that the Performance Standards will require amendment to explicitly include detectors for multiple hold cargo ships and address those additional technical aspects. As with the amendments, IACS intends to present those comments to MSC 103 for the Committee to address follow up action, unless your Committee wishes to take an alternative route."

**AGENDA ITEM 19**

**Statement by the delegation of Japan**

"Regarding requested action item 4 on the fire safety of RORO passenger ships, Japan would like to express our appreciation for the progress made by the SSE Sub-Committee regarding the review of SOLAS chapter II-2 and associated codes.

Especially, Japan would like to express our appreciation for the work done by FIRESAFE I and Item II studies and the outcome of the FSA Expert Group’s review. In this regard, Japan would like to point out that, currently, there are some issues discussed in the Sub-Committee which

were not justified by the cost effectiveness analysis through the Formal Safety Assessment methodology.

For example, the introduction of "heat and smoke detection system" and "video monitoring" for existing RORO passenger ships are discussed as mandatory requirements, but not justified by the cost effectiveness analysis. As stated in paragraph 8 of document SSE 7/WP.4, Japan believes that it is not reasonable to consider mandatory requirements for the fire safety of RORO passenger ships without justification by the results of Formal Safety Assessment, in particular the cost effectiveness analysis."

**Statement by the observer from IACS**

"We note that the request in paragraph 2.9 is for the Committee to approve the Guidelines "in principle". Noting this midway point, IACS has carefully reviewed the draft Guidelines for lifting appliances as presented by the Sub-Committee; and we have some suggestions for their improvement.

As those suggestions are technically detailed, I will give only a general overview at this time. A full submission paper is being prepared for MSC 103 and will be submitted as soon as practicable. I will summarise those suggestions in five points:

1 IACS considers that the current definitions of "Competent Person" and "Responsible Person" are not clearly differentiated; IACS will propose appropriate amendments. IACS also has concerns that the standards which have to be met in order to be considered as "acceptable to the Administration" need clarification;

2 Regarding the load testing and thorough examination, IACS considers that there should be equivalency between the standards acceptable to the Administration and those of the classification society; we will suggest appropriate text to make it clear;

3 IACS supports the option to postpone a survey, however will seek clarity if it also applies to the five-yearly retesting. IACS is of the opinion that a permitted delay in the survey should not lead to an automatic postponement of the next survey;

4 IACS will also propose that some detailed requirements for the proof load of loose gear should also be included in the guidelines; and finally Sir,

5 IACS will propose some "example" forms for the "Register of lifting appliances and cargo handling gear" and for the "Certificate of test and thorough examination of wire rope".

We will be pleased to make those suggestions to MSC 103 or to another body which your Committee would find more suitable."

**AGENDA ITEM 22**

**Statement by the delegation of the Marshall Islands**

"The Marshall Islands wishes to make the following statement on behalf of ourselves, and Liberia and ICS.

First, we would like to thank all Member States for their tireless efforts in response to the COVID pandemic and for the kind support given to seafarers during these unprecedented times which continue to profoundly impact everyone in many ways.

However, amidst so many acts of kindness and care, it is with sincere regret and disappointment that we note that instances are occurring where some authorities are exercising what is considered to be unjustified port state control action against ships, and imposing substantially increased fines to facilitate their release. As we know, such corrupt practices not only interfere with supply chains and economically impact everyone, but also place additional extreme and unnecessary pressure on Masters and Crews to resolve. And this at a time when many are already fatigued and just want to go home.

Therefore, with the greatest respect, we urge all Member States to be vigilant in ensuring that Competent Authorities in charge of the exercise of Port State control under IMO convention provisions, do so in a manner that is consistent with relevant international treaty obligations, and that these needless and unwarranted additional stresses are ultimately removed from shipping and, more importantly, from our crews."

**Statement by the delegation of Malaysia**

"The COVID-19 pandemic has significant impact on the shipping industry and on seafarers. In this regard, Malaysia wishes to thank the United Kingdom on the proposal to create a GISIS module to register ports which facilitate crew changes and disseminate information about those ports to enable shipping companies to easily plan and organize crew changes during the COVID-19 pandemic.

Malaysia is very much in support of this document and measures stipulated under document MSC120/22/8. Concurrently, we also urge other Member States to facilitate and treat seafarers who have shown symptoms of COVID-19 whilst on board. COVID-19 does not choose, anyone can be infected.

As part of humanitarian act, Malaysia urges Member States to take responsibility and share the burden to facilitate ship crew change, access to medical care and seafarer travel during the COVID-19 pandemic. Malaysia wishes to echo IMO Secretary-General statement for Member States to designate seafarers as "key workers" providing an essential service. Such a designation would ensure the continuation of efficient trade and the recovery of the world economy.

For Malaysia, all seafarers are allowed to carry out crew change activities (sign-on & sign-off) in Malaysian ports subject to a strict compliance to the procedures (SOP) and authorities' approval. To date, Malaysia has recorded more than 74,214 sign-on/sign-off seafarers (both locals and foreign) in Malaysian designated ports. From this number, 87 seafarers have been diagnosed positive with COVID-19. All of them are given adequate access to medical care and treated in local hospitals. We are very fortunate, all of them have recovered (zero deaths reported), repatriated and returned safely.

Malaysia reiterates its view for all Member States to take swift and effective action to eliminate obstacles to crew changes and ensure they are free from COVID-19 before their journey to their next port of call."

**Statement by the delegation of Nigeria**

"We will start by thanking the distinguished delegation of Singapore and the Director, Maritime Safety Division for acknowledging and appreciating the efforts made by Nigeria and other stakeholders in repelling the piracy and armed robbery attack on Singapore-flagged tanker **Torm Alexandra** over the last weekend (7th November 2020). This underscores the need for collaborative efforts which Nigeria identifies, necessitating the various initiatives ranging from industry working group, passage of the anti-piracy act and coordination of the C4i centre to deliver 24/7 prevention and control of maritime crimes.

Now to the issue at hand.

Mr. Chair, we thank the United Kingdom and the co-sponsors of document MSC/22/8, which prescribes in its annex, a draft MSC Circular, as framework of protocols for ensuring ship crew changes and travel during the covid-19 pandemic, and which if complied with, will undoubtedly address the challenges being faced by the industry, and more especially, by seafarers needing crew changes, travel and other logistics during this pandemic. Indeed, there are currently restrictions and lockdowns taking place across a number of countries, making it expedient that this framework could not have come at a better time.

Mr. Chair, in addressing crew challenges since the beginning of this pandemic, this delegation appreciates concerted efforts being carried out by member states, the IMO-ICAO-ILO joint statements, designating seafarers as key workers, the ICS-IATA joint statements, the creation of Seafarers Joint Action Team (SCAT), and the International Maritime Summit on crew changes organized and spearheaded by the United Kingdom. All these efforts in our opinion precipitated into the promulgation of resolution MSC.473(ES.2) and Circular Letter No.4204/Add.14/Rev.1.

Indeed, the Nigerian Maritime Administration released marine notices, which among other things, designated seafarers as essential workers and facilitating shore leave, medical care and repatriation. Furthermore, the Nigerian Ports Authority communicated a declaration to keep Nigerian ports open and operational amid the covid-19 pandemic in conformity with the goals of the Port Authority Roundtables (PAR) members.

Mr. Chair, based on the aforementioned activities, we view the recommended framework and protocols contained in this document (MSC 102/22/8) as a harmonized documentation of all the efforts, lessons learnt and experiences gained in addressing crew challenges during this pandemic, and for these reasons, we endorse the proposals contained in paragraphs 6, 7 and 8 of the document."