MARITIME AND PORT AUTHORITY OF SINGAPORE
SHIPPING CIRCULAR
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MPA Shipping Division
460 Alexandra Road
21st Storey PSA Building
Singapore 119963
Fax: 6375 6231
http://www.mpa.gov.sg

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Applicable to: Shipowners, shipmanagers, operators, agents, surveyors and masters of Singapore-registered ships

RESOLUTIONS ADOPTED BY THE 96TH, 97TH, 98TH AND 99TH SESSION OF THE MARITIME SAFETY COMMITTEE (MSC) OF THE INTERNATIONAL MARITIME ORGANIZATION

1. This circular informs the shipping community of the resolutions adopted by the MSC and urges the shipping community to prepare for the implementation of these resolutions.

2. The details of the resolutions can be found in the reports of MSC and is available on the MPA website.

3. The resolutions adopted by MSC 96 include the following:

a. **Resolution MSC.402(96) – REQUIREMENTS FOR MAINTENANCE, THOROUGH EXAMINATION, OPERATIONAL TESTING, OVERHAUL AND REPAIR OF LIFEBOATS AND RESCUE BOATS, LAUNCHING APPLIANCES AND RELEASE GEAR**

The resolution adopts the requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear in relation to the amendments to SOLAS regulation III/20 which will take effect on **1 January 2020**. Details on the authorisation of service providers to carry out the thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear will be disseminated to the industry nearer to the date.

b. **Resolution MSC.403(96) – AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)**

The resolution adopts the amendment to the FSS Code where a new Chapter 17 is added and details the requirements for foam firefighting

appliances for the protection of helicopter facilities. It will enter into force on **1 January 2020**.

c. **Resolution MSC.404(96) – AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

The resolution adopts the following amendments to SOLAS:

i. *Chapter II-2 – Regulation 3 on Definitions*

This relates to the amendment to regulation 3 to include new definitions on helicopter landing area and winching area in paragraphs 57.

ii *Chapter II-2 – Regulation 8 on Automatic Sprinkler System*

This relates to the amendment to regulation 8 to require special attention to the specification of water quality provided by the system manufacturer to prevent internal corrosion and clogging of sprinkler to improve the fire safety onboard.

iii. *Chapter II-2 – Regulation 13 on Means of escape*

This relates to the amendment to regulation 13 to mandate the evacuation analysis for passenger ships. The analysis is applicable for ro-ro passenger ships constructed on or after 1 July 1999 and other passenger ships constructed on or after 1 January 2020 carrying more than 36 passengers.

iv. *Chapter II-2 – Regulation 18 on Helicopter facilities*

This relates to the amendment to regulation 18 to mandate the provision of foam firefighting appliances complying with the FSS Code on ships constructed after 1 January 2020 with helicopter landing area.

v. *Chapter III – Regulation 3 on Definitions*

This relates to the amendment to regulation 3 to give specific reference to Resolution MSC.402(96) on maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear.

vi. *Chapter III – Regulation 20 on maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear*

This relates to the amendment to regulation 20 to mandate the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear as required under SOLAS Chapter III are to be carried out in accordance to the requirements as adopted in Resolution MSC.402(96).

The above amendments to SOLAS 74, as amended, will enter into force on **1 January 2020**.

d. **Resolution MSC.405(96) – AMENDMENTS TO THE INTERNATIONAL CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS, 2011 (2011 ESP CODE)**

The resolution adopts amendments to the IMSBC Code to improve the requirements relating to the preparations for survey - Conditions for survey and also to incorporate reference to the revised recommendations for entering enclosed spaces aboard ships, adopted by the Organization by resolution A.1050(27). The amendments has entered into force on **1 January 2018**.

e. **Resolution MSC.406(96) – AMENDMENTS TO THE INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE (Amendment 38-16)**

The resolution adopts amendments to the IMDG Code in its regular revision of the MDG Code every two years to keep the transportation safety requirements up to date with the number of new products. The amendments has entered into force on **1 January 2018**.

f. **Resolution MSC.407(96) – AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF MOBILE OFFSHORE DRILLING UNITS, 2009 (2009 MODU CODE)**

The resolution adopts amendments to the 2009 MODU Code on provision of foam firefighting appliances complying with the provisions of the FSS Code for helicopter facilities, similar to the amendment to Chapter II-2 of SOLAS. The amendments will enter into force on **1 January 2020**.

g. **Resolution MSC.408(96) – AMENDMENTS TO CHAPTER 2 OF THE CODE OF SAFETY FOR SPECIAL PURPOSE SHIPS, 2008 (2008 SPS CODE)**

The resolution adopts amendments to the 2008 SPS Code related to the subdivision and damage stability of special purpose ships in in accordance with SOLAS Chapter II-1. The amendment is effective from **13 May 2016**.

4. The resolutions adopted by MSC 97 include the following:

a. **Resolution MSC.409(97) – AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

The resolution adopts the following amendments to SOLAS:

i. *Chapter II-1 – Regulation 3-12 on protection against noise*

This relates to the amendment to regulation 3-12 to correct the issue to require ships contracted before 1 July 2014 to comply with the Code on noise levels onboard ships as adopted by Resolution MSC.337(91).

ii. *Chapter II-2 – Regulation 1 on application*

This relates to the amendment to regulation 1 to provide clarity that regulation 10.5.1.2.2, as amended by resolution MSC.409(97), applies to ships constructed before 1 January 2020, including those constructed before 1 July 2012.

iii. *Chapter II-2 – Regulation 10 on suppression of fire*

This relates to the amendment to regulation 10 which removes the requirement of foam type extinguishers of at least 135 litres in machinery spaces of category A in cases of domestic boilers less than 175kw or boilers protected by fixed water based local application fire extinguishing system.

iv. *Chapter XI-1 – Regulation 2-1 Harmonization of survey periods of cargo ships not subject to the ESP Code*

This relates to the amendment to allow the intermediate and renewal surveys included in regulation I/10, for cargo ships not subject to enhanced surveys under regulation XI-1/2, to be carried out and completed over the corresponding periods as specified in the 2011 ESP Code.

The above amendments to SOLAS 74, as amended, will enter into force on **1 January 2020**.

b. **Resolution MSC.410(97) – AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)**

The resolution adopts amendments to FSS Code related to the arrangement of means of escape for passenger ships. The amendments will enter into force on **1 January 2020**.

c. **Resolution MSC.411(97) – AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)**

The resolution adopts amendments to revise paragraph 3.2.5 of the IGC Code and removes the fire rating of wheelhouse windows that faces the cargo area adopted by Resolution MSC.370(93). The amendments will enter into force on **1 January 2020**.

d. **Resolution MSC.412(97) – AMENDMENTS TO THE INTERNATIONAL CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS, 2011 (2011 ESP CODE)**

The resolution adopts amendments to 2011 ESP Code and provides clarity on the close-up surveys and thickness measurements for oil tanker and bulk carriers. The amendments is effective from **1 July 2018**.

e. **Resolution MSC.413(97) – AMENDMENTS TO THE INTRODUCTION AND PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE) (UNDER THE 1974 SOLAS CONVENTION)**

The resolution adopts the amendment to the introduction and part A (the provisions of which shall be treated as mandatory) of the 2008 IS Code, in accordance to regulation II-1/2.27.1 of the International Convention for the Safety of Life at Sea, 1974, to include provisions regarding ships engaged in anchor handling, lifting and towing operations, including escort towing, in the 2008 IS Code. The amendments will enter into force on **1 January 2020**.

f. **Resolution MSC.414(97) – AMENDMENTS TO THE INTRODUCTION AND PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE) (UNDER THE 1988 LOAD LINES PROTOCOL)**

The resolution adopts the amendment to the introduction and part A (the provisions of which shall be treated as mandatory) of the 2008 IS Code, in accordance to paragraph (16).1 of regulation I/3 of the Protocol of 1988 relating to the International Convention on Load Lines, 1966, to include provisions regarding ships engaged in anchor handling, lifting and towing operations, including escort towing, in the 2008 IS Code. The amendments will enter into force on **1 January 2020**.

g. **Resolution MSC.415(97) – AMENDMENTS TO PART B OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE)**

The resolution adopts the amendment to the introduction and part B (the provisions of which shall be treated as recommendatory) of the 2008 IS Code, in accordance to regulation II-1/2.27.2 of the International Convention for the Safety of Life at Sea, 1974, to include provisions regarding ships engaged in anchor handling, lifting and towing operations, including escort towing in the 2008 IS Code. The amendments will take effect on **1 January 2020**.

h. **Resolution MSC.416(97) – AMENDMENTS TO THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS (STCW), 1978, AS AMENDED**

The resolution adopts amendments to the STCW regarding the training of masters and officers for ships operating in polar waters. The amendments will enter into force on **1 July 2018**.

i. **Resolution MSC.417(97) – AMENDMENTS TO PART A OF THE SEAFARERS' TRAINING, CERTIFICATION AND WATCHKEEPING (STCW) CODE**

The resolution adopts amendments to part A of the STCW Code regarding the training of masters and officers for ships operating in polar waters. The amendments will enter into force on **1 July 2018**.

j. **Resolution MSC.418(97) – INTERIM RECOMMENDATIONS ON THE SAFE CARRIAGE OF MORE THAN 12 INDUSTRIAL PERSONNEL (IP) ON BOARD VESSELS ENGAGED ON INTERNATIONAL VOYAGES**

The resolution adopts the interim recommendation on the safe carriage of more than 12 IP on board vessels engaged on international voyages, in recognition of the difficulties caused by the lack of a clear definition for industrial personnel and the lack of legally binding international safety standards. Until such time that the mandatory instrument under development of the International Maritime Organization for the carriage of industrial personnel enters into force, industrial personnel should not be considered or treated as passengers under SOLAS regulation I/2(e) and the annexed interim recommendations shall apply.

k. **Resolution MSC.419(97) – AMENDMENTS TO THE GENERAL PROVISIONS ON SHIPS' ROUTEING (RESOLUTION A.572(14), AS AMENDED)**

The resolution adopts amendments to the General Provisions on Ships' Routeing (resolution A.527(14), as amended), to include a guidance on the multiple structures at sea.

l. **Resolution MSC.420(97) – INTERIM RECOMMENDATIONS FOR CARRIAGE OF LIQUEFIED HYDROGEN IN BULK**

The resolution adopts the interim recommendations for carriage of liquefied Hydrogen in bulk to facilitate establishment of a tripartite agreement for a pilot ship, which will be developed for the research and demonstration of safe long-distance overseas carriage of liquefied hydrogen in bulk. Shipowners wishing to apply the Interim Recommendations to the pilot ship carrying liquefied hydrogen in bulk are to approach MPA or our Recognised Organisation for further guidance.

5. The resolutions adopted by MSC 98 include the following:

a. **Resolution MSC.421(98) – AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

The resolution adopts the following amendments to SOLAS:

i. *Chapter II-1 – Ship's stability requirements*

This relates to the extensive amendment to SOLAS Chapter II-1 including revisions and clarification on application; definitions; conditions for calculating the attained subdivision index A and probability of survival after flooding (factor Si); acceptance of butterfly valve in pipe(s) piercing the collision bulkhead and others.

ii. *Chapter II-2 – Regulation 3 Definitions*

This relates to the amendment to regulation II-2/3.56 to provide clarity on the definition of vehicle carrier to mean a cargo ship which only carries cargo in ro-ro spaces or vehicle spaces and which is designed for the carriage of unoccupied motor vehicles without cargo, as cargo.

iii. *Chapter II-2 Regulation 9 – Containment of fire*

This relates to the amendment to regulation 9 for passenger ships carrying not more than 36 passengers, whereby windows facing survival craft, escape slide, embarkation areas and windows situated below such areas are to have fire integrity at least equal to "A-0" class.

iv. *Chapter II-2 Regulation 20 – Protection of vehicle, special category and ro-ro spaces*

This relates to the amendment to regulation 20 to clarify that cargo spaces used for carriage of unoccupied motor vehicles with fuels in their tanks need not comply with the requirements of SOLAS II-2/10 if the vehicles do not use their own propulsion within the

cargo spaces, provided the vehicles are carried in cargo spaces in compliance with the appropriate requirements of regulation 19 and the vehicles are carried in accordance with the IMDG Code.

v. *Chapter II-2 Regulation 20-1 – Requirements for vehicle carriers carrying motor vehicles with compressed hydrogen or natural gas in their tanks for their own propulsion as cargo*

This relates to the amendment to regulation 20-1 where the words vehicle spaces are deleted to clarify the application of additional safety measures for vehicle carriers constructed on or after 1 January 2016 intended for the carriage of motor vehicles with compressed hydrogen or compressed natural gas in their tanks for their own propulsion, as cargo.

vi. *Chapter III – Amendment to Regulation 1, 30 and 37*

This relates to the amendment to regulation 1, 30 and 37 to incorporate the new requirements for damage control drills for passenger ships to be conducted once every three months and the associated amendment to muster list and emergency instructions for passenger ships to include damage control for flooding emergencies.

vii. *APPENDIX – Amendment to Certificates*

This relates to the amendments to the Record of Equipment for Form P, Form C and Form E to incorporate the multi-system shipborne radionavigation receiver.

The above amendments to SOLAS 74, as amended, will enter into force on **1 January 2020**.

b. **Resolution MSC.422(98) – AMENDMENTS TO THE INTERNATIONAL CODE OF THE SAFETY FOR SHIPS USING GASES OR OTHER LOW-FLASHPOINT FUELS (IGF CODE)**

The resolution removes the requirement for A-0 class division fire rated navigation bridge windows and will be effected on **1 January 2020**. Pending its formal entry into force, Recognised Organisation may apply text of the resolution with immediate effect.

c. **Resolution MSC.423(98) – AMENDMENTS TO THE INTERNATIONAL CODE OF THE SAFETY FOR HIGH-SPEED CRAFT, 1994 (1994 HSC CODE)**

The resolution adopts amendments to the 1994 HSC Code to provide clarity that High Speed Craft of less than 20 meters in length may be exempted from carrying a rescue boat, provided the craft meets all of the

requirements as specified in paragraphs 8.10.1.6.1 to 8.10.1.6.3 of the Code. The amendments will enter into force on **1 January 2020**.

d. **Resolution MSC.424(98) – AMENDMENTS TO THE INTERNATIONAL CODE OF THE SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)**

The resolution adopts amendments to the 2000 HSC Code to provide clarity that High Speed Craft of less than 30 meters in length may be exempted from carrying a rescue boat, provided the craft meets all of the requirements as specified in paragraphs 8.10.1.6.1 to 8.10.1.6.3 of the Code. The amendments will enter into force on **1 January 2020**.

e. **Resolution MSC.425(98) – AMENDMENTS TO THE INTERNATIONAL LIFE-SAVING APPLIANCE (LSA) CODE**

The resolution adopts amendments to the LSA Code to clarify the application of static load and factor of safety to be applied to winches and structural components of launching appliances. The amendments will enter into force on **1 January 2020**.

f. **Resolution MSC.426(98) – AMENDMENTS TO THE INTERNATIONAL MARITIME SOLID BULK CARGOES (IMSBC) CODE**

The resolution adopts amendments to the IMSBC Code to improve the requirements relating to carriage of solid bulk cargoes, and in particular to assign the shipper the responsibility to ensure the test to determine the Transportable Moisture Limit (TML) of a solid bulk cargo is conducted within six months to the date of loading the cargo. In addition, the shipper is to ensure that that sampling and testing for moisture content is conducted as near as practicable to the date of commencement of loading and the interval between sampling/testing and the date of commencement of loading shall not be more than seven days.

The amendments will enter into force on **1 January 2019**. Ship owners are encouraged to apply the aforementioned amendments in whole or in part on a voluntary basis prior to the entry into force date.

g. **Resolution MSC.427(98) – AMENDMENTS TO THE REVISED RECOMMENDATION ON TESTING OF LIFE-SAVING APPLIANCES (RESOLUTION MSC.81(70), AS AMENDED)**

The resolution adopts amendments to incorporate the requirements of Resolution MSC.425(98) on the testing of davits and launching appliances to be subjected to a static proof load of 2.2 times their maximum working load. The amendments will enter into force on **1 January 2020**.

h. **Resolution MSC.428(98) – MARITIME CYBER RISK MANAGEMENT IN SAFETY MANAGEMENT SYSTEMS**

This adopts the resolution on maritime cyber risk management and affirms that an approved safety management system should take into account cyber risk management in accordance with the objectives and functional requirements of the ISM Code.

In view of the increasing cyber risk threats and vulnerabilities to safe and secure shipping, ship owners are encouraged to ensure that cyber risks are appropriately addressed in their safety management systems as soon as possible, but not later than the first annual verification of the company's Document of Compliance after **1 January 2021**.

i. **Resolution MSC.429(98) – REVISED EXPLANATORY NOTES TO THE SOLAS CHAPTER II-1 SUBDIVISION AND DAMAGE STABILITY REGULATIONS**

The resolution adopts the Revised Explanatory Notes to Chapter II-1 of SOLAS subdivision and damage stability regulations in conjunction with the adoption of the aforementioned amendments to subdivision and damage stability regulations in Resolution MSC.421(98) which will enter into force on **1 January 2020**.

j. **Resolution MSC.430(98) – AMENDMENTS TO THE REVISED PERFORMANCE STANDARDS FOR NARROW-BAND DIRECT-PRINTING TELEGRAPH EQUIPMENT FOR THE RECEPTION OF NAVIGATIONAL AND METEOROLOGICAL WARNINGS AND URGENT INFORMATION TO SHIPS (NAVTEX) (RESOLUTION MSC.148(77))**

The resolution adopts amendments to resolution MSC.148(77) on revised performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (NAVTEX), to include an interface for alert management for bridge alert management. NAVTEX receiver equipment **installed on or after 1 July 2019** shall conform to the performance standards not inferior to those set out in the annex to resolution A.148(77), as amended.

k. **Resolution MSC.431(98) – AMENDMENTS TO THE REVISED PERFORMANCE STANDARDS FOR ENHANCED GROUP CALL (EGC) EQUIPMENT (RESOLUTION MSC.306(87))**

The resolution adopts the amendments to resolution MSC.306(87) on revised performance standards for enhanced group call (EGC) equipment. EGC equipment **installed on or after 1 July 2019** shall conform to performance standards not inferior to those set out in the annex to resolution MSC.306(87), as amended.

l. **Resolution MSC.432(98) – AMENDMENTS TO PERFORMANCE STANDARDS FOR MULTI-SYSTEM SHIPBORNE RADIONAVIGATION RECEIVERS (RESOLUTION MSC.401(95))**

The resolution adopts the amendments to resolution MSC.401(95) on performance standards for multi-system shipborne radionavigation receivers. Multi-system shipborne radionavigation receivers **installed on or after 31 December 2017** shall conform to performance standards not inferior to those specified in the annex to resolution MSC.401(95), as amended.

m. **Resolution MSC.435(98) – AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF MOBILE OFFSHORE DRILLING UNITS, 2009 (2009 MODU CODE)**

The resolution adopts amendments to the 2009 MODU Code to improve the safety based on lessons learned from the explosion, fire and sinking of the mobile offshore drilling unit Deepwater Horizon. The amendments shall be applicable for mobile offshore drilling units, the keels of which are laid or which are at a similar stage of construction **on or after 1 January 2020**.

6. The resolutions adopted by MSC 99 include the following:

a. **Resolution MSC.436(99) – AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

The resolution adopts the following amendments to SOLAS:

i. *Chapter II-1 Regulation 1 - Application*

This relates to the application of the amendment to SOLAS Chapter II-1 as adopted in Resolution MSC.436(99).

ii. *Chapter II-1 Regulation 8-1 – System capabilities and operational information after a flooding casualty on passenger ships*

This relates to the amendment to include provisions for safe return to port where an onboard stability computer or access to shore-based support providing operational information to the master for safe return to port after a flooding casualty is required.

iii. *Chapter IV – Radiocommunications*

This relates to the amendment to regulation 2, 7, 8, 9, 10, 12 and 13 to reflect the changes to the use of mobile satellite service recognised by the International Maritime Organization other than "*INMARSAT*".

iv. *APPENDIX – Amendment to Certificates*

This relates to the amendments to the Record of Equipment for Form P, Form R and Form C to replace the word "*INMARSAT*" with "*Recognized mobile satellite service ship earth station*".

The above amendments to SOLAS 74, as amended, will enter into force on **1 January 2020**.

b. **Resolution MSC.437(99) – AMENDMENTS TO THE INTERNATIONAL CODE FOR APPLICATION OF FIRE TEST PROCEDURES, 2010 (2010 FTP CODE)**

The resolution adopts amendments to the 2010 FTP regarding the application of fire protection materials and required approval test methods for passenger ships and high-speed craft carrying less than 36 passengers to be consistent with those carrying more than 36 passengers. The amendments enter into force on **1 January 2020**.

c. **Resolution MSC.438(99) – AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 1994 (1994 HSC CODE)**

The resolution adopts amendments to the 1994 HSC Code to align with the SOLAS Chapter IV amendments on the use of mobile satellite service recognised by the International Maritime Organization other than "*INMARSAT*". The Record of Equipment is similarly amended to replace the word "INMARSAT" with "Recognized mobile satellite service ship earth station". The amendments will enter into force on **1 January 2020**.

d. **Resolution MSC.439(99) – AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)**

The resolution adopts amendments to the 2000 HSC Code to align with the SOLAS Chapter IV amendments on the use of mobile satellite service recognised by the International Maritime Organization other than "INMARSAT". The Record of Equipment is similarly amended to replace the word "INMARSAT" with "Recognized mobile satellite service ship earth station". The amendments will enter into force on **1 January 2020.**

e. **Resolution MSC.440(99) – AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE)**

The resolution adopts the amendment to the IBC Code to replace the existing paragraph 6 of the model form and clarify the requirement for an approved loading and stability information booklet to be supplied to the ship. The amendments will enter into force on **1 January 2020**.

f. **Resolution MSC.441(99) – AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)**

The resolution adopts the amendment to the IGC Code to replace the existing paragraph 6 of the model form and clarify the requirement for an approved loading and stability information booklet to be supplied to the ship. The amendments will enter into force on **1 January 2020**.

g. **Resolution MSC.442(99) – AMENDMENTS TO THE INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE**

The resolution adopts amendments to the IMDG Code in its 2-yearly periodic review to continuously update the Code. It includes revision to the classification categories of Class 1, Class 3, Class 4, Class 5, Class 9 and also revises the Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide). The amendments (39-18) will enter into force on **1 January 2020**. Ship owners are encouraged to apply the aforementioned amendments in whole or in part on a voluntary basis prior to the entry into force date.

h. **Resolution MSC.443(99) – AMENDMENTS TO PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE) (UNDER THE 1974 SOLAS CONVENTION)**

The resolution similarly deletes the footnote to the title of Chapter 2 of part A (Mandatory Criteria) of the International Code on Intact Stability, 2008 ("2008 IS Code"), given effect through SOLAS 74, as amended, where Resolutions MSC.413(97) and MSC.414(97) had included footnote to the title and created some confusion on the mandatory nature of the footnote. The amendments will enter into force on **1 January 2020**.

i. **Resolution MSC.444(99) – AMENDMENTS TO PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE) (UNDER THE 1988 LOAD LINES PROTOCOL)**

The resolution similarly deletes the footnote to the title of Chapter 2 of part A (Mandatory Criteria) of the International Code on Intact Stability, 2008 ("2008 IS Code"), given effect through the 1988 Load Lines protocol, where Resolutions MSC.413(97) and MSC.414(97) had included footnote to the title and created some confusion on the mandatory nature of the footnote. The amendments will enter into force on **1 January 2020**.

j. **Resolution MSC.445(99) – AMENDMENTS TO THE CODE OF SAFETY FOR SPECIAL PURPOSE SHIPS, 2008 (2008 SPS CODE)**

The resolution adopts amendments to the 2008 SPS Code to align the requirements with SOLAS Chapter IV amendments on the use of mobile satellite service recognised by the International Maritime Organization other than "*INMARSAT*". The Record of Equipment is similarly amended to replace the word "INMARSAT" with "Recognized mobile satellite service ship earth station". The amendments will be effective from **1 January 2020**.

k. **Resolution MSC.446(99) – AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (BCH CODE)**

The resolution adopts the amendment to the BCH Code to replace the existing paragraph 6 of the model form and clarify the requirement for an approved loading and stability information booklet to be supplied to the ship. The amendments will enter into force on **1 January 2020**.

l. **Resolution MSC.447(99) – AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (GC CODE)**

The resolution adopts the amendment to the GC Code to replace the existing paragraph 6 of the model form and clarify the requirement for an approved loading and stability information booklet to be supplied to the ship. The amendments will enter into force on **1 January 2020**.

m. **Resolution MSC.448(99) – REVISED GUIDELINES ON THE PREVENTION OF ACCESS BY STOWAWAYS AND THE ALLOCATION OF RESPONSIBILITIES TO SEEK THE SUCCESSFUL RESOLUTION OF STOWAWAY CASES**

The resolution adopts the revised guidelines on the prevention of access by stowaways and the allocation of responsibilities to seek the successful resolution of stowaway cases. Shipping companies, shipowners, ship operators and other stakeholders are invited to note the relevant responsibilities set out in the annexed Guidelines and to guide their masters and crews as to their respective responsibilities in stowaway cases.

n. **Resolution MSC.449(99) – PERFORMANCE STANDARDS FOR SHIPBORNE INDIAN REGIONAL NAVIGATION SATELLITE SYSTEM (IRNSS) RECEIVER EQUIPMENT**

The resolution adopts the performance standards for shipborne IRNSS receiver equipment. IRNSS receiver equipment **installed on or after 1 July 2020** shall conform to performance standards not inferior to those specified in the annex to the resolution.

o. **Resolution MSC.450(99) – STATEMENT OF RECOGNITION OF MARITIME MOBILE SATELLITE SERVICES PROVIDED BY INMARSAT GLOBAL LTD.**

The resolution adopts the Statement of Recognition of the maritime mobile satellite services provided by the Inmarsat Fleet Safety service, in the coverage area under the Inmarsat-4 Middle East and Asia (MEAS) region satellite as set out in the annex, for use in the Global Maritime Distress and Safety System (GMDSS).

p. **Resolution MSC.451(99) – STATEMENT OF RECOGNITION OF MARITIME MOBILE SATELLITE SERVICES PROVIDED BY IRIDIUM SATELLITE LLC.**

The resolution adopts the Statement of Recognition of the maritime mobile satellite services provided by the Iridium Safety Voice, Short-Burst data and enhanced group calling services, for use in the Global Maritime Distress and Safety System (GMDSS).

q. **Resolution MSC.452(99) – AMENDMENTS TO THE REVISED PERFORMANCE STANDARDS FOR INTEGRATED NAVIGATION SYSTEMS (INS) (RESOLUTION MSC.252(83))**

The resolution adopts amendments to resolution MSC.252(83) on revised performance standards for integrated navigation systems (INS), INS equipment **installed on or after 1 July 2020** shall conform to the performance standards not inferior to those set out in the annex to resolution MSC.252(83), as amended.

7. **Unified Interpretations (UI)**

The following Unified Interpretations and clarifications are acceptable to MPA and should be applied in accordance with the recommended application date mentioned in the respective MSC circulars. Shipowners are to approach the Recognised Organisations to seek further guidance.

a. **MSC.1/Circ.1527** – Unified interpretation of SOLAS regulations II-2/4 and II-2/9 on the conditions under which materials other than steel may be permitted for components mounted on engines, turbines and gearboxes; arrangements for fixed hydrocarbon gas detection systems in double-hull and double-bottom spaces of oil tankers; and non-combustible material as "steel or equivalent" for ventilation ducts.

b. **MSC.1/Circ.1528** – Unified interpretations of Chapters 5, 6 and 9 of the FSS Code on fixed gas fire-extinguishing systems and fixed fire detection and fire alarm systems; foam-generating capacity of fixed foam fire-extinguishing systems; and an additional indicating unit in the cargo control rooms.

c. **MSC.1/Circ.1529** – Unified interpretations of paragraph 4.4.7.6 of the LSA Code on lifeboat release and retrieval systems.

d. **MSC.1/Circ.1530** – Unified interpretations of SOLAS regulations III/6.4 and III/6.5 and section 7.2 of the LSA Code on general emergency alarms and public address systems in ro-ro spaces.

e. **MSC.1/Circ.1534 and MSC.1/1534/Corr.1** – Unified interpretations relating to the International Convention on Load Lines, 1966.

f. **MSC.1/Circ.1535 and MSC.1/1535/Corr.1** – Unified interpretations relating to the Protocol of 1988 relating to the International Convention on Load Lines, 1966.

g. **MSC.1/Circ.1536** – Unified interpretations of SOLAS regulations II-1/29.3 and II-1/29.4 on the application of the provisions of SOLAS regulations II-1/29.3 and 29.4 concerning the steering gear test.

h. **MSC.1/Circ.1537** – Unified interpretations of the 2008 IS Code to facilitate global and consistent implementation of requirements.

i. **MSC.1/Circ.1538** – Unified interpretations of the International Code for the Safe Carriage of Grain in Bulk (International Grain Code) relating to requirements concerning the angle of down-flooding.

j. **MSC.1/Circ.1539** – Unified interpretations of SOLAS Chapter II-1 to facilitate global and consistent implementation of requirements.

k. **MSC.1/Circ.1540** – Unified interpretations for Chapter 1 of the 2009 MODU Code to facilitate global and consistent implementation of requirements.

l. **MSC.1/Circ.1541** – Unified interpretations for Chapter 1 of the 1994 HSC Code to facilitate global and consistent implementation of requirements.

m. **MSC.1/Circ.1542** – Unified interpretations for Chapter 1 of the 2000 HSC Code to facilitate global and consistent implementation of requirements.

n. **MSC.1/Circ.1543** – Unified interpretations relating to the IGC Code on the flooding assumptions requirements.

o. **MSC.1/Circ.1544** – Unified interpretations for the application of Chapter 2 of the 2009 MODU Code, and the Revised technical provisions for means of access for inspections (resolution MSC.158(78)).

p. **MSC.1/Circ.1545** – Unified interpretations relating to the application of SOLAS regulation II-1/3-6, as amended, and the Revised technical

provisions for means of access for inspections (resolution MSC.158(78)).

q. **MSC.1/Circ.1546** – Unified interpretations of the 1969 TM Convention, relating to heat exchangers (coolers) fitted on the hull.

r. **MSC.1/Circ.1550** – Unified interpretations relating to the application of SOLAS regulations II-2/10.2.1.3, II-2/10.2.2.4.1.2, II-2/10.7.3.2.3 and II-2/19.3.1, as amended, and paragraph 2.2.1.1 of Chapter 12 of the FSS Code.

s. **MSC.1/Circ.1554** – Unified interpretations of Chapter 9 of the FSS Code on sizing the emergency power source for the fire detection and alarm system.

t. **MSC.1/Circ.1555** – Unified interpretations of SOLAS Chapter II-2 on the definition of vehicle carrier; suitable connections for the supply of inert gas to double-hull spaces; ventilation provided by fan coil units and internal circulation fans; the fire integrity of the bulkheads between the wheelhouse and a toilet inside the wheelhouse; the suitable number of spare air cylinders to be provided in connection with drills; and sources of ignition on board ships carrying dangerous goods.

u. **MSC.1/Circ.1556** – Unified interpretations of Chapter 8 of the FSS Code and the Revised guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12 (resolution A.800(19)) on sizing of pumps and pressure tank for automatic sprinkler systems.

v. **MSC.1/Circ.1558** – Unified interpretations of the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code).

w. **MSC.1/Circ.1559** – Unified interpretations of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code).

x. **MSC.1/Circ.1561** – Unified interpretations of SOLAS regulation XI-1/7 on the provision of suitable means for the calibration of portable atmosphere testing instruments.

y. **MSC.1/Circ.1562** – Unified interpretations of SOLAS regulation XIV/2.2 on the initial and maintenance surveys as required in the provisions of SOLAS Chapter XIV and the Polar Code.

z. **MSC.1/Circ.1571** – Unified interpretations of SOLAS Chapter II-1 on special requirements for vehicle ferries, ro-ro ships and other ships of similar type, and on the drainage of enclosed spaces situated on the bulkhead deck.

aa. **MSC.1/Circ.1572** – Unified interpretations of the provisions of SOLAS Chapters II-1 and XII, of the Revised technical provisions for means of

access for inspections (resolution MSC.158(78)) and of the performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers (resolution MSC.188(79)), containing the provisions of MSC.1/Circ.1464/Rev.1 and Corr.1, as amended by MSC.1/Circ.1507 and MSC.1/Circ.1545.

bb. **MSC.1/Circ.1573** – Unified interpretation of SOLAS regulations II-1/2.20 and II-2/3.21 on the deadweight to be stated on certificates.

cc. **MSC.1/Circ.1576** – Unified interpretations of SOLAS regulations V/18.8, V/18.9 and IV/15.9 relating to the annual testing of VDR, S-VDR, AIS and EPIRB.

dd. **MSC.1/Circ.1577** – Unified interpretations on the application of COLREG with respect to the placement of sidelights in relation to annex I/9(a)(i) and annex I/10(a)(i) of COLREG 1972, as amended.

ee. **MSC.1/Circ.1581** – Unified interpretations of SOLAS Chapter II-2 on suitable means for the calibration of portable atmosphere testing instruments for cargo areas of tankers; fire integrity of the boundaries of spaces within the cargo area of tankers; and fire integrity of the bulkheads between the wheelhouse and the navigation lockers inside the wheelhouse.

ff. **MSC.1/Circ.1582** – Unified interpretations of Chapter 15 of the FSS Code on requirements related to inert gas systems on tankers.

gg. **MSC.1/Circ.1583** – Amendment to unified interpretations of SOLAS regulation II-1/29 (MSC.1/Circ.1398).

hh. **MSC.1/Circ.1590** – Unified interpretations of paragraph 13.3.5 of the International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) (as amended by resolution MSC.370(93) on the expression "each dry-docking" in the context of testing of high-level alarms on liquefied gas tankers.

ii. **MSC.1/Circ.1591** – Unified interpretations for the application of the relevant requirements of the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code).

8. Queries relating to this circular should be directed to Mr. Calvin Lee at 6375-6269 or email shipping@mpa.gov.sg.

CAPT. DAKNASH GANASEN
DIRECTOR OF MARINE
MARITIME AND PORT AUTHORITY OF SINGAPORE

RESOLUTION MSC.402(96)
(adopted on 19 May 2016)

REQUIREMENTS FOR MAINTENANCE, THOROUGH EXAMINATION, OPERATIONAL TESTING, OVERHAUL AND REPAIR OF LIFEBOATS AND RESCUE BOATS, LAUNCHING APPLIANCES AND RELEASE GEAR

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO the *Measures to prevent accidents with lifeboats* (MSC.1/Circ.1206/Rev.1) and the *Interim recommendation on conditions for authorization of service providers for lifeboats, launching appliances and on-load release gear* (MSC.1/Circ.1277) approved by it,

RECOGNIZING the need to establish a uniform, safe and documented standard for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats), launching appliances and release gear,

NOTING that, by resolution MSC.404(96), it adopted amendments to regulations III/3 and III/20 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), concerning maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear,

NOTING ALSO that the aforementioned regulation III/20 of the Convention provides that the maintenance, thorough examination, operational testing, overhaul and repair shall be carried out in accordance with the Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear ("the Requirements"),

HAVING CONSIDERED, at its ninety-sixth session, the recommendation made by the Sub-Committee on Ship Systems and Equipment, at its third session,

1 ADOPTS the Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear, the text of which is set out in the annex to the present resolution;

2 INVITES Contracting Governments to the Convention to note that the Requirements will take effect on 1 January 2020 upon entry into force of the associated amendments to regulations III/3 and III/20 of the Convention;

3 ALSO INVITES Contracting Governments to the Convention to take measures they consider appropriate to ensure that national manufacturers of equipment certified under chapter III of the Convention for installation and use on board ships undertake to ensure that equipment, instructions, specialized tools, spare parts, training and accessories, as required, are available to independent service providers in a timely and cost-effective manner;

4 REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the Requirements contained in the annex to all Contracting Governments to the Convention;

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

***

ANNEX

REQUIREMENTS FOR MAINTENANCE, THOROUGH EXAMINATION, OPERATIONAL TESTING, OVERHAUL AND REPAIR OF LIFEBOATS AND RESCUE BOATS, LAUNCHING APPLIANCES AND RELEASE GEAR

1 GENERAL

1.1 The objective of these Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear (the Requirements) is to establish a uniform, safe and documented standard for maintenance, thorough examination, operational testing, overhaul and repair of the equipment specified in paragraph 2.1.

1.2 The detailed procedures covered by these Requirements are provided in section 6.

1.3 These Requirements relate to the following regulations:

.1 SOLAS regulation III/20 – Operational readiness, maintenance and inspections; and

.2 SOLAS regulation III/36 – Instructions for on-board maintenance.

1.4 The Company shall ensure that maintenance, thorough examination, operational testing, overhaul and repair on board its ships is conducted in accordance with these Requirements and SOLAS regulation III/20. The Company shall establish and implement health, safety and environment (HSE) procedures covering all activities set out in these Requirements.

1.5 The personnel carrying out maintenance, thorough examination, operational testing overhaul and repair as described in paragraphs 4.2 and 4.3 shall be certified by an authorized service provider in accordance with the requirements specified in section 8. When performing such activities on board ships they shall comply with instructions and procedures established by the Company.

2 APPLICATION

2.1 These Requirements shall apply to the maintenance, thorough examination, operational testing, overhaul and repair of:

.1 lifeboats (including free-fall lifeboats), rescue boats and fast rescue boats; and

.2 launching appliances and on-load and off-load release gear for lifeboats (including primary and secondary means of launching appliances for free-fall lifeboats), rescue boats, fast rescue boats and davit-launched liferafts.

2.2 For the purpose of these Requirements:

.1 *Authorized service provider* means an entity authorized by the Administration in accordance with section 3 and section 7.

.2 *Equipment* means the aforementioned equipment to which the Requirements apply.

.3 *Manufacturer* means the original equipment manufacturer or any entity which has taken legal and legitimate responsibilities for equipment when the original equipment manufacturer no longer exists or supports the equipment.

.4 *Off-load release mechanism* means a release mechanism which releases the survival craft/rescue boat/fast rescue boat when it is waterborne or when there is no load on the hooks.

.5 *On-load release mechanism* means a release mechanism which releases the survival craft/rescue boat/fast rescue boat with load on the hooks.

.6 *Repair* means any activities requiring disassembly of equipment, or any other activities outside the scope of the instructions for on-board maintenance and for emergency repair of life-saving appliances prepared in accordance with SOLAS regulations III/36.2 and III/35.3.18, respectively.

.7 *Overhaul* means a periodical activity defined by the manufacturer that proves continued fitness for purpose for a defined period subject to correct maintenance.

3 AUTHORIZATION

3.1 Administrations shall ensure that the thorough examination, operational testing, repair and overhaul of equipment (see paragraphs 4.2 and 4.3) shall be carried out in accordance with SOLAS regulation III/20 by service providers authorized in accordance with section 7.

3.2 The requirements in section 7 shall equally apply to manufacturers when they are acting as authorized service providers.

4 QUALIFICATION LEVELS AND CERTIFICATION

4.1 Weekly and monthly inspections and routine maintenance as specified in the equipment maintenance manual(s), shall be conducted by authorized service providers, or by shipboard personnel under the direction of a senior ship's officer in accordance with the maintenance manual(s).

4.2 Annual thorough examinations and operational tests, as described in section 6.2, shall be conducted by certified personnel of either the manufacturer or an authorized service provider in accordance with section 7 and section 8. The service provider may be the ship operator provided that it is authorized in accordance with section 3 and section 7.

4.3 Five-year thorough examination, any overhaul, overload operational tests, as described in section 6.3, and repair shall be conducted by certified personnel of either the manufacturer or an authorized service provider in accordance with section 7 and section 8.

5 REPORTS AND RECORDS

5.1 All reports and checklists shall be completed and signed by the person who carries out the inspection and maintenance work and countersigned by the Company's representative or the ship's master.

5.2 Records of maintenance, thorough examination, operational testing, overhaul and repair shall be updated and filed on board the ship for the service life of the equipment.

5.3 When thorough examination, operational testing, overhaul and repair are completed, a statement confirming that the lifeboat arrangements remain fit for purpose shall be promptly issued by the manufacturer or authorized service provider that conducted the work. A copy of valid documents of certification and authorization as appropriate shall be included with the statement.

6 SPECIFIC PROCEDURES FOR INSPECTION, MAINTENANCE, THOROUGH EXAMINATION, OPERATIONAL TESTING, OVERHAUL AND REPAIR

6.1 Maintenance manuals

6.1.1 Any inspection, maintenance, thorough examination, operational testing, overhaul and repair shall be carried out according to the maintenance manuals and associated technical documentation developed by the manufacturer.

6.1.2 A full set of maintenance manuals and associated technical documentation as specified in paragraph 6.1.1 shall be available on board.

6.1.3 The maintenance manuals and associated technical documentation as specified in paragraph 6.1.1 shall include the items listed in sections 6.2 and 6.3 as a minimum and shall be kept up to date by the Company taking into account relevant information provided by the manufacturer.

6.2 Annual thorough examination and operational test

6.2.1 All items listed in checklists for the weekly/monthly inspections required by SOLAS regulations III/20.6 and III/20.7 also form the first part of the annual thorough examination.

6.2.2 Records of inspections and routine on-board maintenance carried out by the ship's crew and the applicable certificates for the equipment shall be reviewed.

6.2.3 For lifeboats (including free-fall lifeboats), rescue boats and fast rescue boats, the following items shall be thoroughly examined and checked for satisfactory condition and operation:

.1 condition of the boat structure including fixed and loose equipment (including a visual examination of the external boundaries of the void spaces, as far as practicable);

.2 engine and propulsion system;

.3 sprinkler system, where fitted;

.4 air supply system, where fitted;

.5 manoeuvring system;

.6 power supply system;

.7 bailing system;

.8 fender/skate arrangements; and

.9 rescue boat righting system, where fitted.

6.2.4 For release gear of lifeboats (including free-fall lifeboats), rescue boats, fast rescue boats and liferafts, the following shall be thoroughly examined for satisfactory condition and operation after the annual operational test of the winch brake with the empty boat or equivalent load, as required by paragraph 6.2.10:

.1 operation of devices for activation of release gear;

.2 excessive free play (tolerances);

.3 hydrostatic interlock system, where fitted;

.4 cables for control and release; and

.5 hook fastening.

Notes: 1 The setting and maintenance of release gear are critical operations with regard to maintaining the safe operation of lifeboats (including free-fall lifeboats), rescue boats, fast rescue boats and davit launched liferafts. Utmost care shall be taken when carrying out all inspection and maintenance operations on the equipment.

2 No maintenance or adjustment of the release gear shall be undertaken while the hooks are under load.

6.2.5 The operational test of davit-launched lifeboats' and rescue boats' on-load release function shall be carried out as follows:

.1 position the boat partially in the water such that the mass of the boat is substantially supported by the falls and the hydrostatic interlock system, where fitted, is not triggered;

.2 operate the on-load release gear;

.3 reset the on-load release gear; and

.4 examine the release gear and hook fastening to ensure that the hook is completely reset and no damage has occurred.

6.2.6 The operational test of davit-launched lifeboats' and rescue boats' off-load release function shall be carried out as follows:

.1 position the boat so that it is fully waterborne;

.2 operate the off-load release gear;

.3 reset the off-load release gear; and

.4 recover the boat to the stowed position and prepare for operational readiness.

During the test, prior to hoisting, it shall be checked that the release gear is completely and properly reset. The final turning-in of the boat shall be done without any persons on board.

6.2.7 The operational test of the free-fall lifeboat release function shall be carried out as follows:

.1 engage the arrangements for the test without launching the lifeboat, required by paragraph 4.7.6.4 of the LSA Code, as specified in the manufacturer's operating instructions;

.2 if required to be on board, ensure that the operator is properly seated and secured in the seat location from which the release mechanism is to be operated;

.3 operate the release mechanism to release the lifeboat;

.4 reset the lifeboat in the stowed configuration;

.5 repeat the procedures referred to in .2 to .4 above, using the back-up release mechanism, if applicable;

.6 remove the arrangements for the test without launching the lifeboat, required by paragraph 4.7.6.4 of the LSA Code; and

.7 verify that the lifeboat is in the ready to launch stowed configuration.

6.2.8 The operational test of the davit-launched liferaft automatic release function shall be carried out as follows:

.1 manually release the hook with a load of 150 kg on the hook;

.2 automatically release the hook with a dummy weight of 200 kg on the hook when it is lowered to the ground; and

.3 examine the release hook and hook fastening to ensure that the hook is completely reset and no damage has occurred.

If a raft is used for the test instead of a dummy weight, the automatic release function shall release the raft when waterborne.

6.2.9 For launching appliances for lifeboats (including free-fall lifeboats), rescue boats, fast rescue boats and liferafts, the following items shall be examined for satisfactory condition and operation:

.1 davit or other launching structures, in particular with regard to corrosion, misalignments, deformation and excessive free play;

.2 wires and sheaves, possible damage such as kinks and corrosion;

.3 lubrication of wires, sheaves and moving parts; and

.4 if applicable:

.1 functioning of limit switches;

.2 stored power systems;

.3 hydraulic systems; and

.5 for winches:

.1 inspecting the braking system in accordance with winch manual;

.2 replacing brake pads, when necessary;

.3 winch foundation; and

.4 if applicable:

.1 remote control system; and

.2 power supply system.

6.2.10 For winches of the launching appliances for lifeboats (including free-fall lifeboats), rescue boats, fast rescue boats and liferafts, annual operational testing shall be done by lowering the empty craft or boat or equivalent load. When the craft has reached its maximum lowering speed and before the craft enters the water, the brake shall be abruptly applied. Following these tests, the stressed structural parts shall be reinspected where the structure permits the reinspection.

6.3 Five-year thorough examination, overhaul and overload operational tests

6.3.1 The five-year operational test of the winches of the launching appliances shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment. When the proof load has reached its maximum lowering speed, the brake shall be abruptly applied.

6.3.2 Following these tests, the stressed structural parts shall be reinspected where the structure permits the reinspection.

6.3.3 The operational tests and overhaul at five-year intervals of release gear for lifeboats (including free-fall lifeboats), rescue boats, fast rescue boats and liferafts shall include:

.1 dismantling of hook release units;

.2 examinations with regard to tolerances and design requirements;

.3 adjustment of release gear system after assembly;

.4 operational tests as per paragraphs 6.2.5, 6.2.6, 6.2.7 or 6.2.8 above, as applicable, but with a load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment; and

.5 examinations of vital parts with regard to defects and cracks.

6.3.4 Any other overhaul if required shall be carried out in accordance with paragraph 6.3.3.

7 REQUIREMENTS FOR AUTHORIZATION OF SERVICE PROVIDERS

7.1 Authorization as required by paragraph 3.1 shall include, as a minimum, demonstration of:

.1 employment and documentation of personnel certified in accordance with a recognized national, international or industry standard as applicable, or a manufacturer's established certification programme. In either case, the certification programme shall comply with section 8 for each make and type of equipment for which service is to be provided;

.2 availability of sufficient tools, and in particular any specialized tools specified in the manufacturer's instructions, including portable tools as needed for work to be carried out on board ship;

.3 access to appropriate parts and accessories as specified for maintenance and repair;

.4 availability of the manufacturer's instructions for repair work involving disassembly or adjustment of on-load release mechanisms and davit winches; and

.5 a documented and certified quality system, which covers at least the following:

.1 code of conduct for personnel involved in the relevant activity;

.2 maintenance and calibration of measuring tools and gauges;

.3 training programmes for personnel;

.4 supervision and verification to ensure compliance with operational procedures;

.5 recording and reporting of information;

.6 quality management of subsidiaries and agents;

.7 job preparation; and

.8 periodic review of work process procedures, complaints, corrective actions and issuance, maintenance and control of documents.

Note: A documented quality system complying with the most current version of the ISO 9000 series and including the above items would be considered acceptable.

7.2 The Administration shall ensure that information regarding authorized service providers is made available.

7.3 In cases where a manufacturer is no longer in business or no longer provides technical support, the Administration may authorize service providers for the equipment on the basis of prior authorization for the equipment and/or long-term experience and demonstrated expertise as an authorized service provider.

7.4 Issuance and maintenance of authorization document:

.1 upon successful initial audit of a service provider, an authorization document shall be issued by the Administration defining the scope of services provided (e.g. makes and types of equipment). The expiry date shall be clearly written on the document;

.2 the Administration shall ensure that work continues, e.g. by periodic audit, to be carried out in accordance with these Requirements, and shall withdraw the authorization of service providers who are not in compliance; and

.3 the Administration may accept or recognize service providers authorized by other Administrations or by their Recognized Organizations.

8 REQUIREMENTS FOR CERTIFICATION OF PERSONNEL

8.1 Personnel for the work specified in paragraphs 4.2 and 4.3 shall be certified by the manufacturer or authorized service provider for each make and type of the equipment to be worked on in accordance with the provisions in this section.

8.2 Education and training

8.2.1 Initial certification shall be issued only to personnel having completed education, training and competence assessment. Education shall address, as a minimum:

.1 relevant rules and regulations, including international conventions;

.2 design and construction of lifeboats (including free-fall lifeboats), rescue boats and fast rescue boats, including on-load release gear and launching appliances;

.3 causes of lifeboat and rescue boat accidents;

.4 education and practical training in the procedures specified in section 6 for which certification is sought;

.5 detailed procedures for thorough examination, operational testing, repair and overhaul of lifeboat (including free-fall lifeboats), rescue boats and fast rescue boats, launching appliances and on-load release gear, as applicable;

.6 procedures for issuing a report of service and statement of fitness for purpose based on paragraph 5.3; and

.7 work, health and safety issues while conducting activities on board.

8.2.2 Training shall include practical technical training on thorough examination, operational testing, maintenance, repair and overhaul techniques using the equipment for which the personnel are to be certified. The technical training shall include disassembly, reassembly, correct operation and adjustment of the equipment. Classroom training shall be supplemented by field experience in the operations for which certification is sought, under the supervision of a certified person.

8.2.3 Prior to issuance of certification, a competency assessment shall be satisfactorily completed, using the equipment for which the personnel are to be certified.

8.3 Validity of certificates and renewal

8.3.1 Upon completion of training and competency assessment, a certificate shall be issued defining the level of qualification and the scope of the certification (i.e. makes and types of equipment and specifically state which activities in paragraphs 4.2 and 4.3 are covered by the certification). The expiry date shall clearly be written on the certificate and shall be three years from the date of issue. The validity of any certificate shall be suspended in the event of any shortfall in performance and only revalidated after a further competency assessment.

8.3.2 A competency assessment shall be conducted to renew the certification. In cases where refresher training is found necessary a further assessment shall be carried out after completion.

RESOLUTION MSC.403(96)
(adopted on 19 May 2016)

AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.98(73), by which it adopted the International Code for Fire Safety Systems ("the FSS Code"), which has become mandatory under chapter II-2 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation II-2/3.22 of the Convention concerning the procedure for amending the FSS Code,

HAVING CONSIDERED, at its ninety-sixth session, amendments to the FSS 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 FSS Code the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2019 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 2020 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.

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ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)

CHAPTER 8
AUTOMATIC SPRINKLER, FIRE DETECTION AND FIRE ALARM SYSTEMS

1 The text in existing paragraph 2.4.1 is replaced with the following:

"**2.4.1 General**

2.4.1.1 Any parts of the system which may be subjected to freezing temperatures in service shall be suitably protected against freezing.

2.4.1.2 Special attention shall be paid to the specification of water quality provided by the system manufacturer to prevent internal corrosion of sprinklers and clogging or blockage arising from products of corrosion or scale-forming minerals."

2 A new chapter 17 is added after existing chapter 16 as follows:

"CHAPTER 17
HELICOPTER FACILITY FOAM FIREFIGHTING APPLIANCES

1 Application

This chapter details the specifications for foam firefighting appliances for the protection of helidecks and helicopter landing areas as required by chapter II-2 of the Convention.

2 Definitions

2.1 *D-value* means the largest dimension of the helicopter used for assessment of the helideck when its rotors are turning. It establishes the required area of foam application.

2.2 *Deck integrated foam nozzles* are foam nozzles recessed into or edge mounted on the helideck.

2.3 *Foam-making branch pipes* are air-aspirating nozzles in tube shape for producing and discharging foam, usually in straight stream only.

2.4 *Helicopter landing area* is as defined in SOLAS regulation II-2/3.57.

2.5 *Helideck* is as defined in SOLAS II-2/3.26.

2.6 *Hose reel foam station* is a hose reel fitted with a foam-making branch pipe and non-collapsible hose, together with fixed foam proportioner and fixed foam concentrate tank, mounted on a common frame.

2.7 *Monitor foam station* is a foam monitor, either self-inducing or together with separate fixed foam proportioner, and fixed foam concentrate tank, mounted on a common frame.

2.8 *Obstacle free sector* is the take-off and approach sector which totally encompasses the safe landing area and extends over a sector of at least 210º, within which only specified obstacles are permitted.

2.9 *Limited obstacle sector* is a 150º sector outside the take-off and approach sector that extends outward from a helideck where objects of limited height are permitted.

3 Engineering specifications for helidecks and helicopter landing areas

3.1 The system shall be capable of manual release, and may be arranged for automatic release.

3.2 For helidecks the foam system shall contain at least two fixed foam monitors or deck integrated foam nozzles. In addition, at least two hose reels fitted with a foam-making branch pipe and non-collapsible hose sufficient to reach any part of the helideck shall be provided. The minimum foam system discharge rate shall be determined by multiplying the D-value area by 6 *l*/min/m^2. The minimum foam system discharge rate for deck integrated foam nozzle systems shall be determined by multiplying the overall helideck area by 6 *l*/min/m^2. Each monitor shall be capable of supplying at least 50% of the minimum foam system discharge rate, but not less than 500 *l*/min. The minimum discharge rate of each hose reel shall be at least 400 *l*/min. The quantity of foam concentrate shall be adequate to allow operation of all connected discharge devices for at least 5 min.

3.3 Where foam monitors are installed, the distance from the monitor to the farthest extremity of the protected area shall be not more than 75% of the monitor throw in still air conditions.

3.4 For helicopter landing areas, at least two portable foam applicators or two hose reel foam stations shall be provided, each capable of discharging a minimum foam solution discharge rate, in accordance with the following table.

Category	**Helicopter overall length (D-value)**	**Minimum foam solution discharge rate (*l*/min)**
H1	up to but not including 15 m	250
H2	from 15 m up to but not including 24 m	500
H3	from 24 m up to but not including 35 m	800

The quantity of foam concentrate shall be adequate to allow operation of all connected discharge devices for at least 10 min. For tankers fitted with a deck foam system, the Administration may consider an alternative arrangement, taking into account the type of foam concentrate to be used.

3.5 Manual release stations capable of starting necessary pumps and opening required valves, including the fire main system, if used for water supply, shall be located at each monitor and hose reel. In addition, a central manual release station shall be provided at a protected location. The foam system shall be designed to discharge foam with nominal flow and at design pressure from any connected discharge devices within 30 s of activation.

3.6 Activation of any manual release station shall initiate the flow of foam solution to all connected hose reels, monitors, and deck integrated foam nozzles.

3.7 The system and its components shall be designed to withstand ambient temperature changes, vibration, humidity, shock impact and corrosion normally encountered on the open deck, and shall be manufactured and tested to the satisfaction of the Administration.

3.8 A minimum nozzle throw of at least 15 m shall be provided with all hose reels and monitors discharging foam simultaneously. The discharge pressure, flow rate and discharge pattern of deck integrated foam nozzles shall be to the satisfaction of the Administration, based on tests that demonstrate the nozzle's capability to extinguish fires involving the largest size helicopter for which the helideck is designed.

3.9 Monitors, foam-making branch pipes, deck integrated foam nozzles and couplings shall be constructed of brass, bronze or stainless steel. Piping, fittings and related components, except gaskets, shall be designed to withstand exposure to temperatures up to 925ºC.

3.10 The foam concentrate shall be demonstrated effective for extinguishing aviation fuel spill fires and shall conform to performance standards not inferior to those acceptable to the Organization. Where the foam storage tank is on the exposed deck, freeze protected foam concentrates shall be used, if appropriate, for the area of operation.

3.11 Any foam system equipment installed within the take-off and approach obstacle-free sector shall not exceed a height of 0.25 m. Any foam system equipment installed in the limited obstacle sector shall not exceed the height permitted for objects in this area.

3.12 All manual release stations, monitor foam stations, hose reel foam stations, hose reels and monitors shall be provided with a means of access that does not require travel across the helideck or helicopter landing area.

3.13 Oscillating monitors, if used, shall be pre-set to discharge foam in a spray pattern and have a means of disengaging the oscillating mechanism to allow rapid conversion to manual operation.

3.14 If a foam monitor with flow rate up to 1,000 *l*/min is installed, it shall be equipped with an air-aspirating nozzle. If a deck integrated nozzle system is installed, then the additionally installed hose reel shall be equipped with an air-aspirating handline nozzle (foam branch pipes). Use of non-air-aspirating foam nozzles (on both monitors and the additional hose reel) is permitted only where foam monitors with a flow rate above 1,000 *l*/min are installed. If only portable foam applicators or hose reel stations are provided, these shall be equipped with an air-aspirating handline nozzle (foam branch pipes).

RESOLUTION MSC.404(96)
(adopted on 19 May 2016)

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 ninety-sixth 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 2019, 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 2020 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.

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ANNEX

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

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

PART A
GENERAL

Regulation 3 – Definitions

1 The following new paragraphs are added after the existing paragraph 56:

"57 *Helicopter landing area* is an area on a ship designated for occasional or emergency landing of helicopters but not designed for routine helicopter operations.

58 *Winching area* is a pick-up area provided for the transfer by helicopter of personnel or stores to or from the ship, while the helicopter hovers above the deck.

PART D
ESCAPE

Regulation 13 – Means of escape

2 The following new paragraphs are added after the existing paragraph 3.2.6.2:

"3.2.7 *Evacuation analysis for passenger ships*

3.2.7.1 Escape routes shall be evaluated by an evacuation analysis early in the design process. This analysis shall apply to:

.1 ro-ro passenger ships constructed on or after 1 July 1999; and

.2 other passenger ships constructed on or after 1 January 2020 carrying more than 36 passengers.

3.2.7.2 The analysis shall be used to identify and eliminate, as far as practicable, congestion which may develop during an abandonment, due to normal movement of passengers and crew along escape routes, including the possibility that crew may need to move along these routes in a direction opposite to the movement of passengers. In addition, the analysis shall be used to demonstrate that escape arrangements are sufficiently flexible to provide for the possibility that certain escape routes, assembly stations, embarkation stations or survival craft may not be available as a result of a casualty.

3 Paragraph 7.4 is deleted.

PART G
SPECIAL REQUIREMENTS

Regulation 18 – Helicopter facilities

4 A new paragraph 2.3 is added after the existing paragraph 2.2, as follows:

"2.3 Notwithstanding the requirements of paragraph 2.2 above, ships constructed on or after 1 January 2020, having a helicopter landing area, shall be provided with foam firefighting appliances which comply with the relevant provisions of chapter 17 of the Fire Safety Systems Code."

and the subsequent paragraphs are renumbered accordingly.

5 The renumbered paragraph 2.4 is replaced with the following text:

"2.4 Notwithstanding the requirements of paragraph 2.2 or 2.3 above, ro-ro passenger ships without helidecks shall comply with regulation III/28."

6 A new paragraph 5.1.6 is added after the existing paragraph 5.1.5 as follows:

".6 in lieu of the requirements of paragraphs 5.1.3 through 5.1.5, on ships constructed on or after 1 January 2020 having a helideck, foam firefighting appliances which comply with the provisions of the Fire Safety Systems Code."

and the remaining paragraphs are renumbered accordingly.

CHAPTER III
LIFE-SAVING APPLIANCES AND ARRANGEMENTS

PART A
GENERAL

Regulation 3 – Definitions

7 The following new paragraph 25 is added after the existing paragraph 24:

"25 *Requirements for maintenance, thorough examination, operational testing, overhaul and repair* means the Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear, adopted by the Maritime Safety Committee of the Organization by resolution MSC.402(96), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I."

PART B
REQUIREMENTS FOR SHIPS AND LIFE-SAVING APPLIANCES

Regulation 20 – Operational readiness, maintenance and inspections

8 The existing paragraph 3.1 is replaced with the following text:

"3.1 Maintenance, testing and inspections of life-saving appliances shall be carried out in a manner having due regard to ensuring reliability of such appliances."

9 The existing paragraph 11 is replaced with the following text:

"**11 Maintenance, thorough examination, operational testing, overhaul and repair of lifeboats, rescue boats and fast rescue boats, launching appliances and release gear**

11.1 Launching appliances shall be:

.1 subject to a thorough examination at the annual surveys required by regulations I/7 or I/8, as applicable; and

.2 upon completion of the examination referred to in paragraph 11.1.1, subjected to a dynamic test of the winch brake at maximum lowering speed. The load to be applied shall be the mass of the survival craft or rescue boat without persons on board, except that, at intervals of at least once every five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment.

11.2 Lifeboat and rescue boat release gear, including fast rescue boat release gear and free-fall lifeboat release systems, shall be:

.1 subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8;

.2 in case of on-load release gear, operationally tested under a load of 1.1 times the total mass of the boat when loaded with its full complement of persons and equipment whenever the release gear is overhauled. Such overhauling and operational test shall be carried out at least once every five years; and

.3 notwithstanding paragraph 11.2.2, the operational testing of free-fall lifeboat release systems shall be performed either by free fall launch with only the operating crew on board or by a test without launching the lifeboat carried out based on Requirements for maintenance, thorough examination, operational testing, overhaul and repair.

11.3 Davit-launched liferaft automatic release hooks shall be:

.1 subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8; and

.2 operationally tested under a load of 1.1 times the total mass of the liferaft when loaded with its full complement of persons and equipment whenever the automatic release hook is overhauled. Such overhauling and operational test shall be carried out at least once every five years.

11.4 Lifeboats and rescue boats, including fast rescue boats, shall be subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8.

11.5 The thorough examination, operational testing and overhaul required by paragraphs 11.1 to 11.4 and the maintenance and repair of equipment specified in paragraphs 11.1 to 11.4 shall be carried out in accordance with the Requirements for maintenance, thorough examination, operational testing, overhaul and repair, and the instructions for onboard maintenance as required by regulation 36.

RESOLUTION MSC.405(96)
(adopted on 19 May 2016)

AMENDMENTS TO THE INTERNATIONAL CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS, 2011 (2011 ESP CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution A.1049(27), by which the Assembly adopted the International Code on the Enhanced Programme of Inspections during Surveys of Bulk Carriers and Oil Tankers, 2011 ("the 2011 ESP Code"), which has become mandatory under chapter XI-1 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation XI-1/2 of the Convention concerning the procedure for amending the 2011 ESP Code,

HAVING CONSIDERED, at its ninety-sixth session, amendments to the 2011 ESP 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 2011 ESP Code the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2017 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 2018 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.

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ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS, 2011 (2011 ESP CODE)

ANNEX A

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS

Part A

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS HAVING SINGLE-SIDE SKIN CONSTRUCTION

1 In paragraph 4.2.1.3, the words "hard protective" are inserted after the words "When such breakdown of".

2 Paragraph 5.2.2 is replaced with the following text:

"5.2.2 In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access should be agreed between the owner and the Administration, based on recommendations developed by the Organization.

3 Paragraph 5.2.9 is replaced with the following text:

"5.2.9 The surveyor(s) should always be accompanied by at least one responsible person, assigned by the owner, experienced in tank and enclosed space inspection."

4 Paragraph 5.2.10 is deleted.

Part B

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS HAVING DOUBLE-SIDE SKIN CONSTRUCTION

5 Paragraph 5.2.2 is replaced with the following text:

"5.2.2 In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access should be agreed between the owner and the Administration, based on recommendations developed by the Organization.

6 Paragraph 5.2.9 is replaced with the following text:

"5.2.9 The surveyor(s) should always be accompanied by, at least, one responsible person, assigned by the owner, experienced in tank and enclosed space inspection."

7 Paragraph 5.2.10 is deleted.

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

8 Paragraph 5.2.1.1 is replaced with the following text:

"5.2.1.1 In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access should be agreed between the owner and the Administration, based on recommendations developed by the Organization.

9 Paragraph 5.2.6 is replaced with the following text:

"5.2.6 The surveyor(s) should always be accompanied by at least one responsible person, assigned by the owner, experienced in tank and enclosed space inspection."

10 Paragraph 5.2.7 is deleted.

Part B

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS OTHER THAN DOUBLE-HULL OIL TANKERS

11 Paragraph 5.2.1.1 is replaced with the following text:

"5.2.1.1 In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access should be agreed between the owner and the Administration, based on recommendations developed by the Organization.

12 Paragraph 5.2.6 is replaced with the following text:

"5.2.6 The surveyor(s) should always be accompanied by at least one responsible person, assigned by the owner, experienced in tank and enclosed space inspection."

13 Paragraph 5.2.7 is deleted.

RESOLUTION MSC.406(96)
(adopted on 13 May 2016)

AMENDMENTS TO THE INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.122(75) by which it adopted the International Maritime Dangerous Goods Code ("the IMDG 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/1.1 of the Convention concerning amendment procedure for amending the IMDG Code,

HAVING CONSIDERED, at its ninety-sixth session, amendments to the IMDG 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 IMDG Code, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2017, unless prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2018 upon their acceptance in accordance with paragraph 2 above;

4 AGREES that Contracting Governments to the Convention may apply the aforementioned amendments in whole or in part on a voluntary basis as from 1 January 2017;

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

ANNEX

AMENDMENTS TO THE INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE AMENDMENT 38-16

The complete text of the IMDG Code is replaced with the following:

ANNEX 11

RESOLUTION MSC.407(96)
(adopted on 19 May 2016)

AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF MOBILE OFFSHORE DRILLING UNITS, 2009 (2009 MODU 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 that the Assembly, when adopting resolution A.1023(26) on the Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009 (2009 MODU Code), authorized the Committee to amend the Code as appropriate, taking into consideration development in the design and technologies, in consultation with appropriate organizations,

RECOGNIZING the need for harmonizing the requirements for helicopter facility foam firefighting appliances,

HAVING CONSIDERED, at its ninety-sixth session, the recommendations made by the Sub-Committee on Ship Systems and Equipment, at its second session,

1 ADOPTS amendments to the 2009 MODU Code, set out in the annex to the present resolution;

2 INVITES all Governments concerned to take appropriate steps to give effect to the annexed amendments to the 2009 MODU Code by 1 January 2020.

ANNEX

AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF MOBILE OFFSHORE DRILLING UNITS, 2009 (2009 MODU CODE)

CHAPTER 9
FIRE SAFETY

Paragraph 9.16 – Provisions for helicopter facilities

The following new paragraph 9.16.4.6 is added after existing paragraph 9.16.4.5, and the remaining paragraphs renumbered accordingly:

> ".6 in lieu of the provisions of paragraphs 9.16.4.3 to 9.16.4.5, on units constructed on or after 1 January 2020, foam firefighting appliances complying with the provisions of the FSS Code;"

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RESOLUTION MSC.408(96)
(adopted on 13 May 2016)
AMENDMENTS TO CHAPTER 2 OF THE CODE OF SAFETY FOR
SPECIAL PURPOSE SHIPS, 2008 (2008 SPS CODE)

ANNEX 17

RESOLUTION MSC.408(96)
(adopted on 13 May 2016)

AMENDMENTS TO CHAPTER 2 OF THE CODE OF SAFETY FOR SPECIAL PURPOSE SHIPS, 2008 (2008 SPS 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.266(84), by which it adopted the Code of Safety for Special Purpose Ships, 2008 (2008 SPS Code),

NOTING the need to amend respective provisions of the Code,

HAVING CONSIDERED, at its ninety-sixth session, amendments to chapter 2 of the 2008 SPS Code proposed by the Sub-Committee on Ship Design and Construction, at its third session,

1 ADOPTS amendments to the Code of Safety for Special Purpose Ships, 2008, the text of which is set out in the annex to the present resolution;

2 DETERMINES that the said amendments should become effective on 13 May 2016.

ANNEX

AMENDMENTS TO CHAPTER 2 OF THE CODE OF SAFETY FOR SPECIAL PURPOSE SHIPS, 2008 (2008 SPS CODE)

Chapter 2
Stability and subdivision

1 The existing paragraph 2.2 is replaced by the following:

"2.2 The subdivision and damage stability of special purpose ships should in general be in accordance with SOLAS chapter II-1 where the ship is considered a passenger ship, and special personnel are considered passengers, with an *R*-value calculated as follows:

.1 where the ship is certified to carry 240 persons or more, the *R*-value is assigned as *R*;

.2 where the ship is certified to carry not more than 60 persons, the *R*-value is assigned as 0.8*R*; and

.3 for more than 60 (but not more than 240) persons, the *R*-value should be determined by linear interpolation between the *R*-values given in .1 and .2 above.

Where:

$$R = 1 - \frac{5{,}000}{L_s + 2.5N + 15{,}225}$$

$N = N_1 + 2N_2$

N_1 = number of persons for whom lifeboats are provided

N_2 = number of persons (including officers and crew) the ship is permitted to carry in excess of N_1

2 The following new paragraph 2.3 is added after the amended paragraph 2.2 and the existing paragraphs 2.3 to 2.5 are renumbered accordingly:

"2.3 Where the conditions of service are such that compliance with paragraph 2.2 above on the basis of $N = N_1 + 2N_2$ is impracticable and where the Administration considers that a suitably reduced degree of hazard exists, a lesser value of *N* may be taken but in no case less than $N = N_1 + N_2$."

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RESOLUTION MSC.408(96)
(adopted on 13 May 2016)
AMENDMENTS TO CHAPTER 2 OF THE CODE OF SAFETY FOR
SPECIAL PURPOSE SHIPS, 2008 (2008 SPS CODE)

RESOLUTION MSC.409(97)
(adopted on 25 November 2016)

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 ninety-seventh 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 2019, 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 2020 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 3-12 – Protection against noise

1 The existing paragraph 2.1 is amended to read as follows:

".1 contracted for construction before 1 July 2014 and the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009; or"

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

PART A
GENERAL

Regulation 1 – Application

2 The following new paragraph is added after existing paragraph 2.8:

"2.9 Regulation 10.5.1.2.2, as amended by resolution MSC.409(97), applies to ships constructed before 1 January 2020, including those constructed before 1 July 2012."

PART C
SUPPRESSION OF FIRE

Regulation 10 – Firefighting

3 In paragraph 5.1.2.2, the last sentence is replaced with the following:

"In the case of domestic boilers of less than 175 kW, or boilers protected by fixed water-based local application fire-extinguishing systems as required by paragraph 5.6, an approved foam-type extinguisher of at least 135 *l* capacity is not required."

CHAPTER XI-1
SPECIAL MEASURES TO ENHANCE MARITIME SAFETY

4 The following new regulation 2-1 is inserted after existing regulation 2:

"**Regulation 2-1 – Harmonization of survey periods of cargo ships not subject to the ESP Code**

For cargo ships not subject to enhanced surveys under regulation XI-1/2, notwithstanding any other provisions, the intermediate and renewal surveys included in regulation I/10 may be carried out and completed over the corresponding periods as specified in the 2011 ESP Code, as may be amended, and the guidelines developed by the Organization*, as appropriate.

RESOLUTION MSC.410(97)
(adopted on 25 November 2016)

AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.98(73), by which it adopted the International Code for Fire Safety Systems ("the FSS Code"), which has become mandatory under chapter II-2 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation II-2/3.22 of the Convention concerning the procedure for amending the FSS Code,

HAVING CONSIDERED, at its ninety-seventh session, amendments to the FSS 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 FSS Code the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2019 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 2020 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 CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)

CHAPTER 13
ARRANGEMENT OF MEANS OF ESCAPE

In paragraph 2.1.2.2.2.1, the text of case 2 is replaced with the following:

"Case 2: Passengers in public spaces occupied to 3/4 of maximum capacity, 1/3 of the crew distributed in public spaces; service spaces occupied by 1/3 of the crew; and crew accommodation occupied by 1/3 of the crew."

RESOLUTION MSC.411(97)
(adopted on 25 November 2016)

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

THE MARITIME SAFETY COMMITTEE,

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

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

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

HAVING CONSIDERED, at its ninety-seventh 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 2019 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 2020 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purpose 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 CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

CHAPTER 3
SHIP ARRANGEMENTS

3.2 Accommodation, service and machinery spaces and control stations

Existing paragraph 3.2.5 is replaced with the following:

"3.2.5 Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in 3.2.4, except wheelhouse windows, shall be constructed to "A-60" class. Sidescuttles in the shell below the uppermost continuous deck and in the first tier of the superstructure or deckhouse shall be of fixed (non-opening) type."

ANNEX 4

RESOLUTION MSC.412(97)
(adopted on 25 November 2016)

AMENDMENTS TO THE INTERNATIONAL CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS, 2011 (2011 ESP CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution A.1049(27), by which the Assembly adopted the International Code on the Enhanced Programme of Inspections during Surveys of Bulk Carriers and Oil Tankers, 2011 ("the 2011 ESP Code"), which has become mandatory under chapter XI-1 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

NOTING ALSO Article VIII(b) and regulation XI-1/2 of the Convention concerning the procedure for amending the 2011 ESP Code,

HAVING CONSIDERED, at its ninety-seventh session, amendments to the 2011 ESP 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 2011 ESP Code the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with Article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 January 2018 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 July 2018 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 CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS, 2011 (2011 ESP CODE)**

ANNEX A

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS

Part A

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS HAVING SINGLE-SIDE SKIN CONSTRUCTION

1 Paragraph 1.5 is replaced with the following:

"1.5 **Thickness measurements and close-up surveys**

In any kind of survey, i.e. renewal, intermediate, annual or other surveys having the scope of the foregoing ones, for structures in areas where close-up surveys are required, thickness measurements, when required by annex 2, should be carried out simultaneously with close-up surveys."

2 Paragraph 2.4.4 is replaced with the following:

"2.4.4 Close up survey and thickness measurement[3] of the hatch cover and coaming plating and stiffeners should be carried out as given in annexes 1 and 2.

[3] Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers' structures."

ANNEX 1

REQUIREMENTS FOR CLOSE-UP SURVEY AT RENEWAL SURVEYS

3 Note (D) is replaced with the following:

"(D) Cargo hold hatch covers and coamings. For cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers' structures."

Part B

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS HAVING DOUBLE-SIDE SKIN CONSTRUCTION

4 Paragraph 1.5 is replaced with the following:

"1.5 **Thickness measurements and close-up surveys**

In any kind of survey, i.e. renewal, intermediate, annual or other surveys having the scope of the foregoing ones, for structures in areas where close-up surveys are required, thickness measurements, when required by annex 2, should be carried out simultaneously with close-up surveys."

5 Paragraph 2.4.4 is replaced with the following:

"2.4.4 Close up survey and thickness measurement[3] of the hatch cover and coaming plating and stiffeners should be carried out as given in annexes 1 and 2.

[3] For cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers' structures."

ANNEX 1

REQUIREMENTS FOR CLOSE-UP SURVEY AT RENEWAL SURVEYS

Appendix 1 – Minimum requirements for close-up survey at renewal survey of double-side skin bulk carriers excluding ore carriers

5 < Age ≤ 10 years – Renewal Survey No.2

6 The third paragraph in the column is replaced with the following:

"25% of ordinary transverse frames for transverse framing systems or 25% of longitudinals for longitudinal framing systems on side shell and inner side plating at forward, middle and aft parts in the foremost double-side tanks. (B)"

10 < Age ≤ 15 years – Renewal Survey No.3

7 The third paragraph in the column is replaced with the following:

"25% of ordinary transverse frames for transverse framing systems or 25% of longitudinals for longitudinal framing systems on side shell and inner side plating at forward, middle and aft parts in all double-side tanks. (B)"

Age > 15 years – Renewal Survey No.4 and Subsequent

8 The third paragraph in the column is replaced with the following:

"All ordinary transverse frames for transverse framing systems or all longitudinals for longitudinal framing systems on side shell and inner side plating at forward, middle and aft parts in all double-side tanks. (B)"

9 Note (D) is replaced with the following:

"(D) Cargo hold hatch covers and coamings. For cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers' structures."

Appendix 2 – Minimum requirements for close-up survey at renewal survey for ore carriers

10 Note (D) is replaced with the following:

"(D) Cargo hold hatch covers and coamings. For cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers' structures."

ANNEX 2

REQUIREMENTS FOR THICKNESS MEASUREMENTS AT RENEWAL SURVEYS

5 < Age ≤ 10 years – Renewal Survey No.2

11 Paragraph 3 is replaced with the following:

"3 Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1/appendix 1 or annex 1/appendix 2 as applicable."

10 < Age ≤ 15 years – Renewal Survey No.3

12 Paragraph 3 is replaced with the following:

"3 Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1/appendix 1 or annex 1/appendix 2 as applicable."

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

13 Paragraph 1.5 is replaced with the following:

"1.5 **Thickness measurements and close-up surveys**

In any kind of survey, i.e. renewal, intermediate, annual or other surveys having the scope of the foregoing ones, for structures in areas where close-up surveys are required, thickness measurements, when required by annex 2, should be carried out simultaneously with close-up surveys."

14 Paragraph 2.5.6 is replaced with the following:

"2.5.6 In cases where two or three sections are to be measured, at least one should include a ballast tank within 0.5*L* amidships. In case of oil tankers of 130 m in length and upwards (as defined in the International Convention on Load Lines in force) and more than 10 years of age, for the evaluation of the ship's longitudinal strength as required in 8.1.2, the sampling method of thickness measurements is given in annex 12."

15 Paragraph 2.6.1.1 is replaced with the following:

".1 tank testing procedure, specifying fill heights, tanks being filled and bulkheads being tested, has been submitted by the owner and reviewed by the Administration or recognized organization prior to the testing being carried out;"

ANNEX 1

MINIMUM REQUIREMENTS FOR CLOSE-UP SURVEY AT RENEWAL SURVEY OF DOUBLE-HULL OIL TANKERS

16 Note (7) is replaced with the following:

"(7) Web frame in a cargo oil tank means deck transverse, longitudinal bulkhead structural elements and cross ties, where fitted, including adjacent structural members."

Part B

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS OTHER THAN DOUBLE-HULL OIL TANKERS

17 Paragraph 1.5 is replaced with the following:

"1.5 **Thickness measurements and close-up surveys**

In any kind of survey, i.e. renewal, intermediate, annual or other surveys having the scope of the foregoing ones, for structures in areas where close-up surveys are required, thickness measurements, when required by annex 2, should be carried out simultaneously with close-up surveys."

18 Paragraph 2.6.1.1 is replaced with the following:

".1 tank testing procedure, specifying fill heights, tanks being filled and bulkheads being tested, has been submitted by the owner and reviewed by the Administration or recognized organization prior to the testing being carried out;"

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ANNEX 5

RESOLUTION MSC.413(97)
(adopted on 25 November 2016)

AMENDMENTS TO THE INTRODUCTION AND PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS 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.267(85) by which it adopted the International Code on Intact Stability, 2008 ("2008 IS Code"),

NOTING the provisions regarding the procedure for amendments to the introduction and part A of the 2008 IS Code, stipulated in regulation II-1/2.27.1 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), as amended by resolution MSC.269(85),

RECOGNIZING the need to include provisions regarding ships engaged in anchor handling, lifting and towing operations, including escort towing, in the 2008 IS Code,

HAVING CONSIDERED, at its ninety-seventh session, the amendments to the introduction and part A of the 2008 IS 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 introduction and part A of the 2008 IS Code, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with Article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2019, 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 the Organization 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 2020 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General of the Organization, 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 of the Organization 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 INTRODUCTION AND PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE)

INTRODUCTION

1 Purpose

1 The chapeau of paragraph 1.2 is replaced with the following:

"1.2 Unless otherwise stated, this Code contains intact stability criteria applicable to ships and other marine vehicles of 24 m in length and above, as listed below. The Code also provides intact stability criteria applicable to the same ships and marine vehicles when engaged in certain operations:"

2 In paragraph 1.2, the following new subparagraphs .7 to .9 are inserted after the existing subparagraph .6:

".7 ships engaged in anchor handling operations;

.8 ships engaged in harbour, coastal or ocean-going towing operations and escort operations;

.9 ships engaged in lifting operations;"

and the remaining subparagraphs are renumbered accordingly.

2 Definitions

3 The following new paragraphs 2.27 to 2.31 are inserted after the existing paragraph 2.26:

"2.27 *Ship engaged in anchor handling operations* means a ship engaged in operations with deployment, recovering and repositioning of anchors and the associated mooring lines of rigs or other vessels. Forces associated with anchor handling are generally associated with the winch line pull and may include vertical, transverse, and longitudinal forces applied at the towing point and over the stern roller.

2.28 *Ship engaged in harbour towing* means a ship engaged in an operation intended for assisting ships or other floating structures within sheltered waters, normally while entering or leaving port and during berthing or unberthing operations.

2.29 *Ship engaged in coastal or ocean-going towing* means a ship engaged in an operation intended for assisting ships or other floating structures outside sheltered waters in which the forces associated with towing are often a function of the ship's bollard pull.*

2.30 *Ship engaged in lifting operation* means a ship engaged in an operation involving the raising or lowering of objects using vertical force by means of winches, cranes, a-frames or other lifting devices.**

2.31 *Ship engaged in escort operation* means a ship specifically engaged in steering, braking and otherwise controlling of the assisted ship during ordinary or emergency manoeuvring, whereby the steering and braking forces are generated by the hydrodynamic forces acting on the hull and appendages and the thrust forces exerted by the propulsion units (see also figure 1).

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* Refer to the *Guidelines for safe ocean towing* (MSC/Circ.884).

** Fishing vessels should not be included in the definition of lifting operations. Reference is made to paragraphs 2.1.2.2 and 2.1.2.8 of chapter 2 of part B. For anchor handling operations reference is made to section 2.7 of chapter 2 of part B."

PART A
MANDATORY CRITERIA

4 The following footnote is added to the existing title of chapter 2:

"* Paragraphs 3.4.1.8, 3.4.1.9, 3.6.4 and 3.6.5 in part B should only be considered as recommendations."

***

ANNEX 6

RESOLUTION MSC.414(97)
(adopted on 25 November 2016)

AMENDMENTS TO THE INTRODUCTION AND PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS 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.267(85) by which it adopted the International Code on Intact Stability, 2008 ("2008 IS Code"),

NOTING the provisions regarding the procedure for amendments to the introduction and part A of the 2008 IS Code, stipulated in paragraph (16).1 of regulation I/3 of the Protocol of 1988 relating to the International Convention on Load Lines, 1966 ("1988 Load Lines Protocol"), as amended by resolution MSC.270(85),

RECOGNIZING the need to include provisions regarding ships engaged in anchor handling, lifting and towing operations, including escort towing, in the 2008 IS Code,

HAVING CONSIDERED, at its ninety-seventh session, amendments to the introduction and part A of the 2008 IS Code, proposed and circulated in accordance with paragraph 2(a) of Article VI of the 1988 Load Lines Protocol,

1 ADOPTS, in accordance with paragraph 2(d) of Article VI of the 1988 Load Lines Protocol, amendments to the introduction and part A of the 2008 IS Code, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with paragraph 2(f)(ii)(bb) of Article VI of the 1988 Load Lines Protocol, that the said amendments shall be deemed to have been accepted on 1 July 2019, unless, prior to that date, more than one third of the Parties to the 1988 Load Lines Protocol, or Parties the combined merchant fleets of which constitute not less than 50% of all the merchant fleets of all Parties, have notified the Secretary-General of the Organization of their objections to the amendments;

3 INVITES Parties to the 1988 Load Lines Protocol to note that, in accordance with paragraph 2(g)(ii) of Article VI of the 1988 Load Lines Protocol, the amendments shall enter into force on 1 January 2020 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General of the Organization, for the purposes of paragraph 2(e) of Article VI of the 1988 Load Lines Protocol, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to the 1988 Load Lines Protocol;

5 REQUESTS ALSO the Secretary-General of the Organization to transmit copies of this resolution and its annex to Members of the Organization, which are not Parties to the 1988 Load Lines Protocol.

ANNEX

AMENDMENTS TO THE INTRODUCTION AND PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE)

INTRODUCTION

1 Purpose

1 The chapeau of paragraph 1.2 is replaced with the following:

"1.2 Unless otherwise stated, this Code contains intact stability criteria applicable to ships and other marine vehicles of 24 m in length and above, as listed below. The Code also provides intact stability criteria applicable to the same ships and marine vehicles when engaged in certain operations:"

2 In paragraph 1.2, the following new subparagraphs .7 to .9 are inserted after the existing subparagraph .6:

".7 ships engaged in anchor handling operations;

.8 ships engaged in harbour, coastal or ocean-going towing operations and escort operations;

.9 ships engaged in lifting operations;"

and the remaining subparagraphs are renumbered accordingly.

2 Definitions

3 The following new paragraphs 2.27 to 2.31 are inserted after the existing paragraph 2.26:

"2.27 *Ship engaged in anchor handling operations* means a ship engaged in operations with deployment, recovering and repositioning of anchors and the associated mooring lines of rigs or other vessels. Forces associated with anchor handling are generally associated with the winch line pull and may include vertical, transverse, and longitudinal forces applied at the towing point and over the stern roller.

2.28 *Ship engaged in harbour towing* means a ship engaged in an operation intended for assisting ships or other floating structures within sheltered waters, normally while entering or leaving port and during berthing or unberthing operations.

2.29 *Ship engaged in coastal or ocean-going towing* means a ship engaged in an operation intended for assisting ships or other floating structures outside sheltered waters in which the forces associated with towing are often a function of the ship's bollard pull.[*]

2.30 *Ship engaged in lifting operation* means a ship engaged in an operation involving the raising or lowering of objects using vertical force by means of winches, cranes, a-frames or other lifting devices.[**]

[*] Refer to the *Guidelines for safe ocean towing* (MSC/Circ.884).

[**] Fishing vessels should not be included in the definition of lifting operations. Reference is made to paragraphs 2.1.2.2 and 2.1.2.8 of chapter 2 of part B. For anchor handling operations reference is made to section 2.7 of chapter 2 of part B.

2.31 *Ship engaged in escort operation* means a ship specifically engaged in steering, braking and otherwise controlling of the assisted ship during ordinary or emergency manoeuvring, whereby the steering and braking forces are generated by the hydrodynamic forces acting on the hull and appendages and the thrust forces exerted by the propulsion units (see also figure 1)."

PART A
MANDATORY CRITERIA

4 The following footnote is added to the existing title of chapter 2:

"* Paragraphs 3.4.1.8, 3.4.1.9, 3.6.4 and 3.6.5 in part B should only be considered as recommendations."

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RESOLUTION MSC.415(97)
(adopted on 25 November 2016)
AMENDMENTS TO PART B OF THE INTERNATIONAL
CODE ON INTACT STABILITY, 2008 (2008 IS CODE)

ANNEX 7

RESOLUTION MSC.415(97)
(adopted on 25 November 2016)

AMENDMENTS TO PART B OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS 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.267(85) by which it adopted the International Code on Intact Stability, 2008 ("2008 IS Code"),

NOTING the provisions regarding the procedure for amendments to part B of the 2008 IS Code, stipulated in regulation II-1/2.27.2 of the International Convention for the Safety of Life at Sea, 1974 ("the SOLAS Convention"), as amended by resolution MSC.269(85), and in paragraph (16).2 of regulation I/3 of the Protocol of 1988 relating to the International Convention on Load Lines, 1966 ("1988 Load Lines Protocol"), as amended by resolution MSC.270(85),

RECOGNIZING the need to include provisions regarding ships engaged in anchor handling, lifting and towing operations, including escort towing, in the 2008 IS Code,

HAVING CONSIDERED, at its ninety-seventh session, the proposed amendments to part B of the 2008 IS Code, prepared by the Sub-Committee on Ship Design and Construction, at its second session,

1 ADOPTS amendments to part B of the 2008 IS Code, the text of which is set out in the annex to the present resolution;

2 RECOMMENDS Governments concerned to use the amendments to part B of the 2008 IS Code as a basis for relevant safety standards, unless their national stability requirements provide at least an equivalent degree of safety;

3 INVITES Contracting Governments to the SOLAS Convention and Parties to the 1988 Load Lines Protocol to note that the above amendments to the 2008 IS Code will take effect on 1 January 2020.

ANNEX

AMENDMENTS TO PART B OF THE 2008 IS CODE

1 The title of part B is replaced with the following text:

"**Part B**
Recommendations for ships engaged in certain types of operations, certain types of ships and additional guidelines"

Chapter 1 – General

1.2 Application

2 A new paragraph 1.2.2 is inserted after the existing paragraph 1.2.1 as follows:

"1.2.2 The recommendations contained herein may also apply to other ships subject to similar external forces, when determining the adequacy of stability."

and the existing paragraphs 1.2.2 and 1.2.3 are renumbered accordingly.

Chapter 2 – Recommended design criteria for certain types of ships

3 The title of chapter 2 is replaced with the following:

"**Recommended design criteria for ships engaged in certain types of operations and certain types of ships**"

4 Paragraph 2.4.3.4 is replaced with the following:

"2.4.3.4 A vessel engaged in towing operations should be provided with means for quick release of the towline.[*]

[*] Vessels provided with towing winch systems should also be provided with means of quick release."

5 The following new sections 2.7 to 2.9 are added after existing section 2.6:

"**2.7 Ships engaged in anchor handling operations**

2.7.1 Application

2.7.1.1 The provisions given hereunder apply to ships engaged in anchor handling operations.

2.7.1.2 A *wire* means a dedicated line (wire rope, synthetic rope or chain cable) used for the handling of anchors by means of an anchor handling winch.

2.7.2 Heeling levers

2.7.2.1 A heeling lever, HL_{φ}, generated by the action of a heeling moment caused by the vertical and horizontal components of the tension applied to the wire should be calculated as:

$$HL_{\varphi} = (M_{AH} / \Delta_2) \cos \varphi$$

where:

M_{AH} = $F_p \times (h \sin \alpha \times \cos \beta + y \times \sin \beta)$;

Δ_2 = displacement of a loading condition, including action of the vertical loads added (F_v), at the centreline in the stern of ship;

F_v = $F_p \times \sin \beta$;

α = the horizontal angle between the centreline and the vector at which the wire tension is applied to the ship in the upright position, positive outboard;

β = the vertical angle between the waterplane and the vector at which the wire tension is applied to the ship, positive downwards, should be taken at the maximum heeling moment angle as $\tan^{-1}(y / (h \times \sin \alpha))$, but not less than $\cos^{-1}(1.5\ B_P / (F_P \cos \alpha))$, using consistent units;

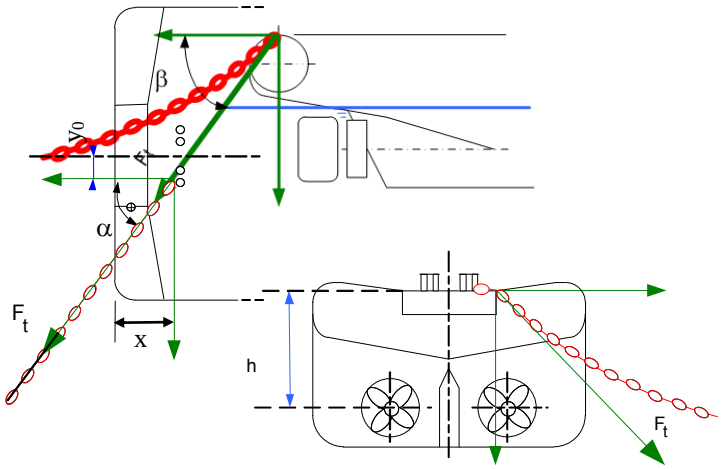


Figure 2.7-1 – Diagrams showing the intended meaning of parameters α, β, x, y and h. **F_t** ***shows the vector of the applied wire tension.***

B_P = the Bollard pull that is the documented maximum continuous pull obtained from a static pull test on sea trial, carried out in accordance with annex A of MSC/Circ.884 or an equivalent standard acceptable to the Administration;

F_p = (Permissible tension) the wire tension which can be applied to the ship as loaded while working through a specified tow pin set, at each α, for which all stability criteria can be met. F_p should in no circumstance be taken as greater than F_d;

F_d = (Design maximum wire tension) the maximum winch wire pull or maximum static winch brake holding force, whichever is greater;

h = the vertical distance (m) from the centre the propulsive force acts on the ship to either:

- the uppermost part at the towing pin, or
- a point on a line defined between the highest point of the winch pay-out and the top of the stern or any physical restriction of the transverse wire movement;

y = the transverse distance (m) from the centreline to the outboard point at which the wire tension is applied to the ship given by:

$y_0 + x \tan \alpha$; but not greater than $B/2$;

B = the moulded breadth (m);

y_0 = the transverse distance (m) between the ship centreline to the inner part of the towing pin or any physical restriction of the transverse wire movement;

x = the longitudinal distance (m) between the stern and the towing pin or any physical restriction of the transverse wire movement.

2.7.3 Permissible tension

2.7.3.1 The permissible tension as function of α, defined in paragraph 2.7.2, should not be greater than the tension given by paragraph 2.7.3.2,

2.7.3.2 Permissible tension as function of α can be calculated by direct stability calculations, provided that the following are met:

.1 the heeling lever should be taken as defined in paragraph 2.7.2 for each α;

.2 the stability criteria in paragraph 2.7.4, should be met;

.3 α should not be taken less than 5 degrees, except as permitted by paragraph 2.7.3.3; and

.4 Intervals of α should not be more than 5 degrees, except that larger intervals may be accepted, provided that the permissible tension is limited to the higher α by forming working sectors.

2.7.3.3 For the case of a planned operation to retrieve a stuck anchor in which the ship is on station above the anchor and the ship has low or no speed, α may be taken as less than 5 degrees.

2.7.4 Stability criteria

2.7.4.1 For the loading conditions intended for anchor handling, but before commencing the operation, the stability criteria given in paragraph 2.2 of part A, or where a ship's characteristics render compliance with paragraph 2.2 of part A impracticable, the equivalent stability criteria given in paragraph 2.4 of part B, should apply. During operation, under the action of the heeling moment, the criteria under paragraphs 2.7.4.2 to 2.7.4.4 should apply.

2.7.4.2 The residual area between the righting lever curve and the heeling lever curve calculated in accordance with paragraph 2.7.2 should not be less than 0.070 metre-radians. The area is determined from the first intersection of the two curves, φ_e, to the angle of the second intersection, φ_c, or the angle of down-flooding, φ_f, whichever is less.

2.7.4.3 The maximum residual righting lever GZ between the righting lever curve and the heeling lever curve calculated in accordance with paragraph 2.7.2 should be at least 0.2 m.

2.7.4.4 The static angle at the first intersection, φ_e, between the righting lever curve and the heeling lever curve calculated in accordance with paragraph 2.7.2 should not be greater than:

.1 the angle at which the righting lever equals 50% of the maximum righting lever;

.2 the deck edge immersion angle; or

.3 15º,

whichever is less.

2.7.4.5 A minimum freeboard at stern, on centreline, of at least 0.005*L* should be maintained in all operating conditions, with a displacement given by Δ_2, as defined in paragraph 2.7.2. In the case of the anchor retrieval operation covered by paragraph 2.7.3.3, a lower minimum freeboard may be accepted provided that due consideration has been given to this in the operation plan.

2.7.5 Constructional precautions against capsizing

2.7.5.1 A stability instrument may be used for determining the permissible tension and checking compliance with relevant stability criteria.

Two types of stability instrument may be used on board:

- either a software checking the intended or actual tension on the basis of the permissible tension curves; or

- a software performing direct stability calculations to check compliance with the relevant criteria, for a given loading condition (before application of the tension force), a given tension and a given wire position (defined by angles α and β).

2.7.5.2 Access to the machinery space, excluding emergency access and removal hatches, should, if possible, be arranged within the forecastle. Any access to the machinery space from the exposed cargo deck should be provided with two weathertight closures. Access to spaces below the exposed cargo deck should preferably be from a position within or above the superstructure deck.

2.7.5.3 The area of freeing ports in the side bulwarks of the cargo deck should at least meet the requirements of regulation 24 of the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto, as amended, as applicable. The disposition of the freeing ports should be carefully considered to ensure the most effective drainage of water trapped in working deck and in recesses at the after end of the forecastle. In ships operating in areas where icing is likely to occur, no shutters should be fitted in the freeing ports.

2.7.5.4 The winch systems should be provided with means of emergency release.

2.7.5.5 For ships engaged in anchor handling operations the following recommendations for the anchor handling arrangements should be considered:

.1 stop pins or other design features meant to impede the movement of the wire further outboard should be installed; and

.2 the working deck should be marked with contrasting colours or other identifiers such as guide pins, stop pins or similar easily identifiable points that identify operational zones for the line to aid operator observation.

2.7.6 Operational procedures against capsizing

2.7.6.1 A comprehensive operational plan should be defined for each anchor handling operation, according to the guidelines given in paragraph 3.8, where at least, but not only, the following procedures and emergency measures should be identified:

.1 environmental conditions for the operation;

.2 winch operations and movements of weights;

.3 compliance with the stability criteria, for the different expected loading conditions;

.4 permissible tensions on the winches as function of α; in accordance with paragraph 3.8;

.5 stop work and corrective procedures; and

.6 confirmation of the master's duty to take corrective action when necessary.

2.7.6.2 The arrangement of cargo stowed on deck should be such as to avoid any obstruction of the freeing ports or sudden shift of cargo on deck.

2.7.6.3 Counter-ballasting to correct the list of the ship during anchor handling operations should be avoided.

2.8 Ships engaged in towing and escort operations

2.8.1 Application

The provisions given hereunder apply to ships the keel of which is laid or which is at a similar stage of construction* on or after 1 January 2020 engaged in harbour towing, coastal or ocean-going towing and escort operations and to ships converted to carry out towing operations after this date.

* A similar stage of construction means the stage at which:
.1 construction identifiable with a specific ship begins; and
.2 assembly of that ship has commenced, comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

2.8.2 Heeling lever for towing operations

2.8.2.1 The self-tripping heeling lever is calculated as provided below:

.1 A transverse heeling moment is generated by the maximum transverse thrust exerted by the ship's propulsion and steering systems and the corresponding opposing towline pull.

.2 The heeling lever HL_φ, in (m), as a function of the heeling angle φ, should be calculated according to the following formula:

$$HL_\varphi = \frac{BP \times C_T \times (h \times \cos\varphi - r \times \sin\varphi)}{g \times \Delta}$$

where:

BP = bollard pull, in (kN), which is the documented maximum continuous pull obtained from a static bollard pull test performed in accordance with relevant IMO guidelines* or a standard acceptable to the Administration;

* Refer to annex A to the *Guidelines for safe ocean towing* (MSC/Circ.884).

C_T =
- 0.5,
for ships with conventional, non-azimuth propulsion units;

- $0.90/(1 + l/L_{LL})$,
for ships with azimuth propulsion units installed at a single point along the length. However, C_T should not be less than 0.7 for ships with azimuth stern drive towing over the stern or tractor tugs towing over the bow, and not less than 0.5 for ships with azimuth stern drive towing over the bow or tractor tugs towing over the stern;

For tugs with other propulsion and/or towing arrangements, the value of C_T is to be established on a case by case basis to the satisfaction of the Administration.

Δ = displacement, in (t);

l = longitudinal distance, in (m), between the towing point and the vertical centreline of the propulsion unit(s) relevant to the towing situation considered;

h = vertical distance, in (m), between the towing point and the horizontal centreline of the propulsion unit(s) as relevant for the towing situation considered;

g = gravitational acceleration, in (m/s^2), to be taken as 9.81;

r = the transverse distance, in (m), between the centre line and the towing point, to be taken as zero when the towing point is at the centre line.

L_{LL} = length (L) as defined in the International Convention on Load Lines in force.

The towing point is the location where the towline force is applied to the ship. The towing point may be a towing hook, staple, fairlead or equivalent fitting serving that purpose.

2.8.2.2 The tow-tripping heeling lever $HL\varphi$, in (m), is calculated according to the following formula:

$$HL_{\varphi} = C_1 \times C_2 \times \gamma \times V^2 \times A_P \times (h \times \cos\varphi - r \times \sin\varphi + C_3 \times d)/(2 \times g \times \Delta)$$

where:

C_1 = lateral traction coefficient = $2.8\left(\frac{L_s}{L_{pp}} - 0.1\right)$ $0.10 \le C_1 \le 1.00$

C_2 = correction of C_1 for angle of heel = $\left(\frac{\varphi}{3 \cdot \varphi_D} + 0.5\right)$ $C_2 \ge 1.00$

Angle to deck edge $\varphi_D = \arctan\left(\frac{2f}{B}\right)$

C_3 = distance from the centre of A_P to the waterline as fraction of the draught related to the heeling angle

$C_3 = \left(\frac{\varphi}{\varphi_D}\right) \times 0.26 + 0.30$ $0.50 \le C_3 \le 0.83$

γ = specific gravity of water, in (t/m^3);

V = lateral velocity, in (m/s), to be taken as 2.57 (5 knots);

A_P = lateral projected area, in (m^2), of the underwater hull;

r = the transverse distance, in (m), between the centre line and the towing point, to be taken as zero when the towing point is at the centre line;

L_S = the longitudinal distance, in (m), from the aft perpendicular to the towing point;

L_{PP}= length between perpendiculars, in (m);

φ = angle of heel;

f = freeboard amidship, in (m);

B = moulded breadth, in (m);

h = vertical distance, in (m), from the waterline to the towing point;

d = actual mean draught, in (m).

The towing point is the location where the towline force is applied to the ship. The towing point may be a towing hook, staple, fairlead or equivalent fitting serving that purpose.

2.8.3 Heeling lever for escort operations

2.8.3.1 For the evaluation of the stability particulars during escort operations the ship is considered to be in an equilibrium position determined by the combined action of the hydrodynamic forces acting on hull and appendages, the thrust force and the towline force as shown in figure 2.8-1.

2.8.3.2 For each equilibrium position the corresponding steering force, braking force, heel angle and heeling lever are to be obtained from the results of full scale trials, model tests, or numerical simulations in accordance with a methodology acceptable to the Administration.

2.8.3.3 For each relevant loading condition the evaluation of the equilibrium positions is to be performed over the applicable escort speed range, whereby the speed of the assisted ship through the water is to be considered.*

* The typical escort speed range is 6 to 10 knots.

2.8.3.4 For each relevant combination of loading condition and escort speed, the maximum heeling lever is to be used for the evaluation of the stability particulars.

2.8.3.5 For the purpose of stability calculations the heeling lever is to be taken as constant.

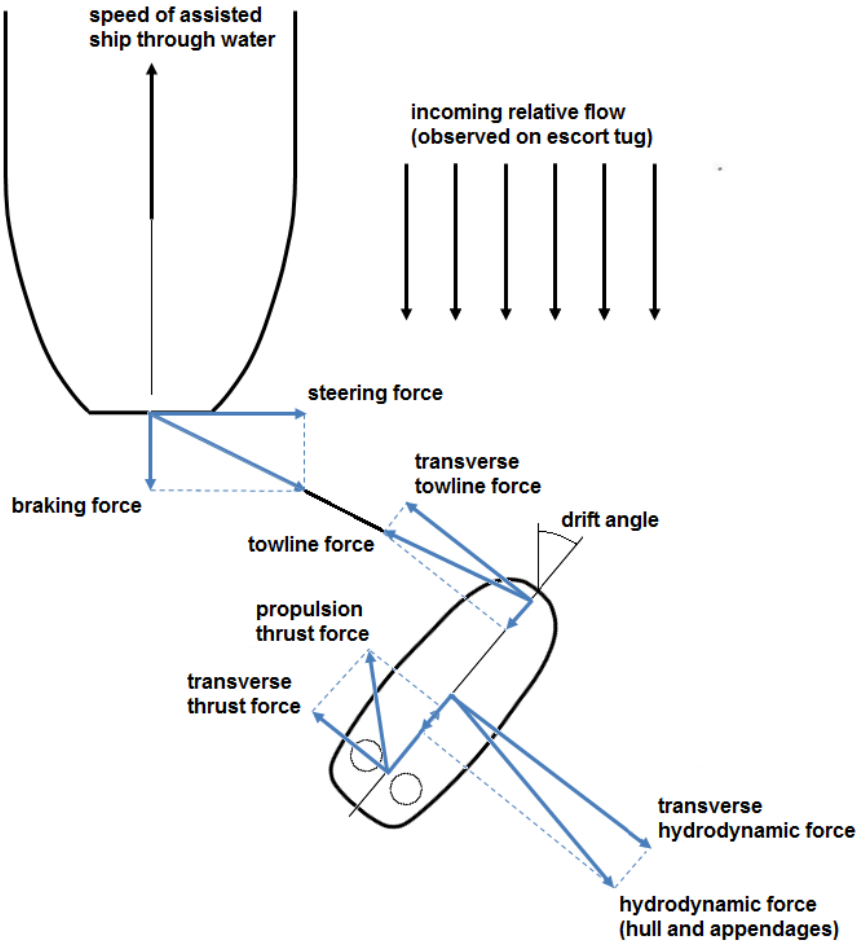


Figure 2.8-1: Escort tug equilibrium position

2.8.4 Stability criteria

2.8.4.1 In addition to the stability criteria given in part A, section 2.2, or the equivalent stability criteria given in chapter 4 of the explanatory notes to the 2008 IS Code where the ship's characteristics render compliance with part A, section 2.2 impracticable, the following stability criteria should be complied with.

2.8.4.2 For ships engaged in harbour, coastal or ocean-going towing operations the area A contained between the righting lever curve and the heeling lever curve calculated in accordance with paragraph 2.8.2.1 (self-tripping), measured from the heel angle, φ_e, to the angle of the second intersection, φ_c, or the angle of down-flooding, φ_f, whichever is less, should be greater than the area B contained between the heeling lever curve and the righting lever curve, measured from the heel angle φ = 0 to the heel angle, φ_e.

where:

φ_e = Angle of first intersection between the heeling lever and righting lever curves;

φ_f = Angle of down-flooding as defined in part A, paragraph 2.3.1.4 of this Code. Openings required to be fitted with weathertight closing devices under the ICLL but, for operational reasons, are required to be kept open should be considered as down-flooding points in stability calculation;

φ_c = Angle of second intersection between the heeling lever and righting lever curves.

2.8.4.3 For ships engaged in harbour, coastal or ocean-going towing operations the first intersection between the righting lever curve and the heeling lever curve calculated in accordance with paragraph 2.8.2.2 (tow-tripping) should occur at an angle of heel less than the angle of down-flooding, φf.

2.8.4.4 For ships engaged in escort operations the maximum heeling lever determined in accordance with paragraph 2.8.3 should comply with the following criteria:

.1 Area A ≥ 1.25 × Area B;

.2 Area C ≥ 1.40 × Area D; and

.3 φ_e ≤ 15 degrees.

where:

Area A = Righting lever curve area measured from the heel angle φ_e to a heel angle of 20 degrees (see figure 2.8-2);

Area B = Heeling lever curve area measured from the heeling angle φe to a heel angle of 20 degrees (see figure 2.8-2);

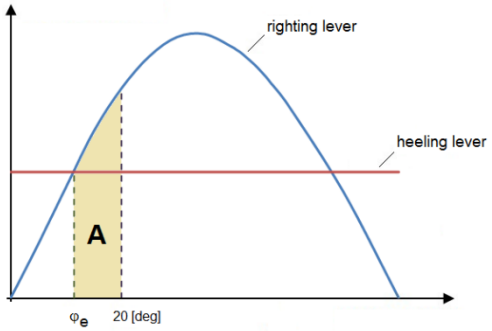
Area C = Righting lever curve area measured from the zero heel (φ = 0) to φ_d (see figure 2.8-3);

Area D = Heeling lever curve area measured from zero heel (φ = 0) to the heeling angle φ_d (see figure 2.8-3);

φ_e = Equilibrium heel angle corresponding to the first intersection between heeling lever curve and the righting lever curve;

φ_d = the heel angle corresponding to the second intersection between heeling lever curve and the righting lever curve or the angle of down-flooding or 40 degrees, whichever is less.

Figure 2.8-2: Areas A and B



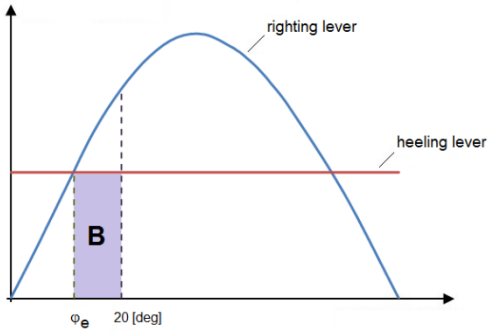
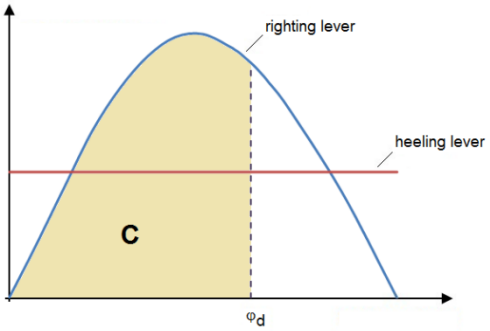
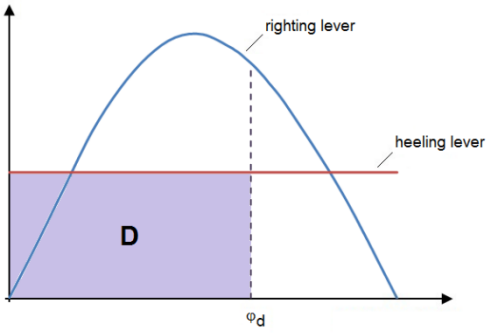


Figure 2.8-3: Areas C and D





2.8.5 Constructional precautions against capsizing

2.8.5.1 Access to the machinery space, excluding emergency access and removal hatches, should, if possible, be arranged within the forecastle. Any access to the machinery space from the exposed cargo deck should be provided with two weathertight closures, if practicable. Access to spaces below the exposed cargo deck should preferably be from a position within or above the superstructure deck.

2.8.5.2 The area of freeing ports in the side bulwarks of the cargo deck should at least meet the requirements of regulation 24 of the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto, as amended, as applicable. The disposition of the freeing ports should be carefully considered to ensure the most effective drainage of water trapped on the working deck and in recesses at the after end of the forecastle. In ships operating in areas where icing is likely to occur, no shutters should be fitted in the freeing ports.

2.8.5.3 A ship engaged in towing operations should be provided with means for quick release of the towline.*

* Ships provided with towing winch systems should also be provided with means of quick release.

2.8.6 Operational procedures against capsizing

2.8.6.1 The arrangement of cargo stowed on deck should be such as to avoid any obstruction of the freeing ports or sudden shift of cargo on deck. Cargo on deck, if any, should not interfere with the movement of the towline.

2.8.6.2 A minimum freeboard at stern of at least $0.005 \times L_{LL}$ should be maintained in all operating conditions.

2.9 Ships engaged in lifting operations

2.9.1 Application

2.9.1.1 The provisions given hereunder apply to ships the keel of which is laid or which is at a similar stage of construction* on or after 1 January 2020 engaged in lifting operations and to ships converted to carry out lifting operations after this date.

* A similar stage of construction means the stage at which:
.1 construction identifiable with a specific ship begins; and
.2 assembly of that ship has commenced, comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

2.9.1.2 The provisions of this section should be applied to operations involving the lifting of the ship's own structures or for lifts in which the maximum heeling moment due to the lift is greater than that given in the following:

$$M_L = 0.67 \cdot \Delta \cdot GM \cdot \left(\frac{f}{B} \right)$$

where:

M_L = Threshold value for the heeling moment, in (t.m), induced by the (lifting equipment and) load in the lifting equipment;

GM = The initial metacentric height, in (m), with free surface correction, including the effect of the (lifting equipment and) load in the lifting equipment;

f = the minimum freeboard, in (m), measured from the upper side of the weather deck to the waterline;

B = the moulded breadth of the ship, in (m); and

Δ = the displacement of the ship, including the lift load, in (t).

The provisions of this section also apply to ships which are engaged in lifting operations where no transverse heeling moment is induced and the increase of the ship's vertical centre of gravity (VCG) due to the lifted weight is greater than 1%.

The calculations should be completed at the most unfavourable loading conditions for which the lifting equipment shall be used.

2.9.1.3 For the purpose of this section, waters that are not exposed are those where the environmental impact on the lifting operation is negligible. Otherwise, waters are to be considered exposed. In general, waters that are not exposed are calm stretches of water, i.e. estuaries, roadsteads, bays, lagoons; where the wind fetch* is six nautical miles or less.

* Wind fetch is an unobstructed horizontal distance over which the wind can travel over water in a straight direction.

2.9.2 Load and vertical centre of gravity for different types of lifting operations

2.9.2.1 In lifting operations involving a lifting appliance consisting of a crane, derrick, sheerlegs, a-frame or similar:

.1 the magnitude of the vertical load (P_L) should be the maximum allowed static load at a given outreach of the lifting appliance;

.2 the transverse distance (y) is the transverse distance between the point at which the vertical load is applied to the lifting appliance and the ship centreline in the upright position;

.3 the vertical height of the load (KG_{load}) is taken as the vertical distance from the point at which the vertical load is applied to the lifting appliance to the baseline in the upright position; and

.4 the change of centre of gravity of the lifting appliance(s) need to be taken into account.

2.9.2.2 In lifting operations not involving a lifting appliance consisting of a crane, derrick, sheerlegs, a-frame or similar, which involve lifting of fully or partially submerged objects over rollers or strong points at or near a deck-level:

.1 the magnitude of the vertical load (P_L) should be the winch brake holding load;

.2 the transverse distance (y) is the transverse distance between the point at which the vertical load is applied to the ship and the ship centreline in the upright position; and

.3 the vertical height of the load (KG_{load}) is taken as the vertical distance from the point at which the vertical load is applied to the ship to the baseline in the upright position.

2.9.3 Stability criteria

2.9.3.1 The stability criteria included herein, or the criteria contained in paragraphs 2.9.4, 2.9.5 or 2.9.7, as applicable shall be satisfied for all loading conditions intended for lifting with the lifting appliance and its load at the most unfavourable positions. For the purpose of this section, the lifting appliance and its load(s) and their centre of gravity (COG) should be included in the displacement and centre of gravity of the ship, in which case no external heeling moment/heeling lever is applied.

2.9.3.2 All loading conditions utilized during the lifting operations are to comply with the stability criteria given in sections 2.2 and 2.3 of part A. Where the ship's characteristics render compliance with section 2.2 of part A impracticable, the equivalent stability criteria given in chapter 4 of the explanatory notes to the 2008 IS Code should apply. During the lifting operation, as determined by paragraphs 2.9.1, the following stability criteria should also apply:

.1 the equilibrium heel angle, φ_1, shall not be greater than the maximum static heeling angle for which the lifting device is designed and which has been considered in the approval of the loading gear;

.2 during lifting operations in non-exposed waters, the minimum distance between the water level and the highest continuous deck enclosing the watertight hull, taking into account trim and heel at any position along the length of the ship, shall not be less than 0.50 m; and

.3 during lifting operations in exposed waters, the residual freeboard shall not be less than 1.00 m or 75% of the highest significant wave height H_S, in (m), encountered during the operation, whichever is greater.

2.9.4 Lifting operations conducted under environmental and operational limitations

2.9.4.1 For lifting conditions carried out within clearly defined limitations set forth in paragraph 2.9.4.1.1, the intact criteria set forth in paragraph 2.9.4.1.2 may be applied instead of the criteria included in paragraph 2.9.3.

.1 The limits of the environmental conditions should specify at least the following:

- the maximum significant wave height, H_S; and
- the maximum wind speed (1 minute sustained at 10 m above sea level).

The limits of the operational conditions should specify at least the following:

- the maximum duration of the lift;
- limitations in ship speed; and
- limitations in traffic/traffic control.

.2 The following stability criteria should apply with the lifted load is at the most unfavourable position:

.1 the corner of the highest continuous deck enclosing the watertight hull shall not be submerged;

.2 $A_{RL} \geq 1.4 \times A_{HL}$

where:

A_{RL} = The area under the net righting lever curve, corrected for crane heeling moment and for the righting moment provided by the counter ballast if applicable, extending from the equilibrium heeling angle, φ_1, to the angle of down flooding, φ_F, the angle of vanishing stability, φ_R, or the second intersection of the righting lever curve with the wind heeling lever curve, whichever is less, see figure 2.9-1;

A_{HL} = The area below the wind heeling lever curve due to the wind force applied to the ship and the lift at the maximum wind speed specified in paragraph 2.9.4.1.1, see figure 2.9-1.

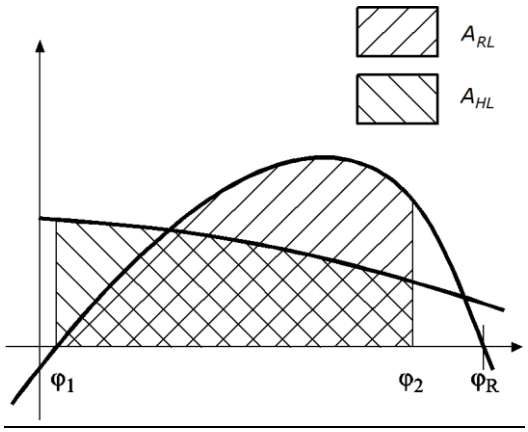


Figure 2.9-1 – Intact criteria under Environmental and Operational limitations

.3 The area under the net righting lever curve from the equilibrium heel angle, φ_1, to the down flooding angle φ_F, or 20°, whichever is less, shall be at least 0.03 m rad.

2.9.5 Sudden loss of hook load

2.9.5.1 A ship engaged in a lifting operation and using counter ballasting should be able to withstand the sudden loss of the hook load, considering the most unfavourable point at which the hook load may be applied to the ship (i.e. largest heeling moment). For this purpose, the area on the side of the ship opposite to the lift (Area 2) should be greater than the residual area on the side of the lift (Area 1), as shown in figure 2.9-2, by an amount given by the following:

Area 2 > 1.4 × Area 1, for lifting operations in waters that are exposed.

Area 2 > 1.0 × Area 1, for lifting operations in waters that are not exposed.

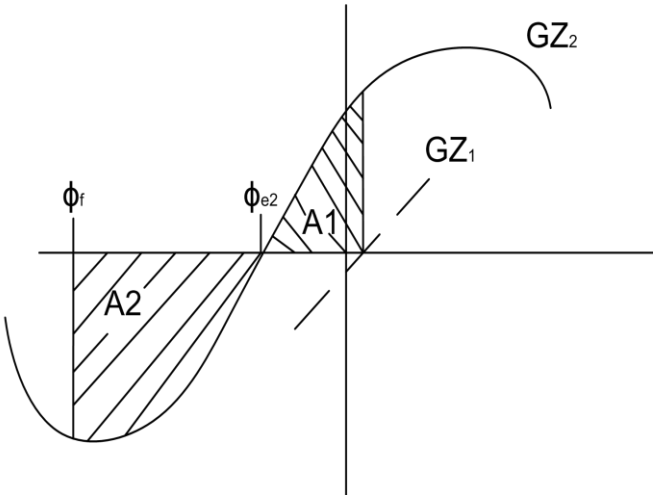


Figure 2.9-2

where:

GZ_1 = net righting lever (GZ) curve for the condition before loss of crane load, corrected for crane heeling moment and for the righting moment provided by the counter ballast if applicable;

GZ_2 = net righting lever (GZ) curve for the condition after loss of crane load, corrected for the transverse moment provided by the counter ballast if applicable;

φ_{e2} = the angle of static equilibrium after loss of crane load;

φ_f = the angle of down-flooding or the heel angle corresponding to the second intersection between heeling and righting arm curves, whichever is less; and

The term "net righting lever" means that the calculation of the GZ curve includes the ship's true transverse centre of gravity as function of the angle of heel.

2.9.6 Alternative method

2.9.6.1 The criteria in paragraph 2.9.6 may be applied to a ship engaged in a lifting operation, as determined by paragraph 2.9.1, as an alternative to the criteria in paragraph 2.9.3 through paragraph 2.9.5, as applicable. For the purpose of this section and the stability criteria set out in paragraph 2.9.7, the lifted load which causes the ship to heel is translated for the purpose of stability calculation to a heeling moment/heeling lever which is applied on the righting lever curve of the ship.

2.9.6.2 The heeling moment applied to the ship due to a lift and the associated heeling lever should be calculated using the following formulae:

$$HM_{\varphi} = P_L \cdot y \cdot \cos\varphi$$

$$HL_{\varphi} = HM_{\varphi} \div \Delta$$

where:

$HM\varphi$ = the heeling moment, in (t·m), due to the lift at φ;

P_L = the vertical load, in (t), of the lift, as defined in 2.9.2.1.1;

y = the transverse distance, in (m), of the lift, metres, as defined in 2.9.2.1.2;

φ = the angle of heel;

$HL\varphi$ = the heeling lever, in (m) due to the lift at φ; and

Δ = the displacement, in (t) of the ship with the load of the lift.

2.9.6.3 For application of the criteria contained in paragraph 2.9.7 involving the sudden loss of load of the lift in which counter-ballast is used, the heeling levers that include the counter-ballast should be calculated using the following formulae:

$$CHL_1 = \frac{\left(P_L \cdot y - CBM\right) \cdot \cos\varphi}{\Delta}$$

$$CBHL_2 = \frac{CBM \cdot \cos\varphi}{\left(\Delta - P_L\right)}$$

where:

CBM = the heeling moment, in (t·m), due to the counter-ballast;

CHL_1 = combined heeling lever, in (m), due to the load of the lift and the counter-ballast heeling moment at the displacement corresponding to the ship with the load of the lift; and

$CBHL_2$ = heeling lever, in (m), due to the counter-ballast heeling moment at the displacement corresponding to the ship without the load of the lift.

2.9.6.4 The equilibrium heel angle φ_e referred to in 2.9.7 means the angle of first intersection between the righting lever curve and the heeling lever curve.

2.9.7 Alternative stability criteria

2.9.7.1 For the loading conditions intended for lifting, but before commencing the operation, the stability criteria given in sections 2.2 and 2.3 of part A should be complied with. Where a ship's characteristics render compliance with section 2.2 of part A impracticable, the equivalent stability criteria given in chapter 4 of the explanatory notes to the 2008 IS Code should apply. During the lifting operation, as determined by paragraph 2.9.1, the following stability criteria should apply:

.1 the residual righting area below the righting lever and above the heeling lever curve between φ_e and the lesser of 40° or the angle of the maximum residual righting lever should not be less than:

0.080 m rad, if lifting operations are performed in waters that are exposed; or

0.053 m rad, if lifting operations are performed in waters that are not exposed;

.2 in addition, the equilibrium angle is to be limited to the lesser of the following:

.1 10 degrees;

.2 the angle of immersion of the highest continuous deck enclosing the watertight hull; or

.3 the lifting appliance allowable value of trim/heel (data to be derived from sidelead and offlead allowable values obtained from manufacturer).

2.9.7.2 A ship engaged in a lifting operation and using counter ballasting should be able to withstand the sudden loss of the hook load, considering the most unfavourable point at which the hook load may be applied to the ship (i.e. largest heeling moment). For this purpose, the area on the side of the ship opposite from the lift (Area 2) in figure 2.9-3 should be greater than the residual area on the side of the lift (Area 1) in figure 2.9-3 by an amount given by the following:

Area 2 – Area 1 > K,

where:

K = 0.037 m rad, for a lifting operation in waters that are exposed; and
K = 0.0 m rad, for a lifting operation in waters that are not exposed.

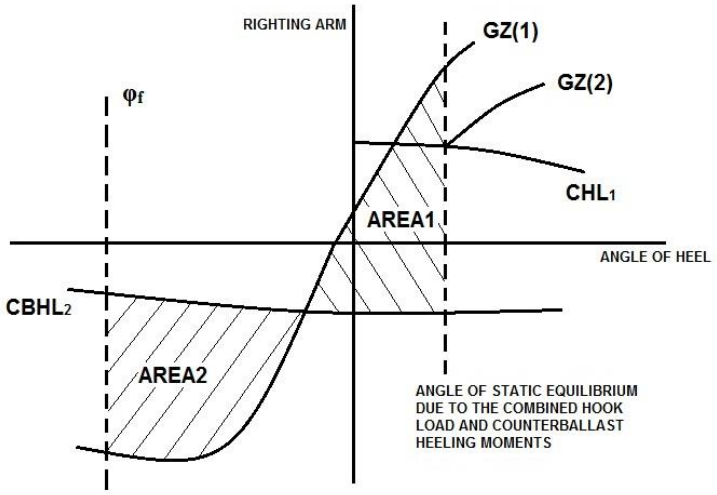


Figure 2.9-3

GZ(1) = The righting arm curve at the displacement corresponding to the ship without hook load;

GZ(2) = The righting arm curve at the displacement corresponding to the ship with hook load;

Area2 = residual area between GZ(1) and $CBHL_2$ up to the lesser of the down-flooding angle or the second intersection of GZ(2) and $CBHL_2$;

Area1 = residual area below GZ(1) and above $CBHL_2$ up to φ_e.

2.9.8 Model tests or direct calculations

2.9.8.1 Model tests or direct calculations, performed in accordance with a methodology acceptable to the Administration, that demonstrate the survivability of the ship after sudden loss of hook load, may be allowed as an alternative to complying with the requirements of paragraph 2.9.5 or 2.9.7.2, provided that:

.1 the effects of wind and waves are taken into account; and

.2 the maximum dynamic roll amplitude of the ship after loss of load will not cause immersion of unprotected openings.

2.9.9 Operational procedures against capsizing

2.9.9.1 Ships should avoid resonant roll conditions when engaged in lifting operations."

Chapter 3 – Guidance in preparing stability information

3.4 Standard conditions of loading to be examined

3.4.1 Loading conditions

6 The following new paragraphs 3.4.1.7 to 3.4.1.10 are added after existing paragraph 3.4.1.6:

"3.4.1.7 For a ship engaged in an anchor handling operation, the standard loading conditions should be as follows, in addition to the standard loading conditions for a cargo ship in paragraph 3.4.1.2:

.1 service loading condition at the maximum draught at which anchor handling operations may occur with the heeling levers as defined in paragraph 2.7.2 for the line tension the ship is capable of with a minimum of 67% stores and fuel, in which all the relevant stability criteria as defined in paragraph 2.7.4 are met;

.2 service loading condition at the minimum draught at which anchor handling operations may occur with the heeling levers as defined in paragraph 2.7.2 for the line tension the ship is capable of with 10% stores and fuel, in which all the relevant stability criteria as defined in paragraph 2.7.4 are met.

3.4.1.8 For a ship engaged in a harbour, coastal or ocean going towing operation and/or escort operation, the following loading conditions should be included in addition to the standard loading conditions for a cargo ship in paragraph 3.4.1.2:

.1 maximum operational draught at which towing or escorting operations are carried out, considering full stores and fuel;

.2 minimum operational draught at which towing or escorting operations are carried out, considering 10% stores and fuel; and

.3 intermediate condition with 50% stores and fuel.

3.4.1.9 For ships engaged in lifting, loading conditions reflecting the operational limitations of the ship, while engaged in lifting shall be included in the stability booklet. Use of counter ballast, if applicable, shall be clearly documented, and the adequacy of the ships stability in the event of the sudden loss of the hook load shall be demonstrated.

3.4.1.10 The criteria stated in paragraphs 2.9.3, 2.9.4, 2.9.5 or 2.9.7, as applicable, shall be satisfied for all loading conditions intended for lifting and with the hook load at the most unfavourable positions. For each loading condition, the weight and centre of gravity of the load being lifted, the lifting appliance, and counter ballast, if any, should be included. The most unfavourable position may be obtained from the load chart and is chosen at the position where the total of the transverse and vertical moment is the greatest. Additional loading conditions corresponding to various boom positions and counter ballast with different filling level (if applicable) may need to be checked."

3.4.2 Assumptions for calculating loading conditions

7 In paragraph 3.4.2.3, the following sentence is inserted at the end:

"If a ship operates in zones where ice accretion is likely to occur, allowance for icing should be made in accordance with the provisions of chapter 6 (Icing considerations)."

8 Subparagraph 3.4.2.7.5 is deleted.

9 Subparagraph 3.4.2.8.2 is deleted and the remaining subparagraphs are renumbered accordingly.

10 The following new paragraphs 3.4.2.9 to 3.4.2.11 are added as follows:

"3.4.2.9 For ships engaged in harbour, coastal or ocean going towing, escort towing, anchor handling or lifting operations, allowance should be made for the anticipated weight of cargo on and below deck, chain in lockers, anticipated type of wire or rope on storage reels and wire on the winches when calculating loading conditions.

3.4.2.10 For ships engaged in anchor handling operations, the compliance with the relevant stability criteria should be made for each set of towing pins and its associated permissible line tensions, including any physical element or arrangement that can restrict the line movement.

3.4.2.11 For ships engaged in anchor handling operations, the reference loading conditions in paragraph 3.4.1.8 should meet the stability criteria in paragraph 2.7.4 when applying the design tension F_d, for the tow pin set nearest to centreline, as a minimum for the lowest α equal to 5 degrees."

3.5 Calculation of stability curves

11 The following new section 3.5.4 is added after existing section 3.5.3:

"**3.5.4 Calculation of stability curves for ships engaged in anchor handling operations to which section 2.7 applies**

3.5.4.1 Curves (or tables) of the permissible tension as a function of permissible KG (or GM) are to be provided for the draught (or displacement) and trim values covering the intended anchor handling operations. The curves (or tables) should be developed under the following assumptions:

.1 the maximum allowable KG from the approved stability booklet;

.2 information of permissible tension curve or table for each set of towing pins, including any physical element or arrangement that can restrict the line movement as function of the stability limiting curve should be included;

.3 where desirable, a permissible tension curve or table should be provided for any specific loading condition;

.4 the draught (or displacement), trim and KG (or GM) to be taken into consideration are those before application of the tension; and

.5 where tables are provided that divide the operational, cautionary, and stop work zones, referred to in paragraph 3.8.2 ("Green", "Yellow" or "Amber", "Red" colour codes, respectively) the limiting angles associated with physical features of the stern, including the roller, may be used to define the boundaries between the operational and cautionary zones (green/yellow boundary) and the cautionary and stop work zones (yellow/red boundary)."

3.6 Stability booklet

12 The following new paragraphs 3.6.3 to 3.6.5 are inserted after existing paragraph 3.6.2:

"3.6.3 The stability manual for ships engaged in anchor handling operations should contain additional information on:

.1 maximum bollard pull, winch pull capacity and brake holding force;

.2 details on the anchor handling arrangement such as location of the fastening point of the wire, type and arrangement of towing pins, stern roller, all points or elements where the tension is applied to the ship;

.3 identification of critical downflooding openings;

.4 guidance on the permissible tensions for each mode of operation and for each set of towing pins, including any physical element or arrangement that can restrict the wire movement, as function of all relevant stability criteria; and

.5 recommendations on the use of roll reduction systems.

3.6.4 The stability booklet for ships engaged in harbour, coastal or ocean going towing operations and/or escort operations should contain additional information on:

.1 maximum bollard pull;

.2 details on the towing arrangement, including location and type of the towing point(s), such as towing hook, staple, fairlead or any other point serving that purpose;

.3 identification of critical down-flooding openings;

.4 recommendations on the use of roll reduction systems;

.5 if any wire, etc. is included as part of the lightship weight, clear guidance on the quantity and size should be given;

.6 maximum and minimum draught for towing and escort operations;

.7 instructions on the use of the quick-release device; and

.8 for ships engaged in escort operations, the following additional operating information should be included:

.1 a table with permissible limits of the heel angle in accordance with the criteria included in paragraph 2.7.3.4 as function of loading condition and escort speed; and

.2 instructions on the available means to limit the heel angle within the permissible limits.

3.6.5 For ships engaged in lifting operations, for which section 2.9 applies, additional documentation should be included in the stability booklet:

.1 maximum heeling moment for each direction of lift/inclination as a function of the counter-ballast heeling moment, if used, the draught, and vertical centre of gravity;

.2 where fixed counter ballast is used, the following information should be included:

.1 weight of the fixed counter ballast; and

.2 centre of gravity (LCG, TCG, VCG) of the fixed counter ballast;

.3 loading conditions over the range of draughts for which lifting operations may be conducted with the maximum vertical load of the lift. Where applicable, righting lever curves for both before and after load drop should be presented for each loading condition;

.4 limitations on crane operation, including permissible heeling angles, if provided;

.5 operational limitations, such as:

.1 Maximum Safe Working Load (SWL);

.2 maximum radius of operation of all derricks and lifting appliances;

.3 maximum load moment; and

.4 environmental condition affecting the stability of the ship;

.6 instructions related to normal crane operation, including those for use of counter ballast;

.7 instructions such as ballasting/de-ballasting procedures to righting the ship following an accidental load drop;

.8 identification of critical down-flooding openings;

.9 recommendations on the use of roll reduction systems;

.10 drawing of the crane showing the weight and centre of gravity, including heel/trim limitations established by the crane manufacturer;

.11 a crane load chart, with appropriate de-ratings for wave height;

.12 load chart for lifting operations covering the range of operational draughts related to lifting and including a summary of the stability results;

.13 a crane specification manual provided by the manufacturer shall be submitted separately for information;

.14 the lifting appliance load, radius, boom angle limit table, including identification of offlead and sidelead angle limits and slewing angle range limits and reference to the ship's centreline;

.15 a table that relates the ship trim and heel to the load, radius, slewing angle and limits, and the offlead and sidelead limits;

.16 procedures for calculating the offlead and sidelead angles and the ship VCG with the load applied;

.17 if installed, data associated with a Load Moment Indicator system and metrics included in the system;

.18 if lifting appliance (crane) offlead and sidelead determine the maximum ship equilibrium angle, the stability booklet should include a note identifying the lifting appliance as the stability limiting factor during lifting operations; and

.19 information regarding the deployment of (stability) pontoons to assist a lifting operation, if fitted.

The information in subparagraphs .2 to .19 above may be included in other ship specific documentation on board the ship. In that case, a reference to these documents shall be included in the stability booklet."

and the existing paragraphs 3.6.3, 3.6.4 and 3.6.5 are renumbered as paragraphs 3.6.6, 3.6.7 and 3.6.8 accordingly.

3.8 Operating booklets for certain ships

13 The following new sections 3.8 and 3.9 are inserted after existing section 3.7:

"**3.8 Operational and planning manuals for ships engaged in anchor handling for which section 2.7 applies:**

3.8.1 To assist the master an operational and planning manual containing guidelines for planning and performing specific operations should be provided on board. The guidelines should contain sufficient information to enable the master to plan and operate the ship in compliance with the applicable requirements contained in this Code. The following information should be included as appropriate:

.1 anchor handling arrangements, including:

- detail arrangement of anchor handling deck equipment (winches, wire stoppers, towing pins, etc.);
- typical arrangement of cargo on deck (anchors, wires, chain cables, etc.);
- chain lockers used for mooring deployment;
- anchor handling/towing winch;
- tugger winches;
- stern roller, including lateral limits on both ends;
- lifting appliances, if any and if forming a physical restriction as per paragraph 3.4.2.10; and
- typical paths of wires between winches and stern roller, showing the limit sectors; and

.2 detailed data of the permissible tensions, stability limiting curves, and recommendations for calculating ship's loading conditions including sample calculations.

3.8.2 An operation plan should be agreed to by the master of the ship and a copy archived on a remote location before the operation commences. Guidelines and procedures to define a step-wise operational plan for a specific operation should contain instructions for:

.1 identifying and calculating loading conditions for all relevant stages of operation, taken into account the expected fuel and stores consumption, alterations on deck load, effects of deployment or recovering of the wire on the winches and chain lockers;

.2 planning ballast operations;

.3 defining the most favourable consumption sequence and identifying the most onerous situations;

.4 identifying the possibility or prohibition of using the roll reduction systems in all operational stages;

.5 operation with open chain lockers, e.g. additional loading conditions for asymmetric filling or other measures to reduce the possibility of flooding;

.6 collect updated weather forecasts, and to define environmental conditions for anchor handling operations;

.7 the use of limiting stability curves and intended tensions;

.8 defining the stop work limits:

.a permissible tensions and operational sectors for α;

.b heeling angles in compliance with the stability criteria; and

.c environmental conditions;

.9 implement and define corrective and emergency procedures;

.10 define:

.a an operational zone in which normal operations up to the permissible tension are to occur (i.e. a "Green" zone);

.b a cautionary zone (i.e. a "Yellow" or "Amber" zone) where operations may be reduced or halted to assess the ship's options to return to the operational or Green Zone: the cautionary zone should be not less than an angle of 10 degrees unless table 3.8.3 provides otherwise; and

.c a "Stop work" zone (i.e. a "Red" zone) in which the operation should be stopped, for which, in normal operations, the yellow/red boundary should not exceed 45 degrees or the point at which the wire rises above the deck. Notwithstanding this, due consideration may be given to different operations from typical anchor handling operations where the planned operation ensures the safety of the ship; and

.11 examples of presentation of permissible tensions are presented in annex 3 to part B.

3.8.3 To aid the definition of permissible tensions and zones based on the availability of tension monitoring and an onboard stability instrument the following table is provided.

Table 3.8.3

Availability of Tension Monitoring and an onboard Stability Instrument	Tension monitoring is not available	Tension monitoring is available but no stability instrument is available	Both tension monitoring and a stability instrument is available
Permissible tension, F_p	Design Maximum Line Tension, F_p, in the operational zone.	F_p as described in Stability Booklet, the operational planning guidelines, or the specific operational plan.	F_p as calculated by the Stability Instrument for the actual loading condition.
Permissible table	First α should be 5°. The only permissible tension is the Design maximum wire	Tables may be prepared for different values of draft, trim, KG or	Tables or curves provided in the stability booklet may be used where F_p

Availability of Tension Monitoring and an onboard Stability Instrument	Tension monitoring is not available	Tension monitoring is available but no stability instrument is available	Both tension monitoring and a stability instrument is available
	Tension, F_d. Figures in the table will be F_d for α for which $F_p \geq F_d$. The cautionary zone would include positions where $F_d > F_p \geq$ maximum winch wire pull. The stop work zone is every other position where $F_p <$ the maximum winch wire pull. If criteria is not fulfilled at α = 5° anchor handling should not be performed without winch modification.	GM, or specific predefined loading conditions. Values in the table should range from α = 0 to α = 90º. A table should identify F_p at critical points and the table should be provided for each set of towing pins.	throughout the nonspecific operational zone exceeds the maximum anticipated wire tension; otherwise, tables or curves calculated for the actual loading condition must be developed.

Availability of Tension Monitoring and an onboard Stability Instrument	Tension monitoring is not available	Tension monitoring is available but no stability instrument is available	Both tension monitoring and a stability instrument is available
Zones	The operational zone should be defined as the sector between the two outboard α values for which $F_p \geq F_d$. The cautionary zone should be defined as the sector between the α at which $F_p = F_d$ and α at which F_p = maximum winch wire pull. The stop work zone should cover every other position. The sectors should be documented in the Stability Booklet, the operational planning guidelines, or the specific operational plan. The sector diagram may be prepared for multiple loading conditions. If the limiting α is less than 5° anchor handling operations should not be performed without winch modifications.	The zones may be developed based on normal operational practices contained in the operational planning guidelines, e.g. the operational zone on the stern roller, cautionary zone for not more than 15deg past the stern roller and the red zone otherwise or developed for a specific operation where the outboard α values at which F_p = maximum anticipated wire tension minus 10º defines the operational zone, if α is greater than 20º. If this α is less than 20º, the operational zone is defined as the sector between ½ the outboard α values at which F_p = maximum anticipated wire tension. In each case, the cautionary zone is defined between the limit of the operational zone and the α value at which F_p = maximum anticipated wire tension. In each case, the operational zone must be identified for the anticipated wire tension.	The zones may be developed based on normal operational practices contained in the operational planning guidelines, e.g. the operational zone on the stern roller, cautionary zone for not more than 15deg past the stern roller and the red zone otherwise or developed for a specific operation where the outboard α values at which F_p = maximum anticipated wire tension minus 10º defines the operational zone, if α is greater than 20º. If this α is less than 20º, the operational zone is defined as the sector between ½ the outboard α values at which F_p = maximum anticipated wire tension. In each case, the cautionary zone is defined between the limit of the operational zone and the α value at which F_p = maximum anticipated wire tension. In each case, the operational zone must be identified for the anticipated wire tension.

3.9 Operational and planning booklets for ships engaged in lifting for which section 2.9 applies

3.9.1 An operation plan should be agreed to by the Master of the ship and a copy archived on a remote location before the operation commences. To assist the master an operational and planning booklet containing guidelines for planning and performing specific operations should be provided on board.

3.9.2 The guidelines should contain sufficient information to enable the Master to plan and operate the ship in compliance with the applicable requirements contained in this Code. The following information should be included as appropriate:

.1 lifting arrangements, capabilities and procedures to operate the lifting systems; and

.2 detailed data concerning the ship's lifting capability, operational limitations, limitations of cargo capacities, stability limiting curves and recommendations for calculating ship's loading conditions including sample calculations.

3.9.3 Guidelines and procedures to define a step-wise operational plan for a specific operation should contain instructions for:

.1 identifying and calculating loading conditions for all relevant stages of operation, taking into account the alterations on deck load, effects of deployment or recovering of the line on the winches (in particular for deep water lifting);

.2 planning ballast or counter ballast operations;

.3 identifying the possibility to use the roll reduction systems in all operational stages;

.4 collecting latest weather forecasts in order to define the environmental conditions for the intended lifting operation;

.5 using limiting stability curves, if applicable;

.6 defining the stop work limits:

.1 heeling angles in compliance with the stability criteria; and

.2 environmental conditions; and

.7 defining and implementing corrective and emergency procedures."

and the existing section 3.8 is renumbered as section 3.10.

Chapter 4 – Stability calculations performed by stability instruments

4.1 Stability instruments

4.1.4 Functional requirements

14 The following new paragraph 4.1.4.2 is inserted after existing paragraph 4.1.4.1:

"4.1.4.2 For ships engaged in anchor handling operations planning tools should be provided in compliance with operational manual requirements. Information such as ballasting and consumables sequences, permissible tension, working sectors, heeling angles and use of roll-reduction devices should be stated."

and the existing paragraphs 4.1.4.2 to 4.1.4.7 are renumbered as 4.1.4.3 to 4.1.4.8 accordingly.

Part B – Annexes

15 A new annex 3 is added at the end of part B as follows:

"**Annex 3**

Recommended model for graphic or tabular presentation of permissible tensions for use in anchor handling operations.

The insertion of a recommended model for the presentation of permissible tensions as function of α might be beneficial for a universal information standard. This uniform presentation will facilitate the circulation and the familiarization of the operators with the ship and its equipment.

A possible graphic presentation of the permissible tension is here included as an example, both table and diagram format.

PERMISSIBLE WIRE TENSION TABLE FOR A SAMPLE AHTS

Trim (M)	-0.5	0.0	0.5	-0.5	0.0	0.5	-0.5	0.0	0.5	-0.5	0.0	0.5	-0.5	0.0	0.5	-0.5	0.0	0.5	-0.5	0.0	0.5
Angle α		0			10			20			30			45			60			90		
Draft (M)																					
Between the Centerline Towing Pins																					
4.8	700	700	700	700	700	690	625	580	540	460	460	435	290	290	290	190	190	190	165	165	165
5.8	700	700	700	700	700	690	655	600	550	430	485	435	285	285	310	190	180	200	170	165	170
6.8	700	635	520	700	635	520	645	575	510	550	485	415	355	355	305	230	240	220	200	205	200
Between the Outer Towing Pins																					
4.8	545	500	465	480	435	405	385	380	350	300	300	300	215	215	215	170	170	170	165	165	165
5.8	575	520	465	500	455	405	360	390	350	275	300	300	220	210	240	180	175	190	170	165	170
6.8	555	480	410	500	435	370	440	385	330	365	340	295	260	270	235	210	215	200	200	205	200
Towing Pin at the Edge of the Cargo Rail																					
4.8	280	280	270	260	260	260	235	235	235	215	215	215	180	180	180	170	170	170	160	160	160
5.8	255	290	280	240	260	265	230	235	250	210	200	235	190	180	200	175	170	180	165	160	165
6.8	345	310	270	320	300	260	290	285	245	260	270	230	220	230	210	205	210	200	195	200	195

Max Wire Pull: 600 t Max Brake Force: 700 t Max Dynamic Brake: 700 t Resulting Fd = 700 t

Trim is Negative by the bow. **Interpolate between drafts only. For trim between table values, use lower permissible tension.**	Permissible tensions shown are in Tonnes. Required tension should not exceed the winches capabilities or the values in the above table.
Table is for Planning and Monitoring AHTS operation. Specific loading conditions may be required for each anchor move.	If wire angle falls into the yellow zone, and wire tension exceeds the permissible value, corrective actions are required
Trim should be minimized or by bow for anchor moves where high wire tensions are expected.	If wire angle falls into the red zone, and the wire tension exceeds the permissible value, halt operations, reduce line tension
Wire angle (alpha α) is relative to vessel's centerline, and is assumed to always be outboard. If angle is exceeded, use next higher angle.	**If planned wire tension exceeds green values above, additional Calculations required. Operations should not be planned for high angles.**
Grey region indicates where the angle of tow wire is not geometrically possible. Permissible tensions are provided for reference only.	**Vessel loading must be in accordance with the approved stability book and include any assumed margins**

Figure A3-1: Permissible tension table for ship with 3 tow points

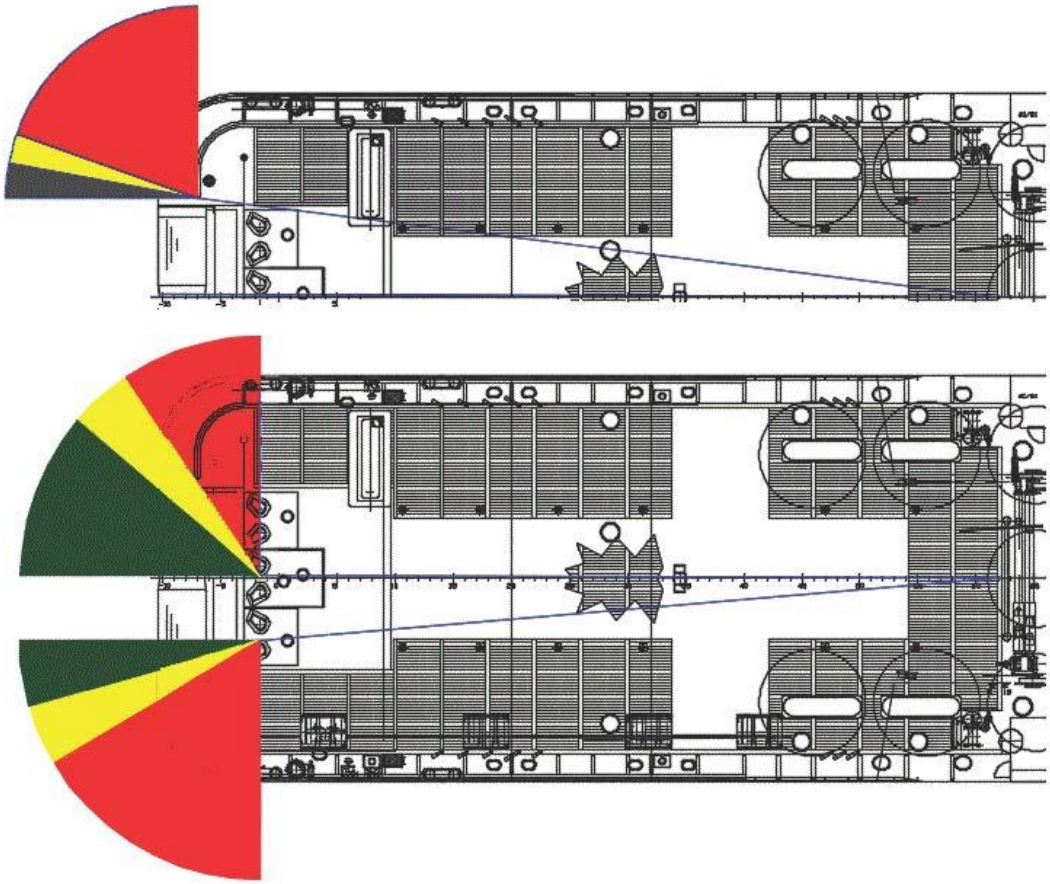


Figure A3-2: Illustration of the operational, cautionary, and stop work zones (coded respectively "Green", "Yellow" and "Red" zones)

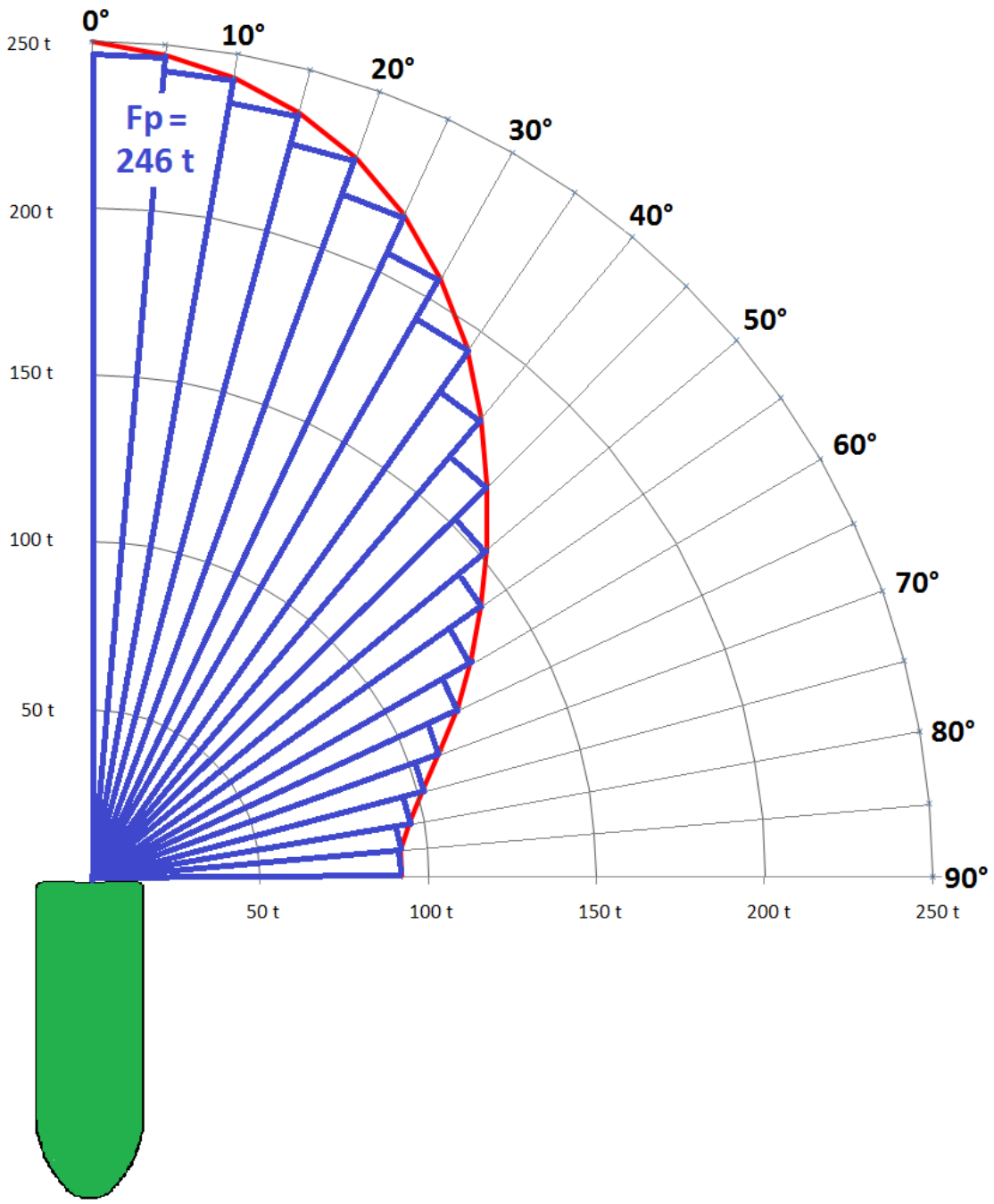


Figure A3-3: Permissible tension sector diagram based on standard alpha values (5°, 10°, 15°, 90°) "

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RESOLUTION MSC.415(97)
(adopted on 25 November 2016)
AMENDMENTS TO PART B OF THE INTERNATIONAL
CODE ON INTACT STABILITY, 2008 (2008 IS CODE)

ANNEX 8

RESOLUTION MSC.416(97)
(adopted on 25 November 2016)

AMENDMENTS TO THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS (STCW), 1978, 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 XII of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 ("the Convention"), concerning the procedures for amending the Convention,

RECALLING FURTHER that the Committee, by resolution MSC.386(94), adopted, inter alia, the new chapter XIV of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended,

ALSO RECALLING that the Committee, by resolution MSC.385(94), adopted the *International Code for Ships Operating in Polar Waters (Polar Code)*, which will take effect on 1 January 2017 upon entry into force of the new chapter XIV of the SOLAS Convention,

NOTING that there will be a transitional period between the entry into force of the Polar Code and the amendments to the STCW Convention, and that section B-V/g of the STCW Code provides guidance regarding the training of masters and officers for ships operating in polar waters which should be applied by Administrations during the transitional period,

ALSO RECALLING that the Committee, at its ninety-sixth session, decided to provide the Member States with a single resolution of amendments to the Convention, including those related to the Polar Code and to passenger ship-specific training and certification,

HAVING CONSIDERED, at its ninety-seventh 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 the said amendments shall be deemed to have been accepted on 1 January 2018, unless, prior to that date, more than one third of Parties or Parties the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant shipping of ships of 100 gross register tons or more, have notified the Secretary-General of the Organization of their objections to the amendments;

3 INVITES Parties to note that, in accordance with Article XII(1)(a)(ix) of the Convention, that the amendments annexed hereto shall enter into force on 1 July 2018 upon their acceptance, in accordance with paragraph 2 above;

4 URGES Parties to implement the amendments to regulation I/1.1, regulation I/11 and regulation V/4 at an early stage;

5 INVITES Parties to recognize seafarers' certificates issued by a Party at an early stage, in accordance with paragraph 4 above, and prior to the entry into force of amendments to regulation V/4;

6 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;

7 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

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

CHAPTER I

General provisions

1 In regulation I/1.1, the following new definitions are added:

".42 *Polar Code* means the International Code for Ships Operating in Polar Waters, as defined in SOLAS regulation XIV/1.1.

.43 *Polar waters* means Arctic waters and/or the Antarctic area, as defined in SOLAS regulations XIV/1.2 to XIV/1.4."

2 In regulation I/11, after the existing paragraph 3, the following new paragraph is inserted and the subsequent paragraphs are renumbered accordingly:

"4 Every master or officer shall, for continuing seagoing service on board ships operating in polar waters, meet the requirements of paragraph 1 of this regulation and be required, at intervals not exceeding five years, to establish continued professional competence for ships operating in polar waters in accordance with section A-1/11, paragraph 4 of the STCW Code."

CHAPTER V

Special training requirements for personnel on certain types of ships

3 In chapter V, the existing regulation V/2 is replaced by the following:

"**Regulation V/2**

Mandatory minimum requirements for the training and qualifications of masters, officers, ratings and other personnel on passenger ships

1 This regulation applies to masters, officers, ratings and other personnel serving on board passenger ships engaged on international voyages. Administrations shall determine the applicability of these requirements to personnel serving on passenger ships engaged on domestic voyages.

2 Before being assigned shipboard duties, all persons serving on a passenger ship shall meet the requirements of section A-VI/1, paragraph 1 of the STCW Code.

3 Masters, officers, ratings and other personnel serving on board passenger ships shall complete the training and familiarization required by paragraphs 5 to 9 below, in accordance with their capacity, duties and responsibilities.

4 Masters, officers, ratings and other personnel, who are required to be trained in accordance with paragraphs 7 to 9 below shall, at intervals not exceeding five years, undertake appropriate refresher training or be required to provide evidence of having achieved the required standard of competence within the previous five years.

5 Personnel serving on board passenger ships shall complete passenger ship emergency familiarization appropriate to their capacity, duties and responsibilities as specified in section A-V/2, paragraph 1 of the STCW Code.

6 Personnel providing direct service to passengers in passenger spaces on board passenger ships shall complete the safety training specified in section A-V/2, paragraph 2 of the STCW Code.

7 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, shall complete passenger ship crowd management training as specified in section A-V/2, paragraph 3 of the STCW Code.

8 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 shall complete approved training in crisis management and human behaviour as specified in section A-V/2, paragraph 4 of the STCW Code.

9 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, shall complete approved training in passenger safety, cargo safety and hull integrity as specified in section A-V/2, paragraph 5 of the STCW Code.

10 Administrations shall ensure that documentary evidence of the training which has been completed is issued to every person found qualified in accordance with paragraphs 6 to 9 of this regulation. "

4 In chapter V, the following new regulation is added:

"**Regulation V/4**

Mandatory minimum requirements for the training and qualifications of masters and deck officers on ships operating in polar waters

1 Masters, chief mates and officers in charge of a navigational watch on ships operating in polar waters shall hold a certificate in basic training for ships operating in polar waters, as required by the Polar Code.

2 Every candidate for a certificate in basic training for ships operating in polar waters shall have completed an approved basic training for ships operating in polar waters and meet the standard of competence specified in section A-V/4, paragraph 1, of the STCW Code.

3 Masters and chief mates on ships operating in polar waters, shall hold a certificate in advanced training for ships operating in polar waters, as required by the Polar Code.

4 Every candidate for a certificate in advanced training for ships operating in polar waters shall:

.1 meet the requirements for certification in basic training for ships in polar waters;

.2 have at least two (2) months of approved seagoing service in the deck department, at management level or while performing watchkeeping duties at the operational level, within polar waters or other equivalent approved seagoing service; and

.3 have completed approved advanced training for ships operating in polar waters and meet the standard of competence specified in section A-V/4, paragraph 2 of the STCW Code.

5 Administrations shall ensure that a Certificate of Proficiency is issued to seafarers who are qualified in accordance with paragraphs 2 or 4, as appropriate.

Transitional provisions

6 Until 1 July 2020, seafarers who commenced approved seagoing service in polar waters prior to 1 July 2018 shall be able to establish that they meet the requirements of paragraph 2 by:

.1 having completed approved seagoing service on board a ship operating in polar waters or equivalent approved seagoing service, performing duties in the deck department at the operational or management level, for a period of at least three months in total during the preceding five years; or

.2 having successfully completed a training course meeting the training guidance established by the Organization for ships operating in polar waters.*

7 Until 1 July 2020, seafarers who commenced approved seagoing service in polar waters prior to 1 July 2018 shall be able to establish that they meet the requirements of paragraph 4 by:

.1 having completed approved seagoing service on board a ship operating in polar waters or equivalent approved seagoing service, performing duties in the deck department at management level, for a period of at least three months in total during the preceding five years; or

.2 having successfully completed a training course meeting the training guidance established by the Organization for ships operating in polar waters* and having completed approved seagoing service on board a ship operating in polar waters or equivalent approved seagoing service, performing duties in the deck department at the management level, for a period of at least two months in total during the preceding five years."

***

* Refer to section B-V/g of the STCW Code.

RESOLUTION MSC.417(97)
(adopted on 25 November 2016)

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

NOTING that there will be a transitional period between the entry into force of the International Code for Ships Operating in Polar Waters (Polar Code), as adopted by resolution MSC.385(94), and the amendments to the STCW Convention, and that section B-V/g of the STCW Code provides guidance regarding the training of masters and officers for ships operating in polar waters which should be applied by Administrations during the transitional period,

HAVING CONSIDERED, at its ninety-seventh 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 the said amendments to the STCW Code shall be deemed to have been accepted on 1 January 2018, unless, prior to that date, more than one third of Parties or Parties the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant shipping of ships of 100 gross register tons or more, have notified 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 annexed amendments to the STCW Code shall enter into force on 1 July 2018 upon their acceptance in accordance with paragraph 2 above;

4 URGES Parties to implement the amendments to section A-I/11 and section A-V/4 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

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

CHAPTER I – General provisions

1 In section A-I/11, after the existing paragraph 3, a new paragraph 4 is added as follows:

"4 Continued professional competence for masters and officers on board ships operating in polar waters, as required under regulation I/11, shall be established by:

.1 approved seagoing service, performing functions appropriate to the certificate held, for a period of at least two months in total during the preceding five years; or

.2 having performed functions considered to be equivalent to the seagoing service required in paragraph 4.1; or

.3 passing an approved test; or

.4 successfully completing an approved training course or courses."

2 In section A-I/14, after existing paragraph 3, a new paragraph 4 is added as follows:

"4 Companies shall ensure that masters and officers on board their passenger ships shall have completed familiarization training to attain the abilities that are appropriate to the capacity to be filled and duties and responsibilities to be taken up, taking into account the guidance given in section B-I/14, paragraph 3 of this Code."

CHAPTER V – Standards regarding special training requirements for personnel on certain types of ships

3 In chapter V, the existing section A-V/2 is replaced by the following:

"**Section A-V/2**

Mandatory minimum requirements for the training and qualification of masters, officers, ratings and other personnel on passenger ships

Passenger ship emergency familiarization

1 Before being assigned to shipboard duties, all personnel serving on board passenger ships engaged on international voyages shall have attained the abilities that are appropriate to their duties and responsibilities as follows:

Contribute to the implementation of emergency plans, instructions and procedures

.1 Familiar with:

.1.1 general safety features aboard ship;

.1.2 location of essential safety and emergency equipment, including life-saving appliances;

.1.3 importance of personal conduct during an emergency; and

.1.4 restrictions on the use of elevators during emergencies.

Contribute to the effective communication with passengers during an emergency

.2 Ability to:

.2.1 communicate in the working language of the ship;

.2.2 non-verbally communicate safety information; and

.2.3 understand one of the languages in which emergency announcements may be broadcast on the ship during an emergency or drill.

Safety training for personnel providing direct service to passengers in passenger spaces

2 Before being assigned to shipboard duties, personnel providing direct service to passengers in passenger spaces shall receive the additional safety training required by regulation V/2, paragraph 6, that ensures at least the attainment of the abilities as follows:

Communication

.1 Ability to communicate with passengers during an emergency, taking into account:

.1.1 the language or languages appropriate to the principal nationalities of passengers carried on the particular route;

.1.2 the likelihood that an ability to use an elementary English vocabulary for basic instructions can provide a means of communicating with a passenger in need of assistance whether or not the passenger and crew member share a common language;

.1.3 the possible need to communicate during an emergency by some other means, such as by demonstration, or hand signals, or calling attention to the location of instructions, muster stations, life-saving devices or evacuation routes, when oral communication is impractical;

1.4 the extent to which complete safety instructions have been provided to passengers in their native language or languages; and

.1.5 the languages in which emergency announcements may be broadcast during an emergency or drill to convey critical guidance to passengers and to facilitate crew members in assisting passengers.

Loading and embarkation procedures

.1 Ability to apply properly the procedures established for the ship regarding:

.1.1 loading and discharging vehicles, rail cars and other cargo transport units, including related communications;

.1.2 lowering and hoisting ramps;

.1.3 setting up and stowing retractable vehicle decks; and

.1.4 embarking and disembarking passengers, with special attention to disabled persons and persons needing assistance.

Carriage of dangerous goods

.2 Ability to apply any special safeguards, procedures and requirements regarding the carriage of dangerous goods on board ro-ro passenger ships.

Securing cargoes

.3 Ability to:

.3.1 apply correctly the provisions of the Code of Safe Practice for Cargo Stowage and Securing to the vehicles, rail cars and other cargo transport units carried; and

.3.2 use properly the cargo-securing equipment and materials provided, taking into account their limitations.

Stability, trim and stress calculations

.4 Ability to:

.4.1 make proper use of the stability and stress information provided;

.4.2 calculate stability and trim for different conditions of loading, using the stability calculators or computer programs provided;

.4.3 calculate load factors for decks; and

.4.4 calculate the impact of ballast and fuel transfers on stability, trim and stress.

Life-saving appliances

.2 Ability to demonstrate to passengers the use of personal life-saving appliances.

Embarkation procedures

.3 Embarking and disembarking passengers, with special attention to disabled persons and persons needing assistance.

Passenger ship crowd management training

3 Before being assigned to shipboard duties, masters, officers, ratings qualified in accordance with chapters II, III and VII and personnel designated on the muster list to assist passengers in emergency situations shall:

.1 have successfully completed the crowd management training required by regulation V/2, paragraph 7, as set out in table A-V/2-1; and

.2 be required to provide evidence that the training has been completed in accordance with table A-V/2-1.

Crisis management and human behaviour training

4 Before being assigned to shipboard duties, masters, chief engineer officers, chief mates, second engineer officers and any person designated on the muster list as having responsibility for the safety of passengers in emergency situations shall:

.1 have successfully completed the approved crisis management and human behaviour training required by regulation V/2, paragraph 8, as set out in table A-V/2-2; and

.2 be required to provide evidence that the required standard of competence has been achieved in accordance with the methods and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-V/2-2.

Passenger safety, cargo safety and hull integrity training

5 Before being assigned to shipboard duties, 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 shall receive the passenger safety, cargo safety and hull integrity training required by regulation V/2, paragraph 9, that ensures at least attainment of the abilities that are appropriate to their duties and responsibilities as follows:

Opening, closing and securing hull openings

.5 Ability to:

.5.1 apply properly the procedures established for the ship regarding the opening, closing and securing of bow, stern and side doors and ramps and to correctly operate the associated systems; and

.5.2 conduct surveys on proper sealing.

Ro-ro deck atmosphere

.6 Ability to:

.6.1 use equipment, where carried, to monitor atmosphere in ro-ro spaces; and

.6.2 apply properly the procedures established for the ship for ventilation of ro-ro spaces during loading and discharging of vehicles, while on voyage and in emergencies.

Table A-V/2-1
Specification of minimum standard of competence in passenger ship crowd management training

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Contribute to the implementation of shipboard emergency plans and procedures to muster and evacuate passengers	Knowledge of the shipboard emergency plans, instructions and procedures related to the management and evacuation of passengers Knowledge of applicable crowd management techniques and relevant equipment to be used to assist passengers in an emergency situation Knowledge of muster lists and emergency instructions	Assessment of evidence obtained from training and/or instruction	Actions taken in case of an emergency are appropriate and comply with established procedures
Assist passengers *en route* to muster and embarkation stations	Ability to give clear reassuring orders Ability to manage passengers in corridors, staircases and passageways Understanding the importance of and having the ability to maintain escape routes clear of obstructions Knowledge of methods available for evacuation of disabled persons and persons needing special assistance Knowledge of methods of searching passenger accommodation and public spaces Ability to disembark passengers, with special attention to disabled persons and persons needing assistance Importance of effective mustering procedures, including: .1 the importance of keeping order; .2 the ability to use procedures for reducing and avoiding panic;	Assessment of evidence obtained from practical training and/or instruction	Actions taken conform with emergency plans, instructions and procedures Information given to individuals, emergency response teams and passengers is accurate, relevant and timely

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
	.3 the ability to use, where appropriate, passenger lists for evacuation counts; .4 the importance of passengers being suitably clothed as far as possible when mustering; and .5 the ability to check that the passengers have donned their life jackets correctly.		

Table A-V/2-2

Specification of minimum standard of competence in passenger ship crisis management and human behaviour

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Organize shipboard emergency procedures	Knowledge of: .1 the general design and layout of the ship .2 safety regulations .3 emergency plans and procedures The importance of the principles for the development of ship-specific emergency procedures, including: .1 the need for pre-planning and drills of shipboard emergency procedures .2 the need for all personnel to be aware of and adhere to pre-planned emergency procedures as carefully as possible in the event of an emergency situation	Assessment of evidence obtained from approved training, exercises with one or more prepared emergency plans and practical demonstration	The shipboard emergency procedures ensure a state of readiness to respond to emergency situations
Optimize the use of resources	Ability to optimize the use of resources, taking into account: .1 the possibility that resources available in an emergency may be limited .2 the need to make full use of personnel and equipment immediately available and, if necessary, to improvise Ability to organize realistic drills to maintain a state of readiness, taking into account lessons learnt from previous accidents involving passenger ships; debriefing after drills	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	Contingency plans optimize the use of available resources Allocation of tasks and responsibilities reflects the known competence of individuals Roles and responsibilities of teams and individuals are clearly defined

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Control response to emergencies	Ability to make an initial assessment and provide an effective response to emergency situations in accordance with established emergency procedures *Leadership skills* Ability to lead and direct others in emergency situations, including the need: .1 to set an example during emergency situations .2 to focus decision making, given the need to act quickly in an emergency .3 to motivate, encourage and reassure passengers and other personnel *Stress handling* Ability to identify the development of symptoms of excessive personal stress and those of other members of the ship's emergency team Understanding that stress generated by emergency situations can affect the performance of individuals and their ability to act on instructions and follow procedures	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	Procedures and actions are in accordance with established principles and plans for crisis management on board Objectives and strategy are appropriate to the nature of the emergency, take account of contingencies and make optimum use of available resources Actions of crew members contribute to maintaining order and control
Control passengers and other personnel during emergency situations	*Human behaviour and responses* Ability to control passengers and other personnel in emergency situations, including: .1 awareness of the general reaction patterns of passengers and other personnel in emergency situations, including the possibility that:	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	Actions of crew members contribute to maintaining order and control

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
	.1.1 generally it takes some time before people accept the fact that there is an emergency situation .1.2 some people may panic and not behave with a normal level of rationality, that their ability to comprehend may be impaired and they may not be as responsive to instructions as in non-emergency situations .2 awareness that passengers and other personnel may, inter alia: .2.1 start looking for relatives, friends and/or their belongings as a first reaction when something goes wrong .2.2 seek safety in their cabins or in other places on board where they think that they can escape danger .2.3 tend to move to the upper side when the ship is listing .3 appreciation of the possible problem of panic resulting from separating families		
Establish and maintain effective communications	Ability to establish and maintain effective communications, including: .1 the importance of clear and concise instructions and reports .2 the need to encourage an exchange of information with, and feedback from, passengers and other personnel	Assessment of evidence obtained from approved training, exercises and practical demonstration	Information from all available sources is obtained, evaluated and confirmed as quickly as possible and reviewed throughout the emergency Information given to individuals, emergency response teams and passengers is accurate, relevant and timely

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
	Ability to provide relevant information to passengers and other personnel during an emergency situation, to keep them apprised of the overall situation and to communicate any action required of them, taking into account: .1 the language or languages appropriate to the principal nationalities of passengers and other personnel carried on the particular route .2 the possible need to communicate during an emergency by some other means, such as by demonstration, or by hand signals or calling attention to the location of instructions, muster stations, life-saving devices or evacuation routes, when oral communication is impractical .3 the language in which emergency announcements may be broadcast during an emergency or drill to convey critical guidance to passengers and to facilitate crew members in assisting passengers		Information keeps passengers informed as to the nature of the emergency and the actions required of them

"

4 A new section A-V/4 is added as follows:

"Section A-V/4

Mandatory minimum requirements for the training and qualifications of masters and deck officers on ships operating in polar waters

Standard of competence

1 Every candidate for certification in basic training for ships operating in polar waters shall be required to:

.1 demonstrate the competence to undertake the tasks, duties and responsibilities listed in column 1 of table A-V/4-1; and

.2 provide evidence of having achieved:

.1 the minimum knowledge, understanding and proficiency listed in column 2 of table A-V/4-1; and

.2 the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-V/4-1.

2 Every candidate for certification in advanced training for ships operating in polar waters shall be required to:

.1 demonstrate the competence to undertake the tasks, duties and responsibilities listed in column 1 of table A-V/4-2; and

.2 provide evidence of having achieved:

.1 the minimum knowledge, understanding and proficiency listed in column 2 of table A-V/4-2; and

.2 the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-V/4-2.

Table A-V/4-1

Specification of minimum standard of competence in basic training for ships operating in polar waters

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Contribute to safe operation of vessels operating in polar waters	*Basic knowledge of ice characteristics and areas where different types of ice can be expected in the area of operation:* .1 ice physics, terms, formation, growth, ageing and stage of melt .2 ice types and concentrations .3 ice pressure and distribution .4 friction from snow covered ice .5 implications of spray-icing; danger of icing up; precautions to avoid icing up and options during icing up .6 ice regimes in different regions; significant differences between the Arctic and the Antarctic, first year and multiyear ice, sea ice and land ice .7 use of ice imagery to recognize consequences of rapid change in ice and weather conditions .8 knowledge of ice blink and water sky .9 knowledge of differential movement of icebergs and pack ice .10 knowledge of tides and currents in ice	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	Identification of ice properties and their characteristics of relevance for safe vessel operation Information obtained from ice information and publications is interpreted correctly and properly applied Use of visible and infrared satellite images Use of egg charts Coordination of meteorological and oceanographic data with ice data Measurements and observations of weather and ice conditions are accurate and appropriate for safe passage planning

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Methods for demonstrating competence	Column 4 Criteria for evaluating competence
	.11 knowledge of effect of wind and current on ice		
	Basic knowledge of vessel performance in ice and low air temperature: .1 vessel characteristics .2 vessel types, hull designs .3 engineering requirements for operating in ice .4 Ice strengthening requirements .5 limitations of ice-classes .6 winterization and preparedness of vessel, including deck and engine .7 low-temperature system performance .8 equipment and machinery limitation in ice condition and low air temperature .9 monitoring of ice pressure on hull .10 sea suction, water intake, superstructure insulation and special systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	Identification of vessel characteristics and limitations under different ice conditions and cold environmental impact Procedures are made for risk assessment before entering ice Awareness of fresh water ballast freezing in ballast tanks Actions are carried out in accordance with accepted principles and procedures to prepare the vessel and the crew for operations in ice and low air temperature Communications are clear, concise and effective at all times in a seamanlike manner
	Basic knowledge and ability to operate and manoeuvre a vessel in ice: .1 safe speed in the presence of ice and icebergs .2 ballast tank monitoring .3 cargo operations in polar waters	Examination and assessment of evidence obtained from one or more of the following:	Use Polar Code and Polar Water Operations Manual to correctly determine the recommended procedures to load/unload cargo and/or embark/disembark passengers in low temperatures, monitor ballast water

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
	.4 awareness of engine loads and cooling problems .5 safety procedures during ice transit	.1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	for icing, monitor engine temperatures, anchor watch concerns in ice, and transit near ice Interpretation and analysis of information from radar is in accordance with lookout procedures with special caution regarding identification of dangerous ice features Information obtained from navigational charts, including electronic charts, and publications is relevant, assessed, interpreted correctly and properly applied The primary method of position fixing is frequent and the most appropriate for the prevailing conditions and routing through ice Performance checks and tests of navigation and communication systems comply with recommendations for high latitude and low air temperature operation

Column 1 **Competence**	Column 2 **Knowledge, understanding and proficiency**	Column 3 **Methods for demonstrating competence**	Column 4 **Criteria for evaluating competence**
Monitor and ensure compliance with legislative requirements	*Basic knowledge of regulatory considerations:* .1 Antarctic Treaty and the Polar Code .2 accident reports concerning vessels in polar waters .3 IMO standards for operation in remote areas	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	Locate and apply relevant parts of the Polar Water Operations Manual Communication is in accordance with local/regional and international standard procedures Legislative requirements related to relevant regulations, codes and practices are identified
Apply safe working practices, respond to emergencies	*Basic knowledge of crew preparation, working conditions and safety:* .1 recognize limitations of search and rescue readiness and responsibility, including sea area A4 and its SAR communication facility limitation .2 awareness of contingency planning .3 how to establish and implement safe working procedures for crew specific to polar environments such as low temperatures, ice-covered surfaces, personal protective equipment, use of buddy system, and working time limitations .4 recognize dangers when crews are exposed to low temperatures	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	Identification and initial actions on becoming aware of hazardous situations for vessel and individual crew members Actions are carried out in accordance with Polar Water Operations Manual, accepted principles and procedures to ensure safety of operations and to avoid pollution of the marine environment Safe working practices are observed and appropriate safety and protective equipment is correctly used at all times Response actions are in accordance with established plans and are appropriate to the situation and nature of the emergency

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
	.5 human factors including cold fatigue, medical-first aid aspects, crew welfare .6 survival requirements including the use of personal survival equipment and group survival equipment .7 awareness of the most common hull and equipment damages and how to avoid these .8 superstructure-deck icing, including effect on stability and trim .9 prevention and removal of ice including the factors of accretion .10 recognize fatigue problems due to noise and vibrations .11 identify need for extra resources, such as bunker, food and extra clothing		Correctly identifies and applies legislative requirements related to relevant regulations, codes and practices Appropriate safety and protective equipment is correctly used Defects and damages are detected and properly reported

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure compliance with pollution-prevention requirements and prevent environmental hazards	*Basic knowledge of environmental factors and regulations:* .1 identify particularly sensitive sea areas regarding discharge .2 identify areas where shipping is prohibited or should be avoided .3 special areas defined in MARPOL .4 recognize limitations of oil-spill equipment .5 plan for coping with increased volumes of garbage, bilge water, sewage, etc. .6 lack of infrastructure .7 oil spill and pollution in ice, including consequences	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	Legislative requirements related to relevant regulations, codes and practices are identified Correctly identify/select the limitations on vessel discharges contained in the Polar Code Correctly apply Polar Water Operations Manual/Waste Management Plan to determine limitations on vessel discharges and plans for storing waste Identify references that provide details of areas to be avoided, such as wildlife refuges, ecological heritage parks, migratory pathways, etc. (MARPOL, Antarctic Treaty, etc.) Identify factors that must be considered to manage waste stream during polar voyages

Table A-V/4-2
Specification of minimum standard of competence in advanced training for ships operating in polar waters

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Plan and conduct a voyage in polar waters	*Knowledge of voyage planning and reporting:* .1 information sources .2 reporting regimes in polar waters .3 development of safe routeing and passage planning to avoid ice where possible .4 ability to recognize the limitations of hydrographic information and charts in polar regions and whether the information is suitable for safe navigation .5 passage planning deviation and modification for dynamic ice conditions *Knowledge of equipment limitations:* .1 understand and identify hazards associated with limited terrestrial navigational aids in polar regions .2 understand and recognize high latitude errors on compasses .3 understand and identify limitations in discrimination of radar targets	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	The equipment, charts and nautical publications required for the voyage are enumerated and appropriate to the safe conduct of the voyage The reasons for the planned route are supported by facts obtained from relevant sources and publications, statistical data and limitations of communication and navigational systems Voyage plan correctly identified relevant polar regulatory regimes and need for ice-pilotage and/or icebreaker assistance All potential navigational hazards are accurately identified Positions, courses, distances and time calculations are correct within accepted accuracy standards for navigational equipment

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Methods for demonstrating competence	Column 4 Criteria for evaluating competence
	and ice features in ice-clutter .4 understand and recognize limitations of electronic positioning systems at high latitude .5 understand and recognize limitations in nautical charts and pilot descriptions .6 understand and recognize limitations in communication systems		
Manage the safe operation of vessels operating in polar waters	*Knowledge and ability to operate and manoeuvre a vessel in ice:* .1 preparation and risk assessment before approaching ice, including presence of icebergs, and taking into account wind, darkness, swell, fog and pressure ice .2 conduct communications with an icebreaker and other vessels in the area and with Rescue Coordination Centres .3 understand and describe the conditions for the safe entry and exit to and from ice or open water, such as leads or cracks, avoiding icebergs and dangerous ice conditions and maintaining safe distance to icebergs	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	All decisions concerning navigating in ice are based on a proper assessment of the ship's manoeuvring and engine characteristics and the forces to be expected while navigating within polar waters Demonstrate communication skills, request ice routeing, plot and commence voyage through ice All potential ice hazards are correctly identified All decisions concerning berthing anchoring, cargo and ballast operations are based on a proper assessment of the ship's manoeuvring and engine

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
	.4 understand and describe ice-ramming procedures including double and single ramming passage .5 recognize and determine the need for bridge watch team augmentation based upon environmental conditions, vessel equipment and vessel ice class .6 recognize the presentations of the various ice conditions as they appear on radar .7 understand icebreaker convoy terminology, and communications, and take icebreaker direction and move in convoy .8 understand methods to avoid besetment and to free beset vessel, and consequences of besetment .9 understand towing and rescue in ice, including risks associated with operation .10 handling ship in various ice concentration and coverage, including risks associated with navigation in ice, e.g. avoid turning and		characteristics and the forces to be expected and in accordance with the Polar Code guidelines and applicable international agreements Safely demonstrate progression of a vessel through ice, manoeuvring vessel through moderate ice concentration (range of 1/10 to 5/10) Safely demonstrate progression of a vessel through ice, manoeuvring vessel through dense ice concentration (range of 6/10 to 10/10) Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operation and to avoid pollution of the marine environment Safety of navigation is maintained through navigation strategy and adjustment of ship's speed and heading through different types of ice Actions are understood to permit use of anchoring system

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Methods for demonstrating competence	Column 4 Criteria for evaluating competence
	backing simultaneously .11 use of different type of propulsion and rudder systems, including limitations to avoid damage when operating in ice .12 use of heeling and trim systems, hazards in connection with ballast and trim in relation with ice .13 docking and undocking in ice-covered waters, including hazards associated with operation and the various techniques to safely dock and undock in ice-covered waters .14 anchoring in ice, including the dangers to anchoring system – ice accretion to hawse pipe and ground tackle .15 recognize conditions which impact polar visibility and may give indication of local ice and water conditions, including sea smoke, water sky, ice blink and refraction		in cold temperatures Actions are carried out in accordance with accepted principles and procedures to prepare for icebreaker towing, including notch towing
Maintain safety of the ship's crew and passengers and the operational	*Knowledge of safety:* .1 understand the procedures and techniques for	Examination and assessment of evidence obtained from one or more of the following:	Response measures are in accordance with established plans and procedures, and are

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
condition of life-saving, firefighting and other safety systems	abandoning the ship and survival on ice and in ice-covered waters .2 recognize limitations of fire-fighting systems and life-saving appliances due to low air temperatures .3 understand unique concerns in conducting emergency drills in ice and low temperatures .4 understand unique concerns in conducting emergency response in ice and low air and water temperatures	.1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	appropriate to the situation and nature of the emergency

RESOLUTION MSC.418(97)
(adopted on 25 November 2016)
INTERIM RECOMMENDATIONS ON THE SAFE CARRIAGE OF MORE THAN 12 INDUSTRIAL PERSONNEL ON BOARD VESSELS ENGAGED ON INTERNATIONAL VOYAGES

ANNEX 11

RESOLUTION MSC.418(97)
(adopted on 25 November 2016)

INTERIM RECOMMENDATIONS ON THE SAFE CARRIAGE OF MORE THAN 12 INDUSTRIAL PERSONNEL ON BOARD VESSELS ENGAGED ON INTERNATIONAL VOYAGES

THE MARITIME SAFETY COMMITTEE,

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

RECOGNIZING that increasing numbers of offshore projects and innovations are creating new and growing demand for the carriage of industrial personnel to and from offshore facilities and/or other ships,

RECOGNIZING ALSO that, with regard to offshore wind farm service vessels for the carriage of construction and maintenance personnel, difficulties are reported caused by the lack of a clear definition for industrial personnel and the lack of legally binding international safety standards for the carriage of more than 12 industrial personnel on board in the existing instruments,

RECOGNIZING FURTHER that the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, currently does not define industrial personnel and that an interim solution is urgently required,

NOTING that the Maritime Safety Committee, at its ninety-sixth session, decided to develop a mandatory instrument for the carriage of industrial personnel so that such personnel should not be considered or treated as passengers under SOLAS regulation I/2(e),

RECOGNIZING the urgent need for Member States to ensure the safe carriage of more than 12 industrial personnel on board vessels engaged on international voyages while the mandatory instrument is developed by the Organization,

HAVING CONSIDERED, at its ninety-seventh session, the *Interim Recommendations on the safe carriage of more than 12 industrial personnel on board vessels engaged on international voyages*,

1 ADOPTS the *Interim Recommendations on the safe carriage of more than 12 industrial personnel on board vessels engaged on international voyages*, the text of which is set out in the annex to the present resolution;

2 INVITES Member States, until such time that the mandatory instrument for the carriage of industrial personnel enters into force, to:

.1 note that industrial personnel should not be considered or treated as passengers under SOLAS regulation I/2(e); and

.2 apply the annexed Interim Recommendations when regulating ships, regardless of size, carrying more than 12 industrial personnel.

3 INVITES ALSO Member States to bring this to the attention of all parties concerned.

ANNEX

INTERIM RECOMMENDATIONS ON THE SAFE CARRIAGE OF MORE THAN 12 INDUSTRIAL PERSONNEL ON BOARD VESSELS ENGAGED ON INTERNATIONAL VOYAGES

1 For the purposes of these Interim Recommendations, *industrial personnel* means all persons who are transported or accommodated on board for the purpose of offshore industrial activities performed on board other vessels and/or other offshore facilities and meet the criteria set out below.

2 Such industrial personnel should not be considered or treated as passengers under SOLAS regulation I/2(e).

3 *Offshore industrial activities* are the construction, maintenance, operation or servicing of offshore facilities related, but not limited, to exploration, the renewable or hydrocarbon energy sectors, aquaculture, ocean mining or similar activities.

4 For the purpose of these Interim Recommendations, all industrial personnel should:

.1 be not less than 16 years of age;

.2 prior to boarding the ship, receive appropriate safety training, meeting the standard in paragraph 2.1 of section A-VI/1 of the STCW Code. Administrations may accept other industrial training standards such as those of the Global Wind Organisation (GWO), Offshore Petroleum Industry Training Organisation (OPITO), Basic Offshore Safety Induction and Emergency Training (OPITO accredited), if they consider these appropriate alternatives;

.3 receive on board ship specific safety familiarization that includes, but is not limited to, the layout of the ship, and handling of the safety equipment, as appropriate. The standard in paragraph 1 of section A-VI/1 of the STCW Code, or equivalent, should be used as the standard;

.4 be familiarized with specific procedures, e.g. transfer procedures on and off the ship while at sea, as appropriate;

.5.1 be accounted for in the ship's life-saving equipment; and

.5.2 be equipped with personal protective clothing and equipment suitable for the safety risks to be encountered both while on board the ship and being transferred at sea; and

.6 meet appropriate medical standards. The standard in section A-I/9 of the STCW Code, applicable to engineers, or equivalent, may be used as a standard.

5 IMO guidance (MSC-MEPC.7/Circ.10) or relevant industry standards should be taken into account, to the extent possible, when transferring industrial personnel at sea.

6 Industrial personnel may be carried on board ships meeting the provisions of the 2008 SPS Code or other standards, providing they meet an equivalent level of safety acceptable to the Administration, taking into consideration the number of persons on board.

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RESOLUTION MSC.418(97)
(adopted on 25 November 2016)
INTERIM RECOMMENDATIONS ON THE SAFE CARRIAGE OF MORE THAN 12 INDUSTRIAL PERSONNEL ON BOARD VESSELS ENGAGED ON INTERNATIONAL VOYAGES

RESOLUTION MSC.408(96)
(adopted on 13 May 2016)
AMENDMENTS TO CHAPTER 2 OF THE CODE OF SAFETY FOR
SPECIAL PURPOSE SHIPS, 2008 (2008 SPS CODE)

RESOLUTION MSC.408(96)
(adopted on 13 May 2016)
AMENDMENTS TO CHAPTER 2 OF THE CODE OF SAFETY FOR
SPECIAL PURPOSE SHIPS, 2008 (2008 SPS CODE)

RESOLUTION MSC.415(97)
(adopted on 25 November 2016)
AMENDMENTS TO PART B OF THE INTERNATIONAL
CODE ON INTACT STABILITY, 2008 (2008 IS CODE)

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RESOLUTION MSC.418(97)
(adopted on 25 November 2016)
INTERIM RECOMMENDATIONS ON THE SAFE CARRIAGE OF MORE THAN 12 INDUSTRIAL PERSONNEL ON BOARD VESSELS ENGAGED ON INTERNATIONAL VOYAGES

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INTERIM RECOMMENDATIONS ON THE SAFE CARRIAGE OF MORE THAN 12 INDUSTRIAL PERSONNEL ON BOARD VESSELS ENGAGED ON INTERNATIONAL VOYAGES

RESOLUTION MSC.419(97)
(adopted on 25 November 2016)
AMENDMENTS TO THE GENERAL PROVISIONS ON SHIPS' ROUTEING
(RESOLUTION A.572(14), AS AMENDED)

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(RESOLUTION A.572(14), AS AMENDED)

ANNEX 12

RESOLUTION MSC.419(97)
(adopted on 25 November 2016)

AMENDMENTS TO THE GENERAL PROVISIONS ON SHIPS' ROUTEING (RESOLUTION A.572(14), AS AMENDED)

THE MARITIME SAFETY COMMITTEE,

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

RECOGNIZING the importance of safeguarding manoeuvring space for ships in the vicinity of multiple structures at sea in ships' routeing systems,

TAKING INTO ACCOUNT the decision of the Sub-Committee on Navigation, Communications and Search and Rescue, at its third session, to include a guidance on the multiple structures at sea in annex 1 of the *General Provisions on Ships' Routeing*,

HAVING CONSIDERED, at its ninety sixth session, the text of proposed amendments to annex 1 of the *General Provisions on Ships' Routeing* (resolution A.572(14), as amended),

1 ADOPTS the amendments to the *General Provisions on Ships' Routeing* (resolution A.527(14), as amended), to include a guidance on the multiple structures at sea, the text of which is set out in the annex to the present resolution;

2 DETERMINES that amendments to the *General Provisions on Ships' Routeing* shall be adopted for implementation by the Committee in accordance with the provisions of resolution A.572(14), as amended, subject to confirmation by the Assembly;

3 INVITES Governments intending to submit proposals for the adoption of ships' routeing systems to take account of the annexed amendments to the General Provisions;

4 INVITES ALSO Governments concerned to bring the contents of this resolution to the attention of all parties concerned.

ANNEX

AMENDMENTS TO THE GENERAL PROVISIONS ON SHIPS' ROUTEING (RESOLUTION A.572(14), AS AMENDED)

Amend annex 1 (resolution A.572(14), as amended), as follows:

Section 3 (Responsibilities of Contracting Governments and recommended and mandatory practices)

Insert after existing paragraph 3.13, a new paragraph 3.14, as follows:

"3.14 In planning to establish multiple structures at sea, including but not limited to wind turbines, Governments should take into account, as far as practicable, the impact these could have on the safety of navigation, including any radar interference. Traffic density and prognoses, the presence or establishment of routeing measures in the area, and the manoeuvrability of ships and their obligations under the 1972 Collision Regulations should be considered when planning to establish multiple structures at sea. Sufficient manoeuvring space extending beyond the side borders of traffic separation schemes should be provided to allow evasive manoeuvres and contingency planning by ships making use of routeing measures in the vicinity of multiple structure areas.",

and renumber the following paragraphs accordingly.

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RESOLUTION MSC.419(97)
(adopted on 25 November 2016)
AMENDMENTS TO THE GENERAL PROVISIONS ON SHIPS' ROUTEING
(RESOLUTION A.572(14), AS AMENDED)

ANNEX 18

RESOLUTION MSC.420(97)
(adopted on 25 November 2016)

INTERIM RECOMMENDATIONS FOR CARRIAGE OF LIQUEFIED HYDROGEN IN BULK

THE MARITIME SAFETY COMMITTEE,

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

NOTING that the International Convention for the Safety of Life at Sea ("the Convention"), 1974 and the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk ("the IGC Code") currently do not specifically provide requirements for carriage of liquefied hydrogen in bulk by sea,

NOTING ALSO that paragraph 5 of Preamble of the IGC Code states that requirements for new products and their conditions of carriage will be circulated as recommendations, on an interim basis, prior to the entry into force of the appropriate amendments.

RECOGNIZING a need for the development of the Interim Recommendations for carriage of liquefied hydrogen in bulk,

ACKNOWLEDGING that, in the interim, there is an urgent need to provide recommendations to the Administrations on safe carriage of liquefied hydrogen in bulk,

ACKNOWLEDGING FURTHER that the Interim Recommendations are intended to facilitate establishment of a tripartite agreement for a pilot ship, which will be developed for the research and demonstration of safe long-distance overseas carriage of liquefied hydrogen in bulk,

HAVING CONSIDERED the Interim Recommendations prepared by the Sub-Committee on Carriage of Cargoes and Containers at its third session,

1 ADOPTS the Interim Recommendations for carriage of liquefied hydrogen in bulk, the text of which is set out in the annex to the present resolution;

2 INVITES Member States to apply the Interim Recommendations to the pilot ship carrying liquefied hydrogen in bulk taking the explanatory notes into consideration;

3 AGREES to acquire information on safe carriage of liquefied hydrogen in bulk prior to amendment to the IGC Code for the inclusion of liquefied hydrogen;

4 AGREES further that these Interim Recommendations may need to be reviewed if they are to be applied to ships other than the pilot ship; and

5 URGES Member States and the industry to submit information, observations, comments and recommendations based on the practical experience gained through the application of the Interim Recommendations and submit relevant safety analysis on ships carrying liquefied hydrogen in bulk.

ANNEX

INTERIM RECOMMENDATIONS FOR CARRIAGE OF LIQUEFIED HYDROGEN IN BULK

1 INTRODUCTION

1.1 For the carriage of liquefied gases in bulk by ships, the ships should comply with the relevant requirements in the IGC Code, as amended by resolution MSC.370(93) ("the Code"). The scope of the Code provided in paragraph 1.1.1 is:

> "The Code applies to ships regardless of their size, including those of less than 500 gross tonnage, engaged in the carriage of liquefied gases having a vapour pressure exceeding 0.28 MPa absolute at a temperature of 37.8°C, and other products, as shown in chapter 19, when carried in bulk".

1.2 A ship carrying liquefied hydrogen in bulk (hereinafter called "liquefied hydrogen carrier") should comply with the Code.

1.3 The Code requires that a gas carrier should comply with the minimum requirements for the cargo listed in chapter 19. However, the requirements for liquefied hydrogen are not specified in the Code.

1.4 This annex provides the interim recommendations, as referred to in paragraph 5 of the preamble of the Code, for the carriage of liquefied hydrogen in bulk, which are intended to provide the basis for the future minimum requirements for the carriage of this cargo.

1.5 These recommendations have been developed under the assumption that a liquefied hydrogen carrier does not carry liquefied gases other than liquefied hydrogen. These recommendations, therefore, are not applicable to liquefied hydrogen carriers carrying gases other than liquefied hydrogen.

1.6 In the Code, reference is made to paragraph 5 of the Preamble; paragraph 1.1.6.1; and Note No.8 on completion of certificate in "model form of international certificate of fitness for the carriage of liquefied gases in bulk" in appendix 2 to the Code.

2 INTERIM RECOMMENDATIONS FOR CARRIAGE OF LIQUEFIED HYDROGEN IN BULK

2.1 The Interim Recommendations for the carriage of liquefied hydrogen in bulk have been developed based on the results of a comparison study of similar cargoes listed in chapter 19 of the Code, e.g. liquefied natural gas.

2.2 In the Code, chapter 19 governs the application of general requirements for respective cargoes. Selections of the general requirements for respective cargoes are expressed in columns 'c' to 'g'. In addition to general requirements, special requirements may apply to specific cargoes depending on the properties/hazards of the cargoes.

2.3 Tables 1 and 2 specify the proposed selection of the general requirements and the special requirements, respectively, for liquefied hydrogen.

Table 1: Interim Recommendations for carriage of liquefied hydrogen in bulk

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
Product name		***Ship type***	***Independent tank type C required***	***Control of vapour space within cargo tanks***	***Vapour detection***	***Gauging***		***Special requirements***
Hydrogen		2G	-	-	F	C		See table 2

Table 2: Special Requirements for carriage of liquefied hydrogen in bulk

No.	Special Requirement	Related hazard
1	Requirements for materials whose design temperature is lower than -165°C should be agreed with the Administration, paying attention to appropriate standards. Where minimum design temperature is lower than -196°C, property testing for insulation materials should be carried out with the appropriate medium, over a range of temperatures expected in service.	Low temperature (see 4.2.1)
2	Materials of construction and ancillary equipment such as insulation should be resistant to the effects of high oxygen concentrations caused by condensation and enrichment at the low temperatures attained in parts of the cargo system (refer to the requirement for nitrogen).	Low temperature (see 4.2.2)
3	For cargo pipes containing liquid hydrogen and cold hydrogen vapour, measures should be taken to prevent the exposed surfaces from reaching -183°C. For places where preventive measures against low temperature are not sufficiently effective, such as cargo manifolds, other appropriate measures such as ventilation which avoids the formation of highly enriched oxygen and the installation of trays recovering liquid air may be permitted in lieu of the preventive measures. Insulation on liquid hydrogen piping systems exposing to air should be of non-combustible material and should be designed to have a seal in the outer covering to prevent the condensation of air and subsequent oxygen enrichment within the insulation.	Low temperature (see 4.2.2)
4	Appropriate means, e.g. filtering, should be provided in cargo piping systems to remove impure substances condensed at low temperature.	Low temperature (see 4.2.3)
5	Pressure relief systems should be suitably designed and constructed to prevent blockage due to formation of water or ice.	Low temperature (see 4.2.4)
6	At places where contact with hydrogen is anticipated, suitable materials should be used to prevent any deterioration owing to hydrogen embrittlement, as necessary.	Hydrogen embrittlement (see 4.3)
7	All welded joints of the shells of cargo tanks should be of the in-plane butt weld full penetration type. For dome-to-shell connections only, tee welds of the full penetration type may be used depending on the results of the tests carried out at the approval of the welding procedure.	Permeability (see 4.4.1)

No.	Special Requirement	Related hazard
8	Double tube structures ensuring no leakage, or fixed hydrogen detectors being capable of detecting a hydrogen leak, should be provided for places where leakage of hydrogen may occur, such as cargo valves, flanges, and seals.	Permeability (see 4.4.2)
9	Helium or a mixture of 5% hydrogen and 95% nitrogen should be used as the tightness test medium for cargo tank and cargo piping.	Permeability (see 4.4.3)
10	The amount of carbon dioxide carried for a carbon dioxide fire-extinguishing system should be sufficient to provide a quantity of free gas equal to 75% or more of the gross volume of the cargo compressor and pump rooms in all cases.	Fire by Hydrogen (see 4.7.3) Wide range of flammability limits (see 4.10)
11	When deterioration of insulation capability by single damage is possible, appropriate safety measures should be adopted taking into account the deterioration.	High pressure (see 4.8)
12	When vacuum insulation is used for a cargo containment system, the insulation performance should be evaluated to the satisfaction of the Administration based on experiments, as necessary.	General (see 4.1)
13	Appropriate measures should be provided to prevent vents becoming blocked by accumulations of ice formed from moisture in the air.	Low temperature (see 4.2.2)
14	Due consideration should be given to means for handling boil-off gas.	High pressure (see 4.8)
15	Due consideration should be given to static electricity associated with rotating or reciprocating machinery including the installation of conductive machinery belts and precautionary measures incorporated in operating and maintenance procedures. Anti-static clothing and footwear, and a portable hydrogen detector should be provided for each crew member working in the cargo area.	Static electricity (see 4.9.2)
16	An operation manual for a liquefied hydrogen carrier should include limitations of various operations in relation to environmental conditions.	Wide range of flammability limits (see 4.10)
17	An appropriate procedure should be established for warm-up, inert gas purge, gas-free, hydrogen purge and pre-cooling. The procedure should include: .1 selection of inert gas in relation to temperature limit; .2 measurement of gas concentration; .3 measurement of temperature; .4 rates of supply of gases; .5 conditions for commencement, suspension, resuming and termination of each operation; .6 treatment of return gases; and .7 discharge of gases.	Prevention of dangerous purging operation (see 4.11)

No.	Special Requirement	Related hazard
18	Only almost pure para-hydrogen (i.e. more than 95%) should be loaded in order to avoid excessive heating by ortho- to para-hydrogen conversion.	General (see 4.1)
19	Fire detectors for detecting hydrogen fire should be selected after due deliberation, taking into account the features of hydrogen fire, to the satisfaction of the Administration.	Features of hydrogen fire (see 4.7.4)
20	At the design stage, dispersion of hydrogen from vent outlets should be analysed in order to minimize risk of ingress of flammable gas into accommodation spaces, service spaces, machinery spaces and control stations. Extension of hazardous areas should be considered based on the results of the analysis.	Low density and high diffusivity (see 4.5)
21	Due consideration should be given to appropriate safety measures to prevent formation of explosive mixture in the case of a leakage of hydrogen, including: .1 installation of hydrogen detectors in order to detect a possible ground-level travel of low temperature hydrogen gas, and at high points in spaces where warm hydrogen gas can be trapped; and .2 application of "best practice" for land-based liquid hydrogen storage taking into account appropriate guidance such as "Cryogenics Safety Manual – Fourth Edition (1998)"[8)].	General (see 4.1)
22	In the case that fusible elements are used as a means of fire detection required by paragraph 18.10.3.2 of the Code, flame detectors suitable for hydrogen flames should be provided in addition at the same locations. Appropriate means should be adopted to prevent the activation of ESD system owing to false alarm of flame detectors, e.g. avoiding activation of ESD system by single sensor (voting method).	Fire hazard (see 4.7.4)
23	Consideration should be given to enhance the ventilation capacity of the enclosed spaces subject to liquefied hydrogen leakage, taking into account the latent heat of vapourization, specific heat and the volume of hydrogen gas in relation to temperature and heat capacity of adjacent spaces.	Low density and high diffusivity (see 4.5)

No.	Special Requirement	Related hazard
24	Liquid and gas hydrogen pipes should not pass through enclosed spaces other than those referred to in paragraph 5.2.2.1.2 of the Code, unless: .1.1 the spaces are equipped with gas detection systems which activate the alarm at not more than 30% LFL and shut down the isolation valves, as appropriate, at not more than 60% LFL (see sections 16.4.2 and 16.4.8 of the Code); and .1.2 the spaces are adequately ventilated; or .2 the spaces are maintained in an inert condition. This requirement is not applicable to spaces constituting a part of a cargo containment system using vacuum insulation where the degree of vacuum is monitored.	Permeability (see 4.4)
25	A risk assessment should be conducted to ensure that risks arising from liquefied hydrogen cargo affecting persons on board, the environment, the structural strength or the integrity of the ship are addressed. Consideration should be given to the hazards associated with properties of liquefied hydrogen and hydrogen gas, physical layout, operation and maintenance, following any reasonably foreseeable failure. For the risk assessment, appropriate methods, e.g. HAZID, HAZOP, FMEA/FMECA, what-if analysis, etc., should be adopted taking into account IEC/ISO 31010:2009 "Risk management – Risk assessment techniques"[7)] and SAE ARP 5580-2001 "Recommended failure modes and effects analysis (FMEA) practices for non-automobile applications"[9)].	General (see 4.1)
26	Relief valve sizing should be undertaken for the most onerous scenario. Whether this scenario is brought into existence due to fire or by loss of vacuum from the overall insulation system should be assessed and the resulting magnitude of the heat flux on the containment system considered in each case.	High pressure hazard (see 4.8)
27	A filling limit exceeding 98% at reference temperature should not be permitted.	High pressure hazard (see 4.8)
28	Bolted flange connections of hydrogen piping should be avoided where welded connections are feasible.	Permeability (see 4.4.2)
29	Due consideration should be given to the invisible nature of hydrogen fire.	Fire hazard (see 4.7.1)

3 EXPLANATION ON GENERAL REQUIREMENTS

3.1 Properties of liquefied hydrogen

The application of general requirements in the Code for liquefied hydrogen has been considered based on a comparison study on the physical properties of liquefied hydrogen and LNG. LNG and liquefied hydrogen are cryogenic liquids, non-toxic, and generate flammable high pressure gas. For reference, table 3 shows the comparison of physical properties of hydrogen and methane, the major component of LNG.

Table 3: Comparison of physical properties of Hydrogen and Methane

	Hydrogen	Methane	References
Boiling temperature (K)*	20.3	111.6	ISO[1)], Annex A, Table A.3
Liquid density (kg/m^3)*	70.8	422.5	ISO[1)], Annex A, Table A.3
Gas density (kg/m^3)** (Air: 1.198)	0.084	0.668	NIST RefProp[10)]
Viscosity (g/cm•s x 10^{-6}) Gas Liquid	 8.8 13.49	 10.91 116.79	 NIST RefProp[10)] NIST RefProp[10)]
Flame temperature in air (°C)	2396	2230	Calculated using Cantera and GRI 3.0 mechanism
Maximum burning velocity (m/s)	3.15	0.385	Calculated using Cantera and GRI 3.0 mechanism
Heat of vapourization (J/g)*	448.7	510.4	ISO[1)], Annex A, Table A.3
Lower flammability limit (% vol. fraction)***	4.0	5.3	ISO[1)], Annex B, Table B.2
Upper flammability limit (% vol. fraction)***	75.0	17.0	ISO[1)], Annex B, Table B.2
Lower detonation limit (%vol. fraction)***	18.3	6.3	ISO[1)], Annex B, Table B.2
Upper detonation limit (% vol. fraction) ***	59.0	13.5	ISO[1)], Annex B, Table B.2
Minimum ignition energy (mJ)***	0.017	0.274	ISO[1)], Annex B, Table B.2
Auto-ignition temp. (°C)***	585	537	ISO[1)], Annex B, Table B.2
Toxicity	Non	Non	Orange book[5)]
Temperature at critical point (K)	33.19****	190.55	Hydrogen: ISO[1)], Annex A, Table A.1 Methane: The Japan Society of Mechanical Engineers, Data Book, Thermophysical Properties of Fluids (1983)
Pressure at critical point (kPaA)	1297****	4595	Hydrogen: ISO[1)], Annex A, Table A.1 Methane: The Japan Society of Mechanical Engineers, Data Book, Thermophysical Properties of Fluids (1983)

Remarks:
* At their normal boiling points for comparison purpose.
** At normal temperature and pressure.
*** Ignition and combustion properties for air mixtures at 25°C and 101.3 kPaA.
**** Normal Hydrogen.

3.2 Explanation on respective requirements

3.2.1 Ship type (column 'c')

3.2.1.1 As a result of the studies, the following points were noted in relation to ship type allocated in the Code:

.1 type 1G is allocated only to dangerous goods of class 2.3* in the International Maritime Dangerous Goods Code, but not to class 2.2 and class 2.1;

.2 type 2G and type 2PG are allocated mainly to non-toxic flammable gases of class 2.1; and

.3 type 3G is allocated only to non-flammable and non-toxic gases of class 2.2.

3.2.1.2 "Type 2PG" is not applicable to liquefied hydrogen for the reason that the design temperature is lower than -55°C. Taking into account that liquefied hydrogen is a class 2.1 dangerous good, it is appropriate to allocate "type 2G" to liquefied hydrogen.

3.2.2 Independent tank type C required (column 'd')

Independent tank type C is allocated only to dangerous goods of class 2.3 whose vapour density is heavier than air. Independent tank type C is considered not to be required for liquefied hydrogen.

3.2.3 Control of vapour space within cargo tank (column 'e')

Special environment controls such as drying and inerting are generally required for liquid chemical products in consideration of the reactivity of cargo vapour and air. As is the case for LNG, it is considered not to be necessary to apply such requirements for liquefied hydrogen.

3.2.4 Vapour detection (column 'f')

Because hydrogen is flammable and non-toxic, it is appropriate to require Flammable (F) as vapour detection for liquefied hydrogen.

3.2.5 Gauging (column 'g')

On the grounds that Closed (C) gauging is required, in principle, for flammable or toxic cargoes, such as methane, it is considered to be appropriate to require Closed (C) gauging for hydrogen, taking into account that hydrogen has high ignitability and a wide flammable range in air and that closed gauging is effective to prevent leakage of gases into air.

4 SPECIAL REQUIREMENTS AGAINST HAZARDS OF LIQUEFIED HYDROGEN

4.1 Hazards of liquefied hydrogen to be considered

4.1.1 The hazards related to liquefied hydrogen are low ignition energy, a wide range of flammability limits, low visibility of flames in case of fire, high flame velocity which may lead to the detonation with shockwave, low temperature and liquefaction/solidification of inert gas and constituents of air which may result in an oxygen-enriched atmosphere, high permeability, low viscosity, and hydrogen embrittlement including weld metals. Where vacuum insulation is adopted, due consideration should be given to the possibility of untimely deterioration of insulation properties at the envisaged carriage temperatures of liquid hydrogen. The vacuum

* Toxic and flammable gases are classified as class 2.3 with subsidiary class 2.1.

insulation evaluation should be specified for the normal range or upper limit of cold vacuum pressure (CVP), and loss of vacuum should be defined with respect to this value. Accordingly, effect of vacuum pressure should be taken into account at the time of design and testing of cargo containment systems and piping. Supporting structure and adjacent hull structure should be designed taking into account the cooling owing to loss of vacuum insulation.

4.1.2 Hydrogen is essentially a mixture of ortho- and para-hydrogen, with an equilibrium concentration of 75% ortho-hydrogen and 25% para-hydrogen at ambient temperature. When liquefied at 20K, there is a slow but continuous transformation of ortho-hydrogen to para-hydrogen. The exothermic conversion of the nuclear spin isomers of hydrogen (ortho- to para-hydrogen) may take place and the effect of the conversion may have an impact on the cooling capacity and relief valve capacity of the vessel's equipment.

4.1.3 For consideration on the special requirements for liquefied hydrogen carriers, bibliographic studies were conducted using the references at the end of this document, in particular, ISO/TR 15916, "High Pressure Gas Safety Act"[1)] (Japanese law), "Safety standard for hydrogen and hydrogen system" by AIAA[2)] and NFPA 2 "Hydrogen Technologies Code"[6)]. The majority of special requirements for liquefied hydrogen carriers are provided based on ISO/TR 15916. This standard refers to liquefied hydrogen tank storage facilities on shore, tank trucks and so on, and includes basic viewpoints when discussing the properties of liquefied hydrogen.

4.1.4 Trace amounts of air will condense or solidify in an environment with liquid hydrogen possibly resulting in an unstable and explosive mixture. Precautions should be taken to assure that the possibility of condensed air is accounted within properly secured hazard areas.

4.2 Low temperature hazard

4.2.1 Selection of appropriate material

4.2.1.1 Tables 6.3 and 6.4 in the Code prescribe material selection for piping or cargo tanks whose design temperature is -165°C or higher. According to Note 2 of table 6.3 and Note 3 of table 6.4 of the Code, the requirements for materials whose design temperatures are lower than -165°C should be specially agreed with the Administration. In this regard, the publication by AIAA[2)] introduces some appropriate materials corresponding to the design temperature and the Administration should take into account such references for the material selection.

4.2.1.2 Although paragraph 4.19.3 in the Code requires testing of materials used for thermal insulation for various properties adequate for the intended service temperature, the minimum test temperature is -196°C. The requirements in the Code do not refer to the normal boiling point of hydrogen, being -253°C. In case of carriage of liquefied hydrogen, special requirements should be provided to consider the lower design temperature.

4.2.2 Measures for condensed air

4.2.2.1 In the case of nitrogen whose normal boiling point is -196°C, for which air condensation and oxygen enrichment are concerns, the following special requirement has already been included in paragraph 17.17 in the Code:

> "Material of construction and ancillary equipment such as insulation shall be resistant to the effect of high oxygen concentrations caused by condensation and enrichment at the low temperatures attained in parts of the cargo system. Due consideration shall be given to ventilation in such areas where condensation might occur to avoid the stratification of oxygen-enriched atmosphere."

A similar special requirement is applicable to hydrogen.

4.2.2.2 A vent may be blocked by accumulation of ice formed from moisture in the air, which may result in excessive pressure leading to rupture of the vent and relevant piping (see paragraph 4.2.4).

4.2.3 Removal of impure substances condensed

The removal of impure substances, such as those contained in condensate in pipes, should be separately considered. Installation of filters can be an appropriate measure and should be stipulated as a special requirement.

4.2.4 Prevention of blockage due to formation of water or ice

Pressure relief systems may become blocked due to formation of water or ice, depending on the temperature and humidity of air, resulting from the low temperature of the cargo and its vapour (see paragraph 4.2.2). Appropriate means should be provided to prevent such phenomena.

4.3 Hydrogen embrittlement

4.3.1 Selection of appropriate materials should be required to prevent failures owing to hydrogen embrittlement. The publication by AIAA[2)] introduces some appropriate materials resistant to hydrogen embrittlement, and concludes that aluminium is the material least affected.

4.3.2 International or national standards should be followed for the selection of materials for the design of liquefied and gaseous hydrogen installations in a marine environment.

4.4 Permeability

4.4.1 Prevention of leakage from cargo tanks

To mitigate leakage of hydrogen, it is deemed appropriate to require "butt weld full penetration" type welds, regardless of tank types, taking into account the high permeability of hydrogen. Furthermore, dome-to-shell connections welds and nozzle welds should be designed with full penetration regardless of tank types, taking into account paragraphs 4.20.1.1 and 4.20.1.2 of the Code.

4.4.2 Prevention of leakage from pipes

To mitigate undetected accumulation of hydrogen in a confined space, effective measures should be employed to reduce the possibility of leakage of hydrogen, taking its high permeability into account. Effective measures can be double tube structures, or fixed hydrogen leak detectors in areas assessed as being highly hazardous with regard to hydrogen leakage. Hydrogen leakage through welds, joints and seals is an important consideration for the design of hydrogen systems and an important operational issue.

4.4.3 Implementation of effective tightness test

4.4.3.1 Tightness tests for cargo tanks and cargo pipes/valves are required by paragraphs 4.20.3.2, 5.13.1 and 5.13.2.3 in the Code respectively. Helium or a mixture of 5% hydrogen and 95% nitrogen should be used as the medium for tightness tests, instead of air, because the permeability of hydrogen is high.

4.4.3.2 For a hydrogen installation, the pipework should be pressure-tested at its design pressure. Consideration should be given to using oxygen-free nitrogen with a small molecule tracer gas, such as helium as the test medium and an electronic leak detector for identifying leaks.

4.4.4 Confirmation of appropriate operating procedure

Instructions/manuals containing the operating procedures for the prevention of leakage during transport, methods for early detection in case of leakage, and appropriate measures after such events, should be provided. For this, paragraph 18.3 of the Code requires that the information shall be on board and available to all concerned, giving the necessary data for the safe carriage of cargo. In detail, the Code requires such information on action to be taken in the event of spills or leak, countermeasures against accidental personal contact, procedures for cargo transfer, and emergency procedures to be on board. With regard to the manuals on procedures for liquefied hydrogen during carriage and transfer operations, the requirements in the Code are applicable and no special requirement is necessary.

4.5 Low density and high diffusivity

Though low density and high diffusivity of hydrogen may reduce the possibility of formation of a flammable atmosphere in open spaces, adequate ventilation is necessary for enclosed spaces in cargo areas where formation of hydrogen-oxygen/air mixture may occur. Paragraph 12.2 of the Code requires fixed ventilation systems or portable mechanical ventilation for such enclosed spaces. These requirements in the Code are applicable to liquefied hydrogen carriers and no special requirement is necessary in this regard.

4.6 Ignitability

4.6.1 The Code requires electrical bonds of the piping and the cargo tanks in paragraph 5.7.4, exclusion of all sources of ignition in paragraph 11.1.2, electrical installations to minimize the risk of fire and explosion from flammable products in paragraph 10.2.1 and so on, in order to prevent ignition of flammable cargoes.

4.6.2 The Code requires compliance with the relevant standards issued by the International Electrotechnical Commission (IEC) and the IEC standards specify the details of such safety measures depending on the respective properties of flammable gases including hydrogen. No special requirement is necessary with regard to ignitability of hydrogen[*].

4.7 Fire hazard

4.7.1 Safety of personnel in case of fire

To avoid the effects of flame and UV radiation produced by a hydrogen fire, it is effective to use firefighter's outfits and protective equipment. The Code already requires firefighter's outfits for ships carrying flammable products in paragraph 11.6.1 and safety equipment in paragraph 14.3. This issue should be considered as the matter of cargo information required by paragraph 18.3 of the Code. Due consideration should be given to the invisible nature of hydrogen fire.

[*] Electrical equipment used in hydrogen/air mixture should be, at least, the type of "II-C" and "T-1" as the group based on the maximum experimental safe gap for flameproof enclosures and the temperature class based on maximum surface temperature, respectively, according to IEC 60079-20-1[4)].

4.7.2 Compatibility of fire-extinguishing systems

Dry chemical powder fire-extinguishing or carbon dioxide fire-extinguishing systems are considered to be effective in case of hydrogen fire and such fire-extinguishing systems are already required by paragraphs 11.4 and 11.5 of the Code. Special requirements for installation of other types of fire-extinguishing systems are considered unnecessary, except with regard to the increased of amount of carbon dioxide required, as mentioned in the next paragraph in this document.

4.7.3 Increase of the amount of gas for carbon dioxide fire-extinguishing systems

4.7.3.1 Paragraph 11.5.1 of the Code requires as follows:

> "Enclosed spaces meeting the criteria of cargo machinery spaces in 1.2.10, and the cargo motor room within the cargo area of any ship, shall be provided with a fixed fire-extinguishing system complying with the provisions of the FSS Code and taking into account the necessary concentrations/application rate required for extinguishing gas fires."

4.7.3.2 Chapter 5 of the FSS Code, i.e. Fixed gas fire-extinguishing systems, requires that the quantity of carbon dioxide for cargo spaces, unless otherwise provided, shall be sufficient to give a minimum volume of free gas equal to 30% of the gross volume of the largest cargo space to be protected in the ship, in paragraph 2.2.1.1.

4.7.3.3 On the other hand, NFPA 12[3)] requires that the design quantity of carbon dioxide for hydrogen fire should be 75% or more of the gross volume of the protected space. The special requirement for an increased amount of carbon dioxide should be provided for carbon dioxide fire-extinguishing systems.

4.7.4 Features of hydrogen fire

Hydrogen burns at high temperature, but generally gives off less radiant heat than propane or other hydrocarbons (e.g. only about 10% of that radiated by an equal-sized propane flame). Although the heat radiated by a hydrogen flame is also relatively low compared to hydrocarbons, it is important to take into account the differences in heats of combustion, burning rate and flame size. Hydrogen flames are colourless or nearly colourless. Both of these characteristics make it more difficult to detect a hydrogen fire. Even relatively small hydrogen fires are very difficult to extinguish. The only reliable approach to extinguish a fire is to shut off the source of hydrogen supply.

4.8 High pressure hazard

4.8.1 High pressure is a hazard common to hydrogen and other flammable gases listed in the Code. To prevent overpressure, the Code requires various measures such as pressure control and pressure design. Specifically, paragraph 8.2, in regard to the provision of pressure control of cargo tanks, requires fittings of pressure relief valves to the cargo tanks. Furthermore, paragraph 7.1.1 requires temperature control by the use of mechanical refrigeration and/or design to withstand possible increases of temperature and pressure. In addition, paragraph 15.2 specifies the filling limit of cargo tanks taking into account cargo volume increase by its thermal expansion. These requirements are applicable for hydrogen and no special requirement is considered necessary in this regard.

4.8.2 Vacuum insulation systems are likely to be used for liquefied hydrogen containment systems and the insulation capability of such systems may be adversely affected by damage to the system, depending on the design of the system. If a rapid deterioration of the insulation system took place, rapid increase of temperature in the cargo tank would occur and/or the rate of vapourization of liquefied hydrogen might exceed the capacity of pressure relief valves. To prevent such dangerous deterioration of insulation, appropriate safety measures should be taken.

4.8.3 Boil-off may be a bigger problem for hydrogen than for LNG in particular when insulation properties have deteriorated. Means of handling boil-off gas should be carefully considered taking into account the following issues:

.1 Re-liquefaction of hydrogen involves very specific and costly equipment. Cargo cooling in order to avoid boil-off shows the same kind of issues; and

.2 Notwithstanding the provision in paragraph 7.4.1 of the Code, thermal oxidation of hydrogen may be permitted in accordance with paragraph 1.3 of the Code.

4.8.4 The special requirements in these aspects are considered necessary.

4.9 Health hazard

4.9.1 Human safety concern under low temperature

With regard to the influences of cold hydrogen on persons' bodies, suitable protective equipment is effective. In this aspect, paragraph 14.1 of the Code requires suitable protective equipment taking into account the character of the products, therefore, no special requirement is considered necessary.

4.9.2 Static electricity

Hydrogen ignition energy is very low and hydrogen can be easily ignitable by static electricity and due consideration should be given to this issue, in accordance with the requirement in the Code on suitable protective equipment.

4.9.3 Oxygen depletion and asphyxiation

Leakage of hydrogen may cause low level of oxygen and associated asphyxiation.

4.10 Wide range of flammable limits

4.10.1 Extinguishing hydrogen fire

4.10.1.1 As mentioned in paragraph 4.6, for flammable products the Code already requires elimination of sources of ignition, including use of electrical installations of appropriate types in order to minimize the risk of fire and explosion. No special requirement is considered necessary with regard to ignitability of hydrogen.

4.10.1.2 Furthermore, with regard to the wide range of flammable limits of hydrogen, the increased quantities of carbon dioxide as a fire-extinguishing medium should be specified as mentioned in paragraph 4.7. No additional special requirement is considered to be necessary with regard to the wide range of flammable limits of hydrogen.

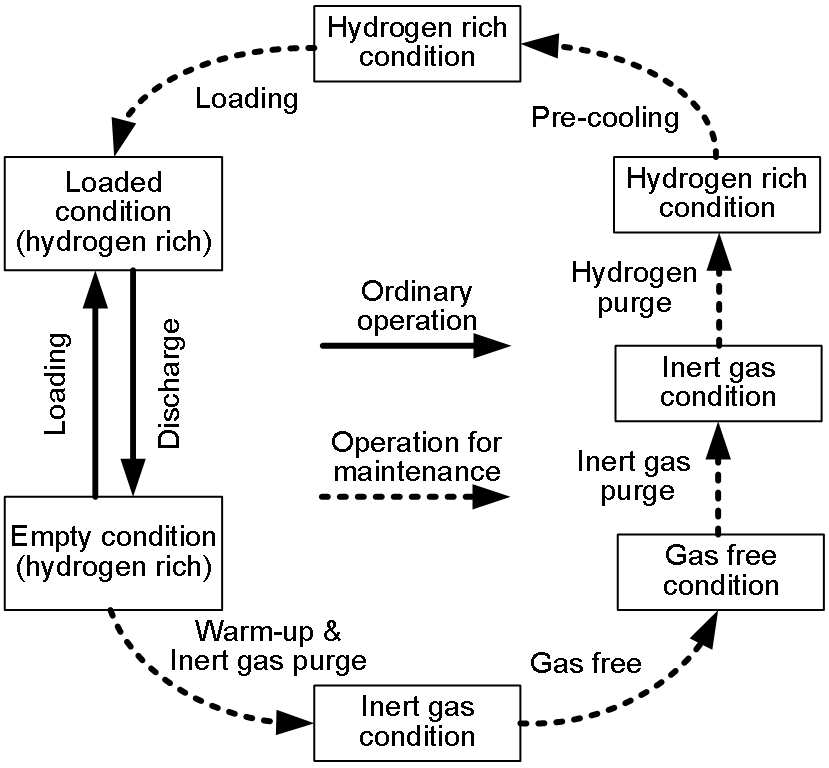
4.10.2 Disposal of cold hydrogen gas

The wide flammability range makes disposal of cold hydrogen gas a major hazard. Cold plumes downwind and inadequate dilution to below 4% provide possibilities for flash-back to the vent from distant ignition sources outside safety-controlled areas. The low ignition energy and wide flammable range may present significant challenges.

4.11 Prevention of dangerous purging operation

4.11.1 During cargo operations for maintenance, pipes and tanks should be purged with an inert gas or inert gases as illustrated in the figure below. For safety, due consideration should be given to temperature and boiling points of the inert gases. Residual pockets of hydrogen or the purge gas will remain in the enclosure if the purging rate, duration, or extent of mixing is too low. Therefore, reliable gas concentration measurements should be obtained at a number of different locations within the system for suitable purges. Temperature should also be measured at a number of locations. Oxidizing agents may exist in a hydrogen containing equipment, specifically: air, cold box atmospheres containing air diluted with nitrogen, or oxygen-enriched air that can be condensed on process pipe work within the cold box in special circumstances.

4.11.2 There are special measures that may need to be put in place in order to mitigate the hazards, e.g. air should be eliminated by nitrogen purge prior to introduction of hydrogen into cargo piping or processing equipment. Nitrogen should then be eliminated by hydrogen purge, where there is a possibility of its solidification in the subsequent process.



References

1) ISO/TR 15916, Basic consideration for the safety of hydrogen systems (ISO)

2) American Institute of Aeronautics and Astronautics, "Safety Standard for Hydrogen and Hydrogen Systems (Guide to Safety of Hydrogen and Hydrogen Systems)", 2005 (AIAA)

3) NFPA 12: Standard on Carbon Dioxide Extinguishing Systems 2005 Edition (NFPA)

4) IEC 60079-20-1 Ed. 1.0:2010 (b) Explosive atmospheres – Part 20-1: Material characteristics for gas and vapour classification – Test methods and data

5) UN Recommendations on the Transport of Dangerous Goods – Model Regulations, Nineteenth revised edition

6) NFPA 2: Hydrogen Technologies Code 2016 Edition (NFPA)

7) IEC/ISO 31010:2009 Risk management – Risk assessment techniques

8) Cryogenics Safety Manual – Fourth Edition (1998)

9) SAE ARP 5580-2001 "Recommended failure modes and effects analysis (FMEA) practices for non-automobile applications"

10) National Institute of Standards and Technology (NIST) RefProp database

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ANNEX 3

RESOLUTION MSC.421(98)
(adopted on 15 June 2017)

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 ninety-eighth 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 said amendments shall be deemed to have been accepted on 1 July 2019, 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 2020 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

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

PART A
GENERAL

Regulation 1 – Application

1 The following new paragraphs 1.1.1 and 1.1.2 are inserted after the existing paragraph 1.1:

"1.1.1 Unless expressly provided otherwise, parts B, B-1, B-2 and B-4 of this chapter shall only apply to ships:

.1 for which the building contract is placed on or after 1 January 2020; 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 2020; or

.3 the delivery of which is on or after 1 January 2024.

1.1.2 Unless expressly provided otherwise, for ships not subject to the provisions of subparagraph 1.1.1 but constructed on or after 1 January 2009, the Administration shall:

.1 ensure that the requirements in parts B, B-1, B-2 and B-4 which are applicable under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974, as amended by resolutions MSC.216(82), MSC.269(85) and MSC.325(90) are complied with; and

.2 ensure that the requirements of regulation 19-1 are complied with."

2 The existing paragraph 1.3.4 is deleted and at the end of the existing paragraph 1.3.3, replaced ";" with ".".

3 The existing paragraph 2 is replaced with the following:

"2 Unless expressly provided otherwise, for ships constructed before 1 January 2009, the Administration shall:

.1 ensure that the requirements which are applicable under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.11(55), MSC.12(56), MSC.13(57), MSC.19(58), MSC.26(60), MSC.27(61), Resolution 1 of the 1995 SOLAS Conference, MSC.47(66), MSC.57(67), MSC.65(68), MSC.69(69), MSC.99(73), MSC.134(76), MSC.151(78) and MSC.170(79) are complied with; and

.2 ensure that the requirements of regulation 19-1 are complied with."

Regulation 2 – Definitions

4 The existing paragraph 2 is replaced with the following:

"2 *Amidships* is at the middle of the length (*L*)."

5 The existing paragraphs 9 and 10 are replaced with the following:

"9 *Draught (d)* is the vertical distance from the keel line at:

.1 amidships, for ships subject to the provisions of regulation II-1/1.1.1.1; and

.2 the mid-point of the subdivision length (L_s), for ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009;

to the waterline in question.

10 *Deepest subdivision draught (d_s)* is the summer load line draught of the ship."

6 The existing paragraph 13 is replaced with the following:

"13 *Trim* is the difference between the draught forward and the draught aft, where the draughts are measured at the forward and aft:

.1 perpendiculars respectively, as defined in the International Convention on Load Lines in force, for ships subject to the provisions of regulation II-1/1.1.1.1; and

.2 terminals respectively, for ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009;

disregarding any rake of keel."

7 The existing paragraph 19 is replaced with the following:

"19 *Bulkhead deck* in a passenger ship means the uppermost deck:

.1 to which the main bulkheads and the ship's shell are carried watertight, for ships subject to the provisions of regulation II-1/1.1.1.1; and

.2 at any point in the subdivision length (L_s) to which the main bulkheads and the ship's shell are carried watertight and the lowermost deck from which passenger and crew evacuation will not be impeded by water in any stage of flooding for damage cases defined in regulation 8 and in part B-2 of this chapter, for ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009.

The bulkhead deck may be a stepped deck. In a cargo ship not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009, the freeboard deck may be taken as the bulkhead deck."

8 The existing paragraph 26 is deleted and remaining paragraphs are renumbered accordingly.

PART B
SUBDIVISION AND STABILITY

Regulation 4 – General

9 The existing paragraph 1 and the footnote to existing paragraph 1 are deleted.

10 The following new paragraphs 1 and 2 are introduced before the existing paragraph 2:

"1 Unless expressly provided otherwise, the requirements in parts B-1 to B-4 shall apply to passenger ships.

2 For cargo ships, the requirements in parts B-1 to B-4 shall apply as follows:

2.1 In part B-1:

.1 Unless expressly provided otherwise, regulation 5 shall apply to cargo ships and regulation 5-1 shall apply to cargo ships other than tankers, as defined in regulation I/2(h);

.2 Regulation 6 to regulation 7-3 shall apply to cargo ships having a length (*L*) of 80 m and upwards, but may exclude those ships subject to the following instruments and shown to comply with the subdivision and damage stability requirements of that instrument:

.1 Annex I to MARPOL, except that combination carriers (as defined in SOLAS regulation II-2/3.14) with type B freeboards shall be in compliance with regulation 6 to regulation 7-3*; or

.2 the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)*; or

.3 the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)*; or

.4 the damage stability requirements of regulation 27 of the 1966 Load Lines Convention as applied in compliance with resolutions A.320(IX) and A.514(13), provided that in the case of cargo ships to which regulation 27(9) applies, main transverse watertight bulkheads, to be considered effective, are spaced according to paragraph (12)(f) of resolution A.320(IX), except that ships intended for the carriage of deck cargo shall be in compliance with regulation 6 to regulation 7-3; or

.5 the damage stability requirements of regulation 27 of the 1988 Load Lines Protocol, except that ships intended for the carriage of deck cargo shall be in compliance with regulation 6 to regulation 7-3; or

.6 the subdivision and damage stability standards in other instruments** developed by the Organization.

2.2 Unless expressly provided otherwise, the requirements in parts B-2 and B-4 shall apply to cargo ships.

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* Refer to *Guidelines for verification of damage stability requirements for tankers* (MSC.1/Circ.1461).

** .1 For offshore supply vessels of not more than 100 m in length (*L*), the *Guidelines for the design and construction of offshore supply vessels, 2006* (resolution MSC.235(82), as amended by resolution MSC.335(90)); or

.2 For special purpose ships, the *Code of safety for special purpose ships, 2008* (resolution MSC.266(84), as amended)."

11 The existing paragraphs 2 to 4 are renumbered accordingly.

PART B-1
STABILITY

Regulation 5 – Intact stability

12 The footnote to the title is deleted and the existing paragraphs 1 and 2 are replaced with the following:

"1 Every passenger ship, regardless of size, and every cargo ship having a length (*L*) of 24 m and upwards, shall be inclined upon its completion. The lightship displacement and the longitudinal, transverse and vertical position of its centre of gravity shall be determined. In addition to any other applicable requirements of the present regulations, ships having a length of 24 m and upwards shall as a minimum comply with the requirements of part A of the 2008 IS Code.

2 The Administration may allow the inclining test of an individual cargo ship to be dispensed with provided basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Administration that reliable stability information for the exempted ship can be obtained from such basic data, as required by regulation 5-1. A lightweight survey shall be carried out upon completion and the ship shall be inclined whenever in comparison with the data derived from the sister ship, a deviation from the lightship displacement exceeding 1% for ships of 160 m or more in length and 2% for ships of 50 m or less in length and as determined by linear interpolation for intermediate lengths or a deviation from the lightship longitudinal centre of gravity exceeding 0.5% of *L* is found."

13 The existing paragraph 5 is replaced with the following:

"5 At periodical intervals not exceeding five years, a lightweight survey shall be carried out on all passenger ships to verify any changes in lightship displacement and longitudinal centre of gravity. The ship shall be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of *L* is found or anticipated."

Regulation 5-1 – Stability information to be supplied to the master

14 The existing footnote to the title of the regulation is replaced with the following:

"* Refer also to the *Guidelines for the preparation of intact stability information* (MSC/Circ.456) and the *Revised guidance to the master for avoiding dangerous situations in adverse weather and sea conditions* (MSC.1/Circ.1228)."

15 The existing regulation 5-1.1 is replaced with the following:

"1 The master shall be supplied with such information to the satisfaction of the Administration as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service. A copy of the stability information shall be furnished to the Administration."

16 The existing paragraph 2.1 is replaced with the following:

".1 curves or tables of minimum operational metacentric height (*GM*) and maximum permissible trim versus draught which assures compliance with the intact and damage stability requirements where applicable, alternatively corresponding curves or tables of the maximum allowable vertical centre of gravity (*KG*) and maximum permissible trim versus draught, or with the equivalents of either of these curves or tables;"

17 The existing paragraphs 3 and 4 are replaced with the following:

"3 The intact and damage stability information required by regulation 5-1.2 shall be presented as consolidated data and encompass the full operating range of draught and trim. Applied trim values shall coincide in all stability information intended for use on board. Information not required for determination of stability and trim limits should be excluded from this information.

4 If the damage stability is calculated in accordance with regulation 6 to regulation 7-3 and, if applicable, with regulations 8 and 9.8, a stability limit curve is to be determined using linear interpolation between the minimum required *GM* assumed for each of the three draughts d_s, d_p and d_l. When additional subdivision indices are calculated for different trims, a single envelope curve based on the minimum values from these calculations shall be presented. When it is intended to develop curves of maximum permissible *KG* it shall be ensured that the resulting maximum *KG* curves correspond with a linear variation of *GM*.

5 As an alternative to a single envelope curve, the calculations for additional trims may be carried out with one common *GM* for all of the trims assumed at each subdivision draught. The lowest values of each partial index A_s, A_p and A_l across these trims shall then be used in the summation of the attained subdivision index *A* according to regulation 7.1. This will result in one *GM* limit curve based on the *GM* used at each draught. A trim limit diagram showing the assumed trim range shall be developed."

18 The existing paragraph 5 is renumbered accordingly and amended to read as follows:

"6 When curves or tables of minimum operational metacentric height (*GM*) or maximum allowable *KG* versus draught are not provided, the master shall ensure that the operating condition does not deviate from approved loading conditions, or verify by calculation that the stability requirements are satisfied for this loading condition."

Regulation 6 – Required subdivision index R

19 The existing chapeau in paragraph 2 is replaced with the following:

"2 For ships to which the damage stability requirements of this part apply, the degree of subdivision to be provided shall be determined by the required subdivision index *R*, as follows:"

20 The existing chapeau in paragraph 2.2 is replaced with the following:

".2 In the case of cargo ships not less than 80 m in length (*L*) and not greater than 100 m in length (L_S):"

21 The text in the existing paragraph 2.3 is replaced with the following:

"2.3 In the case of passenger ships:

Persons on board	***R***
$N < 400$	$R = 0.722$
$400 \leq N \leq 1{,}350$	$R = N / 7{,}580 + 0.66923$
$1{,}350 < N \leq 6{,}000$	$R = 0.0369 \times \text{Ln}(N + 89.048) + 0.579$
$N > 6{,}000$	$R = 1 - (852.5 + 0.03875 \times N) / (N + 5{,}000)$

Where:

N = total number of persons on board."

22 The existing paragraph 2.4 is deleted.

Regulation 7 – Attained subdivision index *A*

23 The first sentence of the existing paragraph 1 is replaced with the following:

"1 An attained subdivision index *A* is obtained by the summation of the partial indices A_S, A_P and A_I, weighted as shown and calculated for the draughts d_S, d_P and d_I defined in regulation 2 in accordance with the following formula:"

24 The existing paragraphs 2 and 3 are replaced with the following:

"2 As a minimum, the calculation of *A* shall be carried out at the level trim for the deepest subdivision draught d_S and the partial subdivision draught d_P. The estimated service trim may be used for the light service draught d_I. If, in any anticipated service condition within the draught range from d_S to d_I, the trim variation in comparison with the calculated trims is greater than 0.5% of *L*, one or more additional calculations of *A* are to be performed for the same draughts but including sufficient trims to ensure that, for all intended service conditions, the difference in trim in comparison with the reference trim used for one calculation will be not more than 0.5% of *L*. Each additional calculation of *A* shall comply with regulation 6.1.

3 When determining the positive righting lever (*GZ*) of the residual stability curve in the intermediate and final equilibrium stages of flooding, the displacement used should be that of the intact loading condition. All calculations should be done with the ship freely trimming."

Regulation 7-1 – Calculation of the factor p_i

25 In the existing paragraph 1, the text of the notation for the mean transverse distance *b* is replaced with the following:

"*b* = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision draught between the shell and an assumed vertical plane extended between the longitudinal limits used in calculating the factor p_i and which is a tangent to, or common with, all or part of the outermost portion of the longitudinal bulkhead under consideration. This vertical plane shall be so orientated that the mean transverse distance to the shell is a maximum, but not more than twice the least distance between the plane and the shell. If the upper part of a longitudinal bulkhead is below the deepest subdivision draught the vertical plane used for determination of *b* is assumed to extend upwards to the deepest subdivision waterline. In any case, *b* is not to be taken greater than *B/2*."

Regulation 7-2 – Calculation of the factor s_i

26 The existing paragraphs 2 to 4.1.2 are replaced with the following:

"2 For passenger ships, and cargo ships fitted with cross-flooding devices, the factor $s_{\text{intermediate},i}$ is taken as the least of the *s*-factors obtained from all flooding stages including the stage before equalization, if any, and is to be calculated as follows:

$$S_{\text{intermediate},i} = \left[\frac{GZ_{\max}}{0.05} \times \frac{Range}{7}\right]^{\frac{1}{4}}$$

where GZ_{max} is not to be taken as more than 0.05 m and *Range* as not more than 7°. $s_{\text{intermediate},i}$ = 0, if the intermediate heel angle exceeds 15º for passenger ships and 30° for cargo ships.

For cargo ships not fitted with cross-flooding devices the factor $s_{\text{intermediate},i}$ is taken as unity, except if the Administration considers that the stability in intermediate stages of flooding may be insufficient, it should require further investigation thereof.

For passenger and cargo ships, where cross-flooding devices are fitted, the time for equalization shall not exceed 10 min.

3 The factor $s_{final,i}$ shall be obtained from the formula:

$$S_{\text{final},i} = K \times \left[\frac{GZ_{\max}}{TGZ_{\max}} \times \frac{Range}{TRange}\right]^{\frac{1}{4}}$$

where:

GZ_{max} is not to be taken as more than TGZ_{max};

Range is not to be taken as more than *TRange*;

TGZ_{max} = 0.20 m, for ro-ro passenger ships each damage case that involves a ro-ro space,

TGZ_{max} = 0.12 m, otherwise;

TRange = 20º, for ro-ro passenger ships each damage case that involves a ro-ro space,

TRange = 16º, otherwise;

$K = 1$ if $\theta_e \leq \theta_{min}$

$K = 0$ if $\theta_e \geq \theta_{max}$

$$K = \sqrt{\frac{\theta_{\max} - \theta_e}{\theta_{\max} - \theta_{\min}}} \text{ otherwise,}$$

where:

θ_{min} is 7° for passenger ships and 25° for cargo ships; and

θ_{max} is 15° for passenger ships and 30° for cargo ships.

4 The factor $s_{mom,i}$ is applicable only to passenger ships (for cargo ships $s_{mom,i}$ shall be taken as unity) and shall be calculated at the final equilibrium from the formula:

$$S_{\text{mom},i} = \frac{(GZ_{\max} - 0.04) \times Displacement}{M_{\text{heel}}}$$

where:

Displacement is the intact displacement at the respective draught (d_s, d_p or d_l).

M_{heel} is the maximum assumed heeling moment as calculated in accordance with subparagraph 4.1; and

$s_{mom,i} \leq 1$

4.1 The heeling moment M_{heel} is to be calculated as follows:

M_{heel} = maximum ($M_{passenger}$ or M_{wind} or $M_{survivalcraft}$)

4.1.1 $M_{passenger}$ is the maximum assumed heeling moment resulting from movement of passengers, and is to be obtained as follows:

$M_{passenger} = (0.075 \times N_p) \times (0.45 \times B)$ (tm)

where:

N_p is the maximum number of passengers permitted to be on board in the service condition corresponding to the deepest subdivision draught under consideration; and

B is the breadth of the ship as defined in regulation 2.8.

Alternatively, the heeling moment may be calculated assuming the passengers are distributed with 4 persons per square metre on available deck areas towards one side of the ship on the decks where muster stations are located and in such a way that they produce the most adverse heeling moment. In doing so, a weight of 75 kg per passenger is to be assumed.

4.1.2 M_{wind} is the maximum assumed wind moment acting in a damage situation:

$M_{wind} = (P \times A \times Z) / 9{,}806$ (tm)

where:

P = 120 N/m^2;

A = projected lateral area above waterline;

Z = distance from centre of lateral projected area above waterline to $T/2$; and

T = respective draught (d_s, d_p or d_l)."

27 The existing paragraph 5 is replaced with the following:

"5 Unsymmetrical flooding is to be kept to a minimum consistent with the efficient arrangements. Where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to equalization devices are provided they shall be operable from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. These fittings together with their controls shall be acceptable to the Administration*. Suitable information concerning the use of equalization devices shall be supplied to the master of the ship.

* Reference is made to the *Revised recommendation on a standard method for evaluating cross-flooding arrangements*, adopted by the Organization by resolution MSC.362(92), as may be amended."

28 The existing chapeau of paragraph 5.2 is replaced with 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:"

29 The existing paragraph 5.3 is replaced with the following:

"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; and

.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."

30 The existing paragraph 5.5 is replaced with the following:

"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, sidescuttles of the non-opening type as well as watertight access doors and watertight hatch covers required to be kept closed at sea need not be considered."

Regulation 8 – Special requirements concerning passenger ship stability

31 The existing paragraphs 1 and 2, and the chapeau of paragraph 3 are replaced with the following:

"1 A passenger ship intended to carry 400 or more persons shall have watertight subdivision abaft the collision bulkhead so that $s_i = 1$ for a damage involving all the compartments within 0.08*L* measured from the forward perpendicular for the three loading conditions used to calculate the attained subdivision index *A*. If the attained subdivision index *A* is calculated for different trims, this requirement shall also be satisfied for those loading conditions.

2 A passenger ship intended to carry 36 or more persons is to be capable of withstanding damage along the side shell to an extent specified in paragraph 3. Compliance with this regulation is to be achieved by demonstrating that s_i, as defined in regulation 7-2, is not less than 0.9 for the three loading conditions used to calculate the attained subdivision index *A*. If the attained subdivision index *A* is calculated for different trims, this requirement shall also be satisfied for those loading conditions.

3 The damage extent to be assumed when demonstrating compliance with paragraph 2, is to be dependent on the total number of persons carried, and *L,* such that:"

32 The existing paragraph 3.2 is replaced with the following:

".2 where 400 or more persons are to be carried, a damage length of 0.03*L*, but not less than 3 m is to be assumed at any position along the side shell, in conjunction with a penetration inboard of 0.1*B* but not less than 0.75 m measured inboard from the ship side, at right angles to the centreline at the level of the deepest subdivision draught;"

33 The existing paragraph 3.4 is replaced with the following:

".4 where 36 persons are carried, a damage length of 0.015*L* but not less than 3 m is to be assumed, in conjunction with a penetration inboard of 0.05*B* but not less than 0.75 m; and"

Regulation 8-1 – System capabilities and operational information after a flooding casualty on passenger ships

2 Availability of essential systems in case of flooding damage

34 The existing text is replaced with the following:

"A passenger ship shall be designed so that the systems specified in regulation II-2/21.4 remain operational when the ship is subject to flooding of any single watertight compartment."

3 Operational information after a flooding casualty

35 The text of the existing chapeau is replaced with the following:

"For the purpose of providing operational information to the Master for safe return to port after a flooding casualty, passenger ships shall have:"

36 The existing footnote to the regulation is replaced with the following:

"* Refer to the *Guidelines on operational information for masters of passenger ships for safe return to port by own power or under tow* (MSC.1/Circ.1400) and the *Revised guidelines on operational information for masters of passenger ships for safe return to port* (MSC.1/Circ.1532)."

PART B-2
SUBDIVISION, WATERTIGHT AND WEATHERTIGHT INTEGRITY

Regulation 9 – Double bottoms in passenger ships and cargo ships other than tankers

37 The existing paragraph 3 is replaced with the following:

"3.1 Small wells constructed in the double bottom in connection with drainage arrangements shall not extend downward more than necessary. The vertical distance from the bottom of such a well to a plane coinciding with the keel line shall not be less than *h*/2 or 500 mm, whichever is greater, or compliance with paragraph 8 of this regulation shall be shown for that part of the ship.

3.2 Other wells (e.g. for lubricating oil under main engines) may be permitted by the Administration if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation.

3.2.1 For a cargo ship of 80 m in length and upwards or for a passenger ship, proof of equivalent protection is to be shown by demonstrating that the ship is capable of withstanding bottom damages as specified in paragraph 8. Alternatively, wells for lubricating oil below main engines may protrude into the double bottom below the boundary line defined by the distance *h* provided that the vertical distance between the well bottom and a plane coinciding with the keel line is not less than *h*/2 or 500 mm, whichever is greater.

3.2.2 For cargo ships of less than 80 m in length the arrangements shall provide a level of safety to the satisfaction of the Administration."

38 The existing paragraphs 6 to 8 are replaced with the following:

"6 Any part of a cargo ship of 80 m in length and upwards or of a passenger ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5, as specified in paragraph 2, shall be capable of withstanding bottom damages, as specified in paragraph 8, in that part of the ship. For cargo ships of less than 80 m in length the alternative arrangements shall provide a level of safety to the satisfaction of the Administration.

7 In the case of unusual bottom arrangements in a cargo ship of 80 m in length and upwards or a passenger ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8. For cargo ships of less than 80 m in length the alternative arrangements shall provide a level of safety to the satisfaction of the Administration.

8 Compliance with paragraphs 3.1, 3.2.1, 6 or 7 is to be achieved by demonstrating that s_i, when calculated in accordance with regulation 7-2, is not less than 1 for all service conditions when subject to bottom damage with an extent specified in subparagraph .2 below for any position in the affected part of the ship:

.1 Flooding of such spaces shall not render emergency power and lighting, internal communication, signals or other emergency devices inoperable in other parts of the ship.

.2 Assumed extent of damage shall be as follows:

	For 0.3 *L* from the forward perpendicular of the ship	Any other part of the ship
Longitudinal extent	1/3 $L^{2/3}$ or 14.5 m, whichever is less	1/3 $L^{2/3}$ or 14.5 m, whichever is less
Transverse extent	*B*/6 or 10 m, whichever is less	*B*/6 or 5 m, whichever is less
Vertical extent, measured from the keel line	*B*/20, to be taken not less than 0.76 m and not more than 2 m	*B*/20, to be taken not less than 0.76 m and not more than 2 m

.3 If any damage of a lesser extent than the maximum damage specified in .2 would result in a more severe condition, such damage should be considered."

Regulation 10 – Construction of watertight bulkheads

39 The existing paragraph 1 is replaced with the following:

"1 Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed having scantlings as specified in regulation 2.17. In all cases, watertight subdivision bulkheads shall be capable of supporting at least the pressure due to a head of water up to the bulkhead deck of passenger ships and the freeboard deck of cargo ships."

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

40 The existing paragraph 1 is replaced with the following:

"1 A collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck of passenger ships and the freeboard deck of cargo ships. This bulkhead shall be located at a distance from the forward perpendicular of not less than 0.05*L* or 10 m, whichever is the less, and, except as may be permitted by the Administration, not more than 0.08*L* or 0.05*L* + 3 m, whichever is the greater.

2 The ship shall be so designed that s_i calculated in accordance with regulation 7-2 will not be less than 1 at the deepest subdivision draught loading condition, level trim or any forward trim loading conditions, if any part of the ship forward of the collision bulkhead is flooded without vertical limits."

41 The existing paragraphs 2 to 10 are replaced with the following:

"3 Where any part of the ship below the waterline extends forward of the forward perpendicular, e.g. a bulbous bow, the distances stipulated in paragraph 1 shall be measured from a point either:

.1 at the mid-length of such extension;

.2 at a distance 0.015*L* forward of the forward perpendicular; or

.3 at a distance 3 m forward of the forward perpendicular,

whichever gives the smallest measurement.

4 The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 1 or 3.

5 No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

6.1 Except as provided in paragraph 6.2, 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 screw-down valve capable of being operated from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the valve being located inside the forepeak at the collision bulkhead. The Administration may, however, authorize the fitting of this valve on the after side of the collision bulkhead provided that

the valve is readily accessible under all service conditions and the space in which it is located is not a cargo space. Alternatively, for cargo ships, the pipe may be fitted with a butterfly valve suitably supported by a seat or flanges and capable of being operated from above the freeboard deck. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.

6.2 If the forepeak is divided to hold two different kinds of liquids the Administration may allow the collision bulkhead to be pierced below the bulkhead deck of passenger ships and the freeboard deck of cargo ships by two pipes, each of which is fitted as required by paragraph 6.1, provided the Administration is satisfied that there is no practical alternative to the fitting of such a second pipe and that, having regard to the additional subdivision provided in the forepeak, the safety of the ship is maintained.

7 Where a long forward superstructure is fitted, the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. The extension need not be fitted directly above the bulkhead below provided that all parts of the extension, including any part of the ramp attached to it are located within the limits prescribed in paragraph 1 or 3, with the exception permitted by paragraph 8 and that the part of the deck which forms the step is made effectively weathertight. The extension shall be so arranged as to preclude the possibility of the bow door or ramp, where fitted, causing damage to it in the case of damage to, or detachment of, a bow door or any part of the ramp.

8 Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck of passenger ships and the freeboard deck of cargo ships the ramp shall be weathertight over its complete length. In cargo ships the part of the ramp which is more than 2.3 m above the freeboard deck may extend forward of the limit specified in paragraph 1 or 3. Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

9 The number of openings in the extension of the collision bulkhead above the freeboard deck shall be restricted to the minimum compatible with the design and normal operation of the ship. All such openings shall be capable of being closed weathertight.

10 Bulkheads shall be fitted separating the machinery space from cargo and accommodation spaces forward and aft and made watertight up to the bulkhead deck of passenger ships and the freeboard deck of cargo ships. An afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck or the freeboard deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck or the freeboard deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

11 In all cases stern tubes shall be enclosed in watertight spaces of moderate volume. In passenger ships the stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the bulkhead deck will not be immersed. In cargo ships other measures to minimize the danger of water penetrating into the ship in case of damage to stern tube arrangements may be taken at the discretion of the Administration."

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

42 The existing paragraph 11.1 is replaced with the following:

"11.1 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 of the type required by its location in the ship. Such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead."

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

43 The existing paragraphs 4 and 5.1 are replaced with the following:

"4 Efficient hinged inside deadlights so arranged that they can be easily and effectively closed and secured watertight, shall be fitted to all sidescuttles except that abaft one eighth of the ship's length from the forward perpendicular and above a line drawn parallel to the bulkhead deck at side and having its lowest point at a height of 3.7 m plus 2.5% of the breadth of the ship above the deepest subdivision draught, the deadlights may be portable in passenger accommodation, unless the deadlights are required by the International Convention on Load Lines in force to be permanently attached in their proper positions. Such portable deadlights shall be stowed adjacent to the sidescuttles they serve.

5.1 No sidescuttles shall be fitted in any spaces which are appropriated exclusively to the carriage of cargo."

44 The existing paragraph 8.2.1 is replaced with the following:

"8.2.1 Subject to the requirements of the International Convention on Load Lines in force, and except as provided in paragraph 8.3, each separate discharge led through the shell plating from spaces below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be provided with either one automatic non-return valve fitted with a positive means of closing it from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships or with two automatic non-return valves without positive means of closing, provided that the inboard valve is situated above the deepest subdivision draught and is always accessible for examination under service conditions. Where a valve with positive means of closing is fitted, the operating position above the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed."

45 The existing paragraph 8.4 is replaced with the following:

"8.4 Moving parts penetrating the shell plating below the deepest subdivision draught shall be fitted with a watertight sealing arrangement acceptable to the Administration. The inboard gland shall be located within a watertight space of such volume that, if flooded, the bulkhead deck of passenger ships and the freeboard

deck of cargo ships will not be submerged. The Administration may require that if such compartment is flooded, essential or emergency power and lighting, internal communication, signals or other emergency devices must remain available in other parts of the ship."

Regulation 16 – Construction and initial tests of watertight doors, sidescuttles, etc.

46 The title of the regulation is replaced with the following:

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

47 The existing paragraphs 1 and 2 are replaced with the following:

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

1.2 Such valves, doors, hatches and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety.

1.3 The frames of vertical watertight doors shall have no groove at the bottom in which dirt might lodge and prevent the door closing properly.

2 Watertight doors and hatches shall be tested by water pressure to the maximum head of water they might sustain in a final or intermediate stage of flooding. For cargo ships not covered by damage stability requirements, watertight doors and hatches shall be tested by water pressure to a head of water measured from the lower edge of the opening to one metre above the freeboard deck. Where testing of individual doors and hatches is not carried out because of possible damage to insulation or outfitting items, testing of individual doors and hatches may be replaced by a prototype pressure test of each type and size of door or hatch with a test pressure corresponding at least to the head required for the individual location. The prototype test shall be carried out before the door or hatch is fitted. The installation method and procedure for fitting the door or hatch on board shall correspond to that of the prototype test. When fitted on board, each door or hatch shall be checked for proper seating between the bulkhead, the frame and the door or between deck, the coaming and the hatch."

Regulation 16-1 – Construction and initial tests of watertight decks, trunks, etc.

48 The existing paragraphs 2 and 3 are replaced with the following:

"2 In passenger ships, where a ventilation trunk passing through a structure penetrates a watertight area of the bulkhead deck, the trunk shall be capable of withstanding the water pressure that may be present within the trunk, after having taken into account the maximum heel angle during flooding, in accordance with regulation 7-2.

3 In ro-ro passenger ships, where all or part of the penetration of the bulkhead deck is on the main ro-ro deck, the trunk shall be capable of withstanding impact pressure due to internal water motions (sloshing) of water trapped on the ro-ro deck."

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

49 The existing paragraph 3 is replaced with the following:

"3 Air pipes terminating within a superstructure which are not fitted with watertight means of closure shall be considered as unprotected openings when applying regulation 7-2.6.1.1."

PART B-4
STABILITY MANAGEMENT

Regulation 19 – Damage control information

50 The existing paragraph 2 is deleted and the remaining paragraphs are renumbered accordingly.

51 The following new regulation 19-1 is introduced after the existing regulation 19:

"**Regulation 19-1 – Damage control drills for passenger ships**

1 This regulation applies to passenger ships constructed before, on or after 1 January 2020.

2 A damage control drill shall take place at least every three months. The entire crew need not participate in every drill, but only those crew members with damage control responsibilities.

3 The damage control drill scenarios shall vary each drill so that emergency conditions are simulated for different damage conditions and shall, as far as practicable, be conducted as if there were an actual emergency.

4 Each damage control drill shall include:

.1 for crew members with damage control responsibilities, reporting to stations and preparing for the duties described in the muster list required by regulation III/8;

.2 use of the damage control information and the on board damage stability computer, if fitted, to conduct stability assessments for the simulated damage conditions;

.3 establishment of the communications link between the ship and shore-based support, if provided;

.4 operation of watertight doors and other watertight closures;

.5 demonstrating proficiency in the use of the flooding detection system, if fitted, in accordance with muster list duties;

.6 demonstrating proficiency in the use of cross-flooding and equalization systems, if fitted, in accordance with muster list duties;

.7 operation of bilge pumps and checking of bilge alarms and automatic bilge pump starting systems; and

.8 instruction in damage survey and use of the ship's damage control systems.

5 At least one damage control drill each year shall include activation of the shore-based support, if provided in compliance with regulation II-1/8-1.3, to conduct stability assessments for the simulated damage conditions.

6 Every crew member with assigned damage control responsibilities shall be familiarized with their duties and about the damage control information before the voyage begins.

7 A record of each damage control drill shall be maintained in the same manner as prescribed for the other drills in regulation III/19.5."

52 The existing title and paragraph 1 of regulation 20 are replaced with the following:

"**Regulation 20 – Loading of ships**

1 On completion of loading of the ship and prior to its departure, the master shall determine the ship's trim and stability and also ascertain and record that the ship is upright and in compliance with stability criteria in relevant regulations. The determination of the ship's stability shall always be made by calculation or by ensuring that the ship is loaded according to one of the precalculated loading conditions within the approved stability information. The Administration may accept the use of an electronic loading and stability computer or equivalent means for this purpose."

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

53 The existing paragraph 1 is replaced with the following:

"1 Operational tests of watertight doors, sidescuttles, valves and closing mechanisms of scuppers, ash-chutes and rubbish-chutes 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."

54 The existing paragraph 4 is replaced with the following:

"4 A record of all operational tests and inspections required by this regulation shall be recorded in the logbook with an explicit record of any defects which may be disclosed."

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

55 In the existing paragraph 1, at the end of the first sentence, the words "paragraphs 3 and 4" are replaced with "paragraph 3".

56 The existing paragraph 2 is replaced with the following:

"2 Watertight doors located below the bulkhead deck of passenger ships and the freeboard deck of cargo ships having a maximum clear opening width of more than 1.2 m shall be kept closed during navigation, except for limited periods when absolutely necessary as determined by the Administration."

57 The existing paragraph 3 is replaced with the following:

"3 A watertight door may be opened during navigation to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened. The door must be immediately closed when transit through the door is complete or when the task which necessitated it being open is finished. The Administration shall authorize that such a watertight door 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*. A watertight door permitted to be opened during navigation shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.

* Refer to the *Revised guidance for watertight doors on passenger ships which may be opened during navigation* (MSC.1/Circ.1564)."

58 The existing paragraphs 4 to 8 are replaced with the following:

"4 Portable plates on bulkheads shall always be in place before the voyage commences, and shall not be removed during navigation except in case of urgent necessity at the discretion of the master. The necessary precautions shall be taken in replacing them to ensure that the joints are watertight. Power-operated sliding watertight doors permitted in machinery spaces in accordance with regulation 13.10 shall be closed before the voyage commences and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.

5 Watertight doors fitted in watertight bulkheads dividing cargo between deck spaces in accordance with regulation 13.9.1 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 log-book as may be prescribed by the Administration.

6 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 voyage commences, and shall be kept closed during navigation.

7 The following doors, located above the bulkhead deck of passenger ships and the freeboard deck of cargo ships, shall be closed and locked before the voyage commences and shall remain closed and locked until the ship is at its next berth:

.1 cargo loading doors in the shell or the boundaries of enclosed superstructures;

.2 bow visors fitted in positions as indicated in paragraph 7.1;

.3 cargo loading doors in the collision bulkhead; and

.4 ramps forming an alternative closure to those defined in paragraphs 7.1 to 7.3 inclusive."

59 The existing paragraph 9 is renumbered as paragraph 8, and the existing paragraphs 10 to 16 are replaced with the following:

"9 Notwithstanding the requirements of paragraphs 7.1 and 7.4, the Administration may authorize that particular doors can be opened at the discretion of the master, if necessary for the operation of the ship or the embarking and disembarking of passengers when the ship is at safe anchorage and provided that the safety of the ship is not impaired.

10 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph 7 is implemented.

11 The master shall ensure, before any voyage commences, that an entry in such log-book as may be prescribed by the Administration is made of the time the doors specified in paragraph 12 are closed and the time at which particular doors are opened in accordance with paragraph 13.

12 Hinged doors, portable plates, sidescuttles, gangway, cargo and bunkering ports and other openings, which are required by these regulations to be kept closed during navigation, shall be closed before the voyage commences. The time at which such doors are opened and closed (if permissible under these regulations) shall be recorded in such log-book as may be prescribed by the Administration.

13 Where in a between-deck, the sills of any of the sidescuttles referred to in regulation 15.3.2 are below a 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 water when the voyage commences, all the sidescuttles in that between-deck shall be closed watertight and locked before the voyage commences, and they shall not be opened before the ship arrives at the next port. In the application of this paragraph the appropriate allowance for fresh water may be made when applicable.

.1 The time at which such sidescuttles are opened in port and closed and locked before the voyage commences shall be recorded in such log-book as may be prescribed by the Administration.

.2 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 13 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 during navigation. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.

14 Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the voyage commences.

15 If cargo is carried in spaces referred to in regulation 15.5.2, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and the time at which such scuttles and deadlights are closed and locked shall be recorded in such log-book as may be prescribed by the Administration."

60 The existing paragraph 17 is renumbered as paragraph 16.

Regulation 22-1 – Flooding detection systems for passenger ships carrying 36 or more persons constructed on or after 1 July 2010

61 In regulation 22-1, the words "constructed on or after 1 July 2010" are removed from the end of the existing title.

Regulation 23 – Special requirements for ro-ro passenger ships

62 The existing text of this regulation is replaced with the following:

"1 Special category spaces and ro-ro spaces shall be continuously patrolled or monitored by effective means, such as television surveillance, so that any movement of vehicles in adverse weather conditions and unauthorized access by passengers thereto can be detected during navigation.

2 Documented operating procedures for closing and securing all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Administration, lead to flooding of a special category space or ro-ro space, shall be kept on board and posted at an appropriate place.

3 All accesses from the ro-ro deck and vehicle ramps that lead to spaces below the bulkhead deck shall be closed before the voyage commences and shall remain closed until the ship is at its next berth.

4 The master shall ensure that an effective system of supervision and reporting of the closing and opening of such accesses referred to in paragraph 3 is implemented.

5 The master shall ensure, before the voyage commences, that an entry in the log-book, as required by regulation 22.12, is made of the time of the last closing of the accesses referred to in paragraph 3.

6 Notwithstanding the requirements of paragraph 3, the Administration may permit some accesses to be opened during the voyage, but only for a period sufficient to permit through passage and, if required, for the essential working of the ship.

7 All transverse or longitudinal bulkheads which are taken into account as effective to confine the seawater accumulated on the ro-ro deck shall be in place and secured before the voyage commences and remain in place and secured until the ship is at its next berth.

8 Notwithstanding the requirements of paragraph 7, the Administration may permit some accesses within such bulkheads to be opened during the voyage but only for sufficient time to permit through passage and, if required, for the essential working of the ship.

9 In all ro-ro passenger ships, the master or the designated officer shall ensure that, without the expressed consent of the master or the designated officer, no passengers are allowed access to an enclosed ro-ro deck during navigation."

63 In regulation 24, the existing title and paragraph 1 are replaced with the following:

"**Regulation 24 – Additional requirements for prevention and control of water ingress, etc. in cargo ships**

1 Openings in the shell plating below the deck limiting the vertical extent of damage shall be kept permanently closed during navigation."

64 The existing paragraph 3 is replaced with the following:

"3 Watertight doors or ramps fitted to internally subdivide large cargo spaces 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 log-book as may be prescribed by the Administration."

PART C
MACHINERY INSTALLATIONS

Regulation 35-1 – Bilge pumping arrangements

65 The following new sentence is added at the end of the existing paragraph 2.6:

"For ships subject to the provisions of regulation II-1/1.1.1.1, for the special hazards associated with loss of stability when fitted with fixed pressure water-spraying fire-extinguishing systems refer to regulation II-2/20.6.1.4."

66 In paragraph 3.2, the existing text of the whole volume of the passenger and crew spaces below the bulkhead deck *P* is replaced with the following:

"*P* = the whole volume of the passenger and crew spaces below the bulkhead deck (cubic metres), which are provided for the accommodation and use of passengers and crew, excluding baggage, store and provision rooms;"

67 In paragraph 3.4, the existing chapeau is replaced with the following:

"3.4 On a ship of 91.5 m in length *L* and upwards or having a bilge pump numeral, calculated in accordance with paragraph 3.2, of 30 or more, the arrangements shall be such that at least one power bilge pump shall be available for use in all flooding conditions which the ship is required to withstand, and, for ships subject to the provisions of regulation II-1/1.1.1.1, in all flooding conditions derived from consideration of minor damages as specified in regulation 8 as follows:"

68 The following new sentence is added at the end of the existing paragraph 3.10:

"For ships subject to the provisions of regulation II-1/1.1.1.1, the deepest subdivision load line shall be taken as the deepest subdivision draught."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

PART A
GENERAL

Regulation 3 – Definitions

69 Regulation II-2/3.56 is replaced as follows:

"56 Vehicle carrier means a cargo ship which only carries cargo in ro-ro spaces or vehicle spaces, and which is designed for the carriage of unoccupied motor vehicles without cargo, as cargo."

PART C
SUPPRESSION OF FIRE

Regulation 9 – Containment of fire

70 The following new paragraphs 4.1.3.4 to 4.1.3.6 are added after the existing paragraph 4.1.3.3:

"4.1.3.4 Notwithstanding the requirement in paragraph 4.1.3.3, the requirements in paragraphs 4.1.3.5 and 4.1.3.6 shall apply to ships constructed on or after 1 January 2020.

4.1.3.5 For ships carrying more than 36 passengers, windows facing survival craft, embarkation and assembly stations, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas shall have fire integrity as required in table 9.1. Where automatic dedicated sprinkler heads are provided for windows, "A-0" windows may be accepted as equivalent. To be considered under this paragraph, the sprinkler heads must either be:

.1 dedicated heads located above the windows, and installed in addition to the conventional ceiling sprinklers; or

.2 conventional ceiling sprinkler heads arranged such that the window is protected by an average application rate of at least 5 l/min per square metre and the additional window area is included in the calculation of the area of coverage; or

.3 water-mist nozzles that have been tested and approved in accordance with the Guidelines approved by the Organization*; and

Windows located in the ship's side below the lifeboat embarkation area shall have fire integrity at least equal to "A-0" class.

4.1.3.6 For ships carrying not more than 36 passengers, windows facing survival craft and escape slide, embarkation areas and windows situated below such areas shall have fire integrity at least equal to "A-0" class.

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* Refer to the *Revised guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12* (resolution A.800(19), as amended)."

PART G

SPECIAL REQUIREMENTS

Regulation 20 – Protection of vehicle, special category and ro-ro spaces

71 The existing paragraph under 2.1 is numbered as 2.1.1, the following paragraph 2.1.2 is added after the paragraph 2.1.1:

"2.1.2 On all ships, vehicles with fuel in their tanks for their own propulsion may be carried in cargo spaces other than vehicle, special category or ro-ro spaces, provided that all the following conditions are met:

.1 the vehicles do not use their own propulsion within the cargo spaces;

.2 the cargo spaces are in compliance with the appropriate requirements of regulation 19; and

.3 the vehicles are carried in accordance with the IMDG Code, as defined in regulation VII/1.1."

Regulation 20-1 – Requirements for vehicle carriers carrying motor vehicles with compressed hydrogen or natural gas in their tanks for their own propulsion as cargo

72 The existing paragraph 2.1 is replaced with the following:

"2.1 In addition to complying with the requirements of regulation 20, as appropriate, vehicle carriers constructed on or after 1 January 2016 intended for the carriage of motor vehicles with compressed hydrogen or compressed natural gas in their tanks for their own propulsion as cargo shall comply with the requirements in paragraphs 3 to 5 of this regulation."

CHAPTER III
LIFE-SAVING APPLIANCES AND ARRANGEMENTS

PART A
GENERAL

Regulation 1 – Application

73 The existing paragraph 4 is replaced with the following:

"4 For ships constructed before 1 July 1998, the Administration shall:

.1 ensure that, subject to the provisions of paragraph 4.2, the requirements which are applicable under chapter III of the International Convention for the Safety of Life at Sea, 1974, in force prior to 1 July 1998 to new or existing ships as prescribed by that chapter are complied with;

.2 ensure that when life-saving appliances or arrangements on such ships are replaced or such ships undergo repairs, alterations or modifications of a major character which involve replacement of, or any addition to, their existing life-saving appliances or arrangements, such life-saving appliances or arrangements, in so far as is reasonable and practicable, comply with the requirements of this chapter. However, if a survival craft other than an inflatable liferaft is replaced without replacing its launching appliance, or vice versa, the survival craft or launching appliance may be of the same type as that replaced; and

.3 ensure that the requirements of regulations 30.3 and 37.3.9 are complied with."

PART B
REQUIREMENTS FOR SHIPS AND LIFE-SAVING APPLIANCES

Regulation 30 – Drills

74 The following new paragraph 3 is added after the existing paragraph 2:

"3 Damage control drills shall be conducted as required in regulation II-1/19-1."

Regulation 37 – Muster list and emergency instructions

75 In paragraph 3, the existing sub-paragraphs .7 and .8 are replaced with the following:

".7 manning of fire parties assigned to deal with fires;

.8 special duties assigned in respect to the use of fire-fighting equipment and installations; and

.9 for passenger ships only, damage control for flooding emergencies."

APPENDIX

CERTIFICATES

RECORD OF EQUIPMENT FOR PASSENGER SHIP SAFETY (FORM P)

76 In part 5, the existing item 3.1 is replaced by the following:

"3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system/multi-system shipborne radionavigation receiver[3,4]"

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM E)

77 In part 3, the existing item 3.1 is replaced by the following:

"3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system/multi-system shipborne radionavigation receiver[2,3]"

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM C)

78 In part 5, the existing item 3.1 is replaced by the following:

"3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system/multi-system shipborne radionavigation receiver[2,3]"

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ANNEX 4

RESOLUTION MSC.422(98)
(adopted on 15 June 2017)

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

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.391(95), by which it adopted the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels ("the IGF Code"), which has become mandatory under chapters II-1 and II-2 of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation II-1/2.29 of the Convention concerning the procedure for amending the IGF Code,

HAVING CONSIDERED, at its ninety-eighth 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 2019 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 2020 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purpose 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 CODE OF SAFETY FOR SHIPS USING GASES OR OTHER LOW-FLASHPOINT FUELS (IGF CODE)

CHAPTER 11
FIRE SAFETY

11.3 Regulations for fire protection

1 In paragraph 11.3.2, the words ", and any boundaries above that, including navigation bridge windows, shall have A-0 class divisions" are deleted.

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ANNEX 5

RESOLUTION MSC.423(98)
(adopted on 15 June 2017)

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

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.36(63), by which it adopted the International Code of Safety for High-Speed Craft ("the 1994 HSC Code"), which has become mandatory under chapter X of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation X/1.1 of the Convention concerning the procedure for amending the 1994 HSC Code,

HAVING CONSIDERED, at its ninety-eighth session, amendments to the 1994 HSC 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 1994 HSC 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 said amendments shall be deemed to have been accepted on 1 July 2019 unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50 % of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2020 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 CODE OF SAFETY FOR HIGH-SPEED CRAFT, 1994 (1994 HSC CODE)

Chapter 8
Life-saving appliances and arrangements

8.10 Survival craft and rescue boats

1 Paragraphs 8.10.1.5 and 8.10.1.6 are replaced with the following:

".5 notwithstanding the provision of .4 above, craft should carry sufficient rescue boats to ensure that, in providing for abandonment by the total number of persons the craft is certified to carry:

.5.1 not more than nine of the liferafts provided in accordance with 8.10.1.1 are marshalled by each rescue boat; or

.5.2 if the Administration is satisfied that the rescue boats are capable of towing a pair of such liferafts simultaneously, not more than 12 of the liferafts provided in accordance with 8.10.1.1 are marshalled by each rescue boat; and

.5.3 the craft can be evacuated within the time specified in 4.8.

.6 craft of less than 20 m in length may be exempted from carrying a rescue boat, provided the craft meets all of the following requirements:

.6.1 the craft is arranged to allow a helpless person to be recovered from the water in a horizontal or near-horizontal body position;

.6.2 recovery of the helpless person can be observed from the navigating bridge; and

.6.3 the craft is sufficiently manoeuvrable to close in and recover persons in the worst intended conditions."

***

ANNEX 6

RESOLUTION MSC.424(98)
(adopted on 15 June 2017)

AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.97(73), by which it adopted the International Code of Safety for High-Speed Craft, 2000 ("the 2000 HSC Code"), which has become mandatory under chapter X of the International Convention for the Safety of Life at Sea (SOLAS), 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation X/1.2 of the Convention concerning the procedure for amending the 2000 HSC Code,

HAVING CONSIDERED, at its ninety-eighth session, amendments to the 2000 HSC 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 2000 HSC 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 said amendments shall be deemed to have been accepted on 1 July 2019 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 2020 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 CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)

Chapter 8
Life-saving appliances and arrangements

8.10 Survival craft and rescue boats

1 Paragraphs 8.10.1.5 and 8.10.1.6 are replaced with the following:

".5 notwithstanding the provision of .4 above, craft shall carry sufficient rescue boats to ensure that, in providing for abandonment by the total number of persons the craft is certified to carry:

.5.1 not more than nine of the liferafts provided in accordance with 8.10.1.1 are marshalled by each rescue boat; or

.5.2 if the Administration is satisfied that the rescue boats are capable of towing a pair of such liferafts simultaneously, not more than 12 of the liferafts provided in accordance with 8.10.1.1 are marshalled by each rescue boat; and

.5.3 the craft can be evacuated within the time specified in 4.8.

.6 craft of less than 30 m in length may be exempted from carrying a rescue boat, provided the craft meets all of the following requirements:

.6.1 the craft is arranged to allow a helpless person to be recovered from the water in a horizontal or near-horizontal body position;

.6.2 recovery of the helpless person can be observed from the navigating bridge; and

.6.3 the craft is sufficiently manoeuvrable to close in and recover persons in the worst intended conditions."

***

ANNEX 7

RESOLUTION MSC.425(98)
(adopted on 15 June 2017)

AMENDMENTS TO THE INTERNATIONAL LIFE-SAVING APPLIANCE (LSA) CODE

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.48(66), by which it adopted the International Life-Saving Appliance (LSA) Code ("the LSA Code"), which has become mandatory under chapter III of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation III/3.10 of the Convention concerning the procedure for amending the LSA Code,

HAVING CONSIDERED, at its ninety-eighth session, amendments to the LSA 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 LSA 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 said amendments shall be deemed to have been accepted on 1 July 2019 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 2020 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 LIFE-SAVING APPLIANCE (LSA) CODE

CHAPTER VI
LAUNCHING AND EMBARKATION APPLIANCES

6.1 Launching and embarkation appliances

1 Paragraphs 6.1.1.5 and 6.1.1.6 are replaced with the following:

"6.1.1.5 The launching appliance and its attachments other than winches shall be of sufficient strength to withstand a factory static proof load test of not less than 2.2 times the maximum working load.

6.1.1.6 Structural members and all blocks, falls, padeyes, links, fastenings and all other fittings used in connection with launching equipment shall be designed with a factor of safety on the basis of the maximum working load assigned and the ultimate strengths of the materials used for construction. A minimum factor of safety of 4.5 shall be applied to all structural members including winch structural components and a minimum factor of safety of 6 shall be applied to falls, suspension chains, links and blocks."

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ANNEX 8

RESOLUTION MSC.426(98)
(adopted on 15 June 2017)

AMENDMENTS TO THE INTERNATIONAL MARITIME SOLID BULK CARGOES (IMSBC) CODE

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.268(85) by which it adopted the International Maritime Solid Bulk Cargoes Code ("the IMSBC Code"), which has become mandatory under chapter VI of the International Convention for the Safety of Life at Sea, 1974, as amended ("the Convention"),

NOTING ALSO article VIII(b) and regulation VI/1-1.1 of the Convention concerning the procedure for amending the IMSBC Code,

HAVING CONSIDERED, at its ninety-eighth session, amendments to the IMSBC 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 IMSBC 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 said amendments shall be deemed to have been accepted on 1 July 2018 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 2019 upon their acceptance in accordance with paragraph 2 above;

4 AGREES that Contracting Governments to the Convention may apply the aforementioned amendments in whole or in part on a voluntary basis as from 1 January 2018;

5 REQUESTS the Secretary-General, for the purpose 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; and

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

ANNEX

AMENDMENTS TO THE INTERNATIONAL MARITIME SOLID BULK CARGOES (IMSBC) CODE

Section 1
General provisions

1.4 Application and implementation of this Code

1 In paragraph 1.4.2, the words "Characteristics (other than CLASS and GROUP)" are replaced with the words "Characteristics (other than CLASS, SUBSIDIARY RISK and GROUP)". The words "Paragraph 4.2.2.2;" and "Section 14 Prevention of pollution by cargo residues from ships;" are deleted.

1.7 Definitions

2 In the definition for "*Bulk Cargo Shipping Name (BCSN)*", the third sentence is replaced with the following:

"When a cargo is dangerous goods as defined in the IMDG Code, as defined in regulation VII/1.1 of the SOLAS Convention, refer to 4.1.1."

Section 4
Assessment of acceptability of consignments for safe shipment

4.1 Identification and classification

3 The existing paragraph "4.1.1" is replaced with the following:

"4.1.1 Bulk Cargo Shipping Name

4.1.1.1 Each solid bulk cargo in this Code has been assigned a Bulk Cargo Shipping Name (BCSN). When a solid bulk cargo is carried by sea it shall be identified in the transport documentation by the BCSN.

4.1.1.2 Where the cargo is dangerous goods and not identified with a generic Proper Shipping Name, or not otherwise specified (N.O.S) in the IMDG Code, the BCSN shall consist of the Proper Shipping Name followed by the UN number.

4.1.1.3 Except for RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile – excepted UN 2912 and RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I), non-fissile or fissile – excepted UN 2913, where the cargo is dangerous goods identified with a generic Proper Shipping Name and/or not otherwise specified (N.O.S) in the IMDG Code, the BCSN shall consist of, in the following order:

.1 a chemical or technical name of the material;

.2 a specific description to identify the properties of the material; and

.3 the UN number."

4.2 Provision of information

4 The existing paragraph 4.2.2.1 is renumbered as "4.2.2".

5 In the renumbered paragraph 4.2.2, in sub-paragraph .15, the word "and" is deleted.

6 In the renumbered paragraph 4.2.2, a new sub-paragraph .16 is inserted as follows:

".16 whether or not the cargo is classified as harmful to the marine environment in accordance with Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended; and"

7 In the renumbered paragraph 4.2.2, the existing sub-paragraph .16 is renumbered as sub-paragraph .17.

8 Paragraph 4.2.2.2 "The cargo information should include whether or not the cargo is harmful to the marine environment*" and the corresponding footnote are deleted.

4.5 Interval between sampling/testing and loading for TML and moisture content determination

9 Replace the existing paragraphs 4.5.1 and 4.5.2 with the following:

"4.5.1 The shipper shall be responsible for ensuring that a test to determine the TML of a solid bulk cargo is conducted within six months to the date of loading the cargo. Notwithstanding this provision, where the composition or characteristics of the cargo are variable for any reason, the shipper shall be responsible for ensuring that a test to determine the TML is conducted again after it is reasonably assumed that such variation has taken place.

4.5.2 The shipper shall be responsible for ensuring that sampling and testing for moisture content is conducted as near as practicable to the date of commencement of loading. The interval between sampling/testing and the date of commencement of loading shall never be more than seven days. If the cargo has been exposed to significant rain or snow between the time of testing and the date of completion of loading, the shipper shall be responsible for ensuring that the moisture content of the cargo is still less than its TML, and evidence of this is provided to the master as soon as practicable."

Section 9
Materials possessing chemical hazards

9.3.3 Segregation between bulk materials possessing chemical hazards and dangerous goods in packaged form

10 In the segregation table as contained in paragraph 9.3.3, in the row of "Substances which, in contact with water, emit flammable gases", under the column "2.1", replace the number "1" with "2".

Section 13
References to related information and recommendations

13.2 Reference list

11 In section 13.2.7 "Minimum information/documentation", new rows are added at the end of section as follows:

4.2	MARPOL Annex V, regulation 4.3	*Discharge of garbage outside special areas*
4.2	MARPOL Annex V, regulation 6.1.2.2	*Discharge of garbage within special areas*

13.2.10 Segregation

12 Delete row "9.3.3".

13.2.11 Transport of solid wastes in bulk

13 In row "10.6", under the column "Reference to the relevant IMO instruments or standard (2)", replace the term "chapter 7.8.4" with "sub-section 2.0.5.4".

Section 14
Prevention of pollution by cargo residues from ships

14 Section 14 is deleted.

APPENDIX 1

Individual schedules of solid bulk cargoes

Amendments to existing individual schedules

ALUMINA

15 In the individual schedule for "ALUMINA", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINA, CALCINED

16 In the individual schedule for "ALUMINA, CALCINED", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINA HYDRATE

17 In the individual schedule for "ALUMINA HYDRATE", under the section for "Hazard", in the first sentence, add the word "a" before "moisture content"; in the second sentence, replace the words "of the Code" with the words "of this Code" and under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINA SILICA

18 In the individual schedule for "ALUMINA SILICA", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINA SILICA, pellets

19 In the individual schedule for "ALUMINA SILICA, pellets", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINIUM FERROSILICON POWDER UN 1395

20 In the individual schedule for "ALUMINIUM FERROSILICON POWDER UN 1395", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINIUM FLUORIDE

21 In the individual schedule for "ALUMINIUM FLUORIDE", under the section for "Weather precautions", the words "less than its TML during voyage" are replaced with the words "less than its TML during loading operations and the voyage".

ALUMINIUM NITRATE UN 1438

22 In the individual schedule for "ALUMINIUM NITRATE UN 1438 ", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINIUM SILICON POWDER, UNCOATED UN 1398

23 In the individual schedule for "ALUMINIUM SILICON POWDER, UNCOATED UN 1398", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

**ALUMINIUM SMELTING BY-PRODUCTS or
ALUMINIUM REMELTING BY-PRODUCTS UN 3170**

24 In the individual schedule for "ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS UN 3170", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINIUM SMELTING/REMELTING BY-PRODUCTS, PROCESSED

25 In the individual schedule for "ALUMINIUM SMELTING/REMELTING BY-PRODUCTS, PROCESSED", under the section for "Hazard", in the second sentence, add the word "a" before "moisture content"; in the third sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Loading", replace the words "of the Code" with the words "of this Code". Under the section for "Clean-up", in the third sentence, replace the word "should" with "shall".

AMMONIUM NITRATE UN 1942

26 In the individual schedule for "AMMONIUM NITRATE UN 1942", under the section for "Loading", in the second sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

AMMONIUM NITRATE BASED FERTILIZER UN 2067

27 In the individual schedule for "AMMONIUM NITRATE BASED FERTILIZER UN 2067", under the section for "Loading", in the first sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

AMMONIUM NITRATE BASED FERTILIZER UN 2071

28 In the individual schedule for "AMMONIUM NITRATE BASED FERTILIZER UN 2071", under the section for "Loading", in the first sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

AMMONIUM NITRATE BASED FERTILIZER (non-hazardous)

29 In the individual schedule for "AMMONIUM NITRATE BASED FERTILIZER (non-hazardous)", under the section for "Stowage and segregation", in the first sentence, replace the word "should" with "shall". Under the section for "Loading", in the first sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

AMMONIUM SULPHATE

30 In the individual schedule for "AMMONIUM SULPHATE", under the section for "Loading", in the third sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

ANTIMONY ORE AND RESIDUE

31 In the individual schedule for "ANTIMONY ORE AND RESIDUE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

BARIUM NITRATE UN 1446

32 In the individual schedule for "BARIUM NITRATE UN 1446", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

BARYTES

33 In the individual schedule for "BARYTES", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

BAUXITE

34 In the individual schedule for "BAUXITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

BIOSLUDGE

35 In the individual schedule for "BIOSLUDGE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

BORAX (PENTAHYDRATE CRUDE)

36 In the individual schedule for "BORAX (PENTAHYDRATE CRUDE)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

BORAX, ANHYDROUS (crude or refined)

37 In the individual schedule for "BORAX, ANHYDROUS (crude or refined)", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

BROWN COAL BRIQUETTES

38 In the individual schedule for "BROWN COAL BRIQUETTES", in the appendix of the schedule, under the section for "Carriage", in 8.1, after the words "The company's", add "*" with the following footnote:

"* Refer to SOLAS regulation IX/1.2.";

and under the section for "Discharge", after the words "self-contained breathing apparatus", add "*" with the following footnote:

"* Refer to the *Revised recommendations for entering enclosed spaces aboard ships,* adopted by the Organization by resolution A.1050(27)."

CALCIUM NITRATE UN 1454

39 In the individual schedule for "CALCIUM NITRATE UN 1454", under the section for "Loading", in the second sentence, replace the words "of the Code" with the words "of this Code".

CALCIUM NITRATE FERTILIZER

40 In the individual schedule for "CALCIUM NITRATE FERTILIZER", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

CARBORUNDUM

41 In the individual schedule for "CARBORUNDUM", under the section for "Loading", replace the words "of the Code" with the words "of this Code" and add the following text:

"As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo.";

and under the section for "Precautions", replace the word "should" with the word "shall".

CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or CASTOR FLAKE UN 2969

42 In the individual schedule for "CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or CASTOR FLAKE UN 2969", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CEMENT CLINKERS

43 In the individual schedule for "CEMENT CLINKERS", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CHAMOTTE

44 In the individual schedule for "CHAMOTTE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CHARCOAL

45 In the individual schedule for "CHARCOAL", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

CHOPPED RUBBER AND PLASTIC INSULATION

46 In the individual schedule for "CHOPPED RUBBER AND PLASTIC INSULATION", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CHROME PELLETS

47 In the individual schedule for "CHROME PELLETS", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CHROMITE ORE

48 In the individual schedule for "CHROMITE ORE ", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

CLAY

49 In the individual schedule for "CLAY", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CLINKER ASH

50 In the existing individual schedule for "CLINKER ASH", under the section for "Description", in the fourth sentence, the words "taken out" are replaced with "discharged" twice. Under the section for "Hazard", in the second sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COAL

51 In the individual schedule for "COAL", under the BCSN, add the following sentences and the corresponding footnote:

> "Coal shall be classified as Group A and B unless classified as Group B only by a test determined by the appropriate authority* or where it has the following particle size distribution:
>
> .1 not more than 10% by weight of particles less than 1 mm (D10 > 1mm); and

.2 not more than 50% by weight of particles less than 10 mm (D50 > 10 mm).

Notwithstanding the above, a blend of two or more coals shall be classified as Group A and B unless all original coals in the blend are Group B only.

* See subsection 8.1 of this Code."

52 Under the section for "Hazard", delete the sentence "Can liquefy if predominantly fine 75% less than 5 mm coal." and add the sentence "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code." at the end of the section.

53 Under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"

and

".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". and add the sentence "Due consideration shall be given to moisture migration and formation of dangerous wet base when blended coals are loaded." at the end of the section.

54 In the appendix, under the section "Special precautions", in "2 Self-heating coals", in paragraph .5, after the words "and the company", add "*" with the following footnote:

"* Refer to SOLAS regulation IX/1.2."

COAL SLURRY

55 In the individual schedule for "COAL SLURRY", under the section for "Hazard", replace the first sentence with:

"This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"

and

".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COAL TAR PITCH

56 In the individual schedule for "COAL TAR PITCH", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COARSE CHOPPED TYRES

57 In the individual schedule for "COARSE CHOPPED TYRES", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COARSE IRON AND STEEL SLAG AND ITS MIXTURE

58 In the individual schedule for "COARSE IRON AND STEEL SLAG AND ITS MIXTURE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

COKE

59 In the individual schedule for "COKE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COKE BREEZE

60 In the individual schedule for "COKE BREEZE", under the section for "Hazard", replace the first sentence with:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COLEMANITE

61 In the individual schedule for "COLEMANITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COPPER GRANULES

62 In the individual schedule for "COPPER GRANULES", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

COPPER MATTE

63 In the individual schedule for "COPPER MATTE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

COPPER SLAG

64 In the individual schedule for "COPPER SLAG ", under the section for "Hazard", in the first sentence, add the word "a" before the words "moisture content". Under the section for "Loading", replace the first sentence with the following:

> "This cargo shall be trimmed to ensure that the height difference between peaks and troughs does not exceed 5% of the ship's breadth and that the cargo slopes uniformly from the hatch boundaries to the bulkheads to avoid steep surfaces of cargo that could collapse during voyage.";

and under the section for "Carriage", add the following text at the end of the section:

> "The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge."

COPRA (dry) UN 1363

65 In the individual schedule for "COPRA (dry) UN 1363", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Precautions", after the words "concentration of oxygen", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

CRUSHED CARBON ANODES

66 In the individual schedule for "CRUSHED CARBON ANODES", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CRYOLITE

67 In the individual schedule for "CRYOLITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

DIAMMONIUM PHOSPHATE (D.A.P.)

68 In the individual schedule for "DIAMMONIUM PHOSPHATE (D.A.P.)", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

DIRECT REDUCED IRON (A) Briquettes, hot-moulded

69 In the individual schedule for "DIRECT REDUCED IRON (A) Briquettes, hot-moulded", under the section for "Loading", in the sixth sentence, replace the words "of the Code" with the words "of this Code"; add the following text at the end of the section:

> "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo.";

under the section for "Precautions", in the last sentence, after the words "adjacent spaces", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).";

and under the sections for "Carriage" and "Discharge", replace the words "(> 25% LEL)" with "(> 25% lower explosive limit (LEL))". Under the section for "Clean-up", in the third sentence, replace the word "should" with the word "shall".

DIRECT REDUCED IRON (B) Lumps, pellets, cold-moulded briquettes

70 In the individual schedule for "DIRECT REDUCED IRON (B) Lumps, pellets, cold-moulded briquettes", under the section for "Loading", in the sentence "Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code", replace the words "of the Code" with the words "of this Code"; add the following text:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

under the section for "Precautions", in the sentence "All precautions shall be taken when entering the cargo spaces", after the words "entering the cargo spaces", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).";

and under the sections for "Carriage" and "Discharge", replace the words "(> 25% LEL)" with "(> 25% lower explosive limit (LEL))". Under the section for "Clean-up", in the second sentence, replace the word "should" with the word "shall".

DIRECT REDUCED IRON (C) By-product fines

71 In the individual schedule for "DIRECT REDUCED IRON (C) (By-product fines)", under the section for "Loading", in the sentence "Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code", replace the words "of the Code" with the words "of this Code"; and add the following text:

> "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo.";

under the section for "Precautions", in the sixteenth sentence, after the words "to support life", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).";

and under the sections for "Carriage" and "Discharge", replace the words "(> 25% LEL)" with "(> 25% lower explosive limit (LEL))".

DISTILLERS DRIED GRAINS WITH SOLUBLES

72 In the individual schedule for "DISTILLERS DRIED GRAINS WITH SOLUBLES", under the section for "Loading", in the second sentence, replace the words "of the Code" with the words "of this Code".

DOLOMITE

73 In the individual schedule for "DOLOMITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

FELSPAR LUMP

74 In the individual schedule for "FELSPAR LUMP", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

FERROCHROME

75 In the individual schedule for "FERROCHROME", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERROCHROME, exothermic

76 In the individual schedule for "FERROCHROME, exothermic", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERROMANGANESE

77 In the individual schedule for "FERROMANGANESE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERRONICKEL

78 In the individual schedule for "FERRONICKEL", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERROPHOSPHORUS (including briquettes)

79 In the individual schedule for "FERROPHOSPHORUS (including briquettes)", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERROSILICON UN 1408 with 30% or more but less than 90% silicon (including briquettes)

80 In the individual schedule for "FERROSILICON UN 1408 with 30% or more but less than 90% silicon (including briquettes)", replace the table in the section for "Characteristics" with the following:

"

Angle of repose	Bulk density (kg/m^3)		Stowage factor (m^3/t)
Not applicable	1,389 to 2,083 (1,111 to 1,538 for briquettes)		0.48 to 0.72 (0.65 to 0.90 for briquettes)
Size	**Class**	**Subsidiary risk**	**Group**
Up to 300 mm briquettes	4.3	6.1	B

"

Under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code"; and replace the sentences "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo." with the following:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

and under the section for "Operational requirements" in the appendix, in (vii), after the words "below 18%", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

FERROSILICON 25% to 30% silicon, or 90% or more silicon (including briquettes)

81 In the individual schedule for "FERROSILICON 25% to 30% silicon, or 90% or more silicon (including briquettes)", the Bulk Cargo Shipping Name is replaced with following:

> "FERROSILICON with at least 25% but less than 30% silicon, or 90% or more silicon";

in the table of "Characteristics", under the section for "Size", the words "Diameter: 2.54" are replaced with "Up to 300 mm briquettes". Under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code"; and replace the sentences "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo." with the following:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

and under the section for "Operational requirements" in the appendix, in (vii), after the words "below 18%", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS UN 2793 in a form liable to self-heating

82 In the individual schedule for "FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS UN 2793 in a form liable to self-heating", under the section for "Discharge", after the words "appropriate breathing apparatus", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

FERROUS SULPHATE HEPTAHYDRATE

83 In the individual schedule for "FERROUS SULPHATE HEPTAHYDRATE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

FERTILIZERS WITHOUT NITRATES (non-hazardous)

84 In the individual schedule for "FERTILIZERS WITHOUT NITRATES (non-hazardous)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

FISH (IN BULK)

85 In the individual schedule for "FISH (IN BULK)", under the section for "Loading", replace the words "of the Code" with the words "of this Code". Under the section for "Carriage", replace the words "No special requirements" with the following:

> "The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge."

FISHMEAL (FISHSCRAP), STABILIZED UN 2216 Anti-oxidant treated

86 In the individual schedule for "FISHMEAL (FISHSCRAP), STABILIZED UN 2216 Anti-oxidant treated", in the provision under the Bulk Cargo Shipping Name, delete the term "Group C,"; and under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FLUORSPAR

87 In the individual schedule for "FLUORSPAR", under the section for "Hazard", replace the first and second sentence with:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

ANNEX 8

RESOLUTION MSC.426(98)
(adopted on 15 June 2017)

AMENDMENTS TO THE INTERNATIONAL MARITIME SOLID BULK CARGOES (IMSBC) CODE

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.268(85) by which it adopted the International Maritime Solid Bulk Cargoes Code ("the IMSBC Code"), which has become mandatory under chapter VI of the International Convention for the Safety of Life at Sea, 1974, as amended ("the Convention"),

NOTING ALSO article VIII(b) and regulation VI/1-1.1 of the Convention concerning the procedure for amending the IMSBC Code,

HAVING CONSIDERED, at its ninety-eighth session, amendments to the IMSBC 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 IMSBC 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 said amendments shall be deemed to have been accepted on 1 July 2018 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 2019 upon their acceptance in accordance with paragraph 2 above;

4 AGREES that Contracting Governments to the Convention may apply the aforementioned amendments in whole or in part on a voluntary basis as from 1 January 2018;

5 REQUESTS the Secretary-General, for the purpose 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; and

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

ANNEX

AMENDMENTS TO THE INTERNATIONAL MARITIME SOLID BULK CARGOES (IMSBC) CODE

Section 1
General provisions

1.4 Application and implementation of this Code

1 In paragraph 1.4.2, the words "Characteristics (other than CLASS and GROUP)" are replaced with the words "Characteristics (other than CLASS, SUBSIDIARY RISK and GROUP)". The words "Paragraph 4.2.2.2;" and "Section 14 Prevention of pollution by cargo residues from ships;" are deleted.

1.7 Definitions

2 In the definition for "*Bulk Cargo Shipping Name (BCSN)*", the third sentence is replaced with the following:

"When a cargo is dangerous goods as defined in the IMDG Code, as defined in regulation VII/1.1 of the SOLAS Convention, refer to 4.1.1."

Section 4
Assessment of acceptability of consignments for safe shipment

4.1 Identification and classification

3 The existing paragraph "4.1.1" is replaced with the following:

"4.1.1 Bulk Cargo Shipping Name

4.1.1.1 Each solid bulk cargo in this Code has been assigned a Bulk Cargo Shipping Name (BCSN). When a solid bulk cargo is carried by sea it shall be identified in the transport documentation by the BCSN.

4.1.1.2 Where the cargo is dangerous goods and not identified with a generic Proper Shipping Name, or not otherwise specified (N.O.S) in the IMDG Code, the BCSN shall consist of the Proper Shipping Name followed by the UN number.

4.1.1.3 Except for RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile – excepted UN 2912 and RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I), non-fissile or fissile – excepted UN 2913, where the cargo is dangerous goods identified with a generic Proper Shipping Name and/or not otherwise specified (N.O.S) in the IMDG Code, the BCSN shall consist of, in the following order:

.1 a chemical or technical name of the material;

.2 a specific description to identify the properties of the material; and

.3 the UN number."

4.2 Provision of information

4 The existing paragraph 4.2.2.1 is renumbered as "4.2.2".

5 In the renumbered paragraph 4.2.2, in sub-paragraph .15, the word "and" is deleted.

6 In the renumbered paragraph 4.2.2, a new sub-paragraph .16 is inserted as follows:

".16 whether or not the cargo is classified as harmful to the marine environment in accordance with Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended; and"

7 In the renumbered paragraph 4.2.2, the existing sub-paragraph .16 is renumbered as sub-paragraph .17.

8 Paragraph 4.2.2.2 "The cargo information should include whether or not the cargo is harmful to the marine environment*" and the corresponding footnote are deleted.

4.5 Interval between sampling/testing and loading for TML and moisture content determination

9 Replace the existing paragraphs 4.5.1 and 4.5.2 with the following:

"4.5.1 The shipper shall be responsible for ensuring that a test to determine the TML of a solid bulk cargo is conducted within six months to the date of loading the cargo. Notwithstanding this provision, where the composition or characteristics of the cargo are variable for any reason, the shipper shall be responsible for ensuring that a test to determine the TML is conducted again after it is reasonably assumed that such variation has taken place.

4.5.2 The shipper shall be responsible for ensuring that sampling and testing for moisture content is conducted as near as practicable to the date of commencement of loading. The interval between sampling/testing and the date of commencement of loading shall never be more than seven days. If the cargo has been exposed to significant rain or snow between the time of testing and the date of completion of loading, the shipper shall be responsible for ensuring that the moisture content of the cargo is still less than its TML, and evidence of this is provided to the master as soon as practicable."

Section 9
Materials possessing chemical hazards

9.3.3 Segregation between bulk materials possessing chemical hazards and dangerous goods in packaged form

10 In the segregation table as contained in paragraph 9.3.3, in the row of "Substances which, in contact with water, emit flammable gases", under the column "2.1", replace the number "1" with "2".

Section 13
References to related information and recommendations

13.2 Reference list

11 In section 13.2.7 "Minimum information/documentation", new rows are added at the end of section as follows:

4.2	MARPOL Annex V, regulation 4.3	*Discharge of garbage outside special areas*
4.2	MARPOL Annex V, regulation 6.1.2.2	*Discharge of garbage within special areas*

13.2.10 Segregation

12 Delete row "9.3.3".

13.2.11 Transport of solid wastes in bulk

13 In row "10.6", under the column "Reference to the relevant IMO instruments or standard (2)", replace the term "chapter 7.8.4" with "sub-section 2.0.5.4".

Section 14
Prevention of pollution by cargo residues from ships

14 Section 14 is deleted.

APPENDIX 1

Individual schedules of solid bulk cargoes

Amendments to existing individual schedules

ALUMINA

15 In the individual schedule for "ALUMINA", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINA, CALCINED

16 In the individual schedule for "ALUMINA, CALCINED", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINA HYDRATE

17 In the individual schedule for "ALUMINA HYDRATE", under the section for "Hazard", in the first sentence, add the word "a" before "moisture content"; in the second sentence, replace the words "of the Code" with the words "of this Code" and under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINA SILICA

18 In the individual schedule for "ALUMINA SILICA", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINA SILICA, pellets

19 In the individual schedule for "ALUMINA SILICA, pellets", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINIUM FERROSILICON POWDER UN 1395

20 In the individual schedule for "ALUMINIUM FERROSILICON POWDER UN 1395", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINIUM FLUORIDE

21 In the individual schedule for "ALUMINIUM FLUORIDE", under the section for "Weather precautions", the words "less than its TML during voyage" are replaced with the words "less than its TML during loading operations and the voyage".

ALUMINIUM NITRATE UN 1438

22 In the individual schedule for "ALUMINIUM NITRATE UN 1438 ", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINIUM SILICON POWDER, UNCOATED UN 1398

23 In the individual schedule for "ALUMINIUM SILICON POWDER, UNCOATED UN 1398", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

**ALUMINIUM SMELTING BY-PRODUCTS or
ALUMINIUM REMELTING BY-PRODUCTS UN 3170**

24 In the individual schedule for "ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS UN 3170", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ALUMINIUM SMELTING/REMELTING BY-PRODUCTS, PROCESSED

25 In the individual schedule for "ALUMINIUM SMELTING/REMELTING BY-PRODUCTS, PROCESSED", under the section for "Hazard", in the second sentence, add the word "a" before "moisture content"; in the third sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Loading", replace the words "of the Code" with the words "of this Code". Under the section for "Clean-up", in the third sentence, replace the word "should" with "shall".

AMMONIUM NITRATE UN 1942

26 In the individual schedule for "AMMONIUM NITRATE UN 1942", under the section for "Loading", in the second sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

AMMONIUM NITRATE BASED FERTILIZER UN 2067

27 In the individual schedule for "AMMONIUM NITRATE BASED FERTILIZER UN 2067", under the section for "Loading", in the first sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

AMMONIUM NITRATE BASED FERTILIZER UN 2071

28 In the individual schedule for "AMMONIUM NITRATE BASED FERTILIZER UN 2071", under the section for "Loading", in the first sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

AMMONIUM NITRATE BASED FERTILIZER (non-hazardous)

29 In the individual schedule for "AMMONIUM NITRATE BASED FERTILIZER (non-hazardous)", under the section for "Stowage and segregation", in the first sentence, replace the word "should" with "shall". Under the section for "Loading", in the first sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

AMMONIUM SULPHATE

30 In the individual schedule for "AMMONIUM SULPHATE", under the section for "Loading", in the third sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

ANTIMONY ORE AND RESIDUE

31 In the individual schedule for "ANTIMONY ORE AND RESIDUE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

BARIUM NITRATE UN 1446

32 In the individual schedule for "BARIUM NITRATE UN 1446", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

BARYTES

33 In the individual schedule for "BARYTES", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

BAUXITE

34 In the individual schedule for "BAUXITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

BIOSLUDGE

35 In the individual schedule for "BIOSLUDGE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

BORAX (PENTAHYDRATE CRUDE)

36 In the individual schedule for "BORAX (PENTAHYDRATE CRUDE)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

BORAX, ANHYDROUS (crude or refined)

37 In the individual schedule for "BORAX, ANHYDROUS (crude or refined)", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

BROWN COAL BRIQUETTES

38 In the individual schedule for "BROWN COAL BRIQUETTES", in the appendix of the schedule, under the section for "Carriage", in 8.1, after the words "The company's", add "*" with the following footnote:

"* Refer to SOLAS regulation IX/1.2.";

and under the section for "Discharge", after the words "self-contained breathing apparatus", add "*" with the following footnote:

"* Refer to the *Revised recommendations for entering enclosed spaces aboard ships,* adopted by the Organization by resolution A.1050(27)."

CALCIUM NITRATE UN 1454

39 In the individual schedule for "CALCIUM NITRATE UN 1454", under the section for "Loading", in the second sentence, replace the words "of the Code" with the words "of this Code".

CALCIUM NITRATE FERTILIZER

40 In the individual schedule for "CALCIUM NITRATE FERTILIZER", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

CARBORUNDUM

41 In the individual schedule for "CARBORUNDUM", under the section for "Loading", replace the words "of the Code" with the words "of this Code" and add the following text:

"As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo.";

and under the section for "Precautions", replace the word "should" with the word "shall".

CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or CASTOR FLAKE UN 2969

42 In the individual schedule for "CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or CASTOR FLAKE UN 2969", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CEMENT CLINKERS

43 In the individual schedule for "CEMENT CLINKERS", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CHAMOTTE

44 In the individual schedule for "CHAMOTTE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CHARCOAL

45 In the individual schedule for "CHARCOAL", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

CHOPPED RUBBER AND PLASTIC INSULATION

46 In the individual schedule for "CHOPPED RUBBER AND PLASTIC INSULATION", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CHROME PELLETS

47 In the individual schedule for "CHROME PELLETS", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CHROMITE ORE

48 In the individual schedule for "CHROMITE ORE ", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

CLAY

49 In the individual schedule for "CLAY", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CLINKER ASH

50 In the existing individual schedule for "CLINKER ASH", under the section for "Description", in the fourth sentence, the words "taken out" are replaced with "discharged" twice. Under the section for "Hazard", in the second sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COAL

51 In the individual schedule for "COAL", under the BCSN, add the following sentences and the corresponding footnote:

> "Coal shall be classified as Group A and B unless classified as Group B only by a test determined by the appropriate authority* or where it has the following particle size distribution:
>
> .1 not more than 10% by weight of particles less than 1 mm (D10 > 1mm); and

.2 not more than 50% by weight of particles less than 10 mm (D50 > 10 mm).

Notwithstanding the above, a blend of two or more coals shall be classified as Group A and B unless all original coals in the blend are Group B only.

* See subsection 8.1 of this Code."

52 Under the section for "Hazard", delete the sentence "Can liquefy if predominantly fine 75% less than 5 mm coal." and add the sentence "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code." at the end of the section.

53 Under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"

and

".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". and add the sentence "Due consideration shall be given to moisture migration and formation of dangerous wet base when blended coals are loaded." at the end of the section.

54 In the appendix, under the section "Special precautions", in "2 Self-heating coals", in paragraph .5, after the words "and the company", add "*" with the following footnote:

"* Refer to SOLAS regulation IX/1.2."

COAL SLURRY

55 In the individual schedule for "COAL SLURRY", under the section for "Hazard", replace the first sentence with:

"This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"

and

".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COAL TAR PITCH

56 In the individual schedule for "COAL TAR PITCH", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COARSE CHOPPED TYRES

57 In the individual schedule for "COARSE CHOPPED TYRES", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COARSE IRON AND STEEL SLAG AND ITS MIXTURE

58 In the individual schedule for "COARSE IRON AND STEEL SLAG AND ITS MIXTURE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

COKE

59 In the individual schedule for "COKE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COKE BREEZE

60 In the individual schedule for "COKE BREEZE", under the section for "Hazard", replace the first sentence with:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COLEMANITE

61 In the individual schedule for "COLEMANITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

COPPER GRANULES

62 In the individual schedule for "COPPER GRANULES", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

COPPER MATTE

63 In the individual schedule for "COPPER MATTE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

COPPER SLAG

64 In the individual schedule for "COPPER SLAG ", under the section for "Hazard", in the first sentence, add the word "a" before the words "moisture content". Under the section for "Loading", replace the first sentence with the following:

> "This cargo shall be trimmed to ensure that the height difference between peaks and troughs does not exceed 5% of the ship's breadth and that the cargo slopes uniformly from the hatch boundaries to the bulkheads to avoid steep surfaces of cargo that could collapse during voyage.";

and under the section for "Carriage", add the following text at the end of the section:

> "The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge."

COPRA (dry) UN 1363

65 In the individual schedule for "COPRA (dry) UN 1363", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Precautions", after the words "concentration of oxygen", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

CRUSHED CARBON ANODES

66 In the individual schedule for "CRUSHED CARBON ANODES", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

CRYOLITE

67 In the individual schedule for "CRYOLITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

DIAMMONIUM PHOSPHATE (D.A.P.)

68 In the individual schedule for "DIAMMONIUM PHOSPHATE (D.A.P.)", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

DIRECT REDUCED IRON (A) Briquettes, hot-moulded

69 In the individual schedule for "DIRECT REDUCED IRON (A) Briquettes, hot-moulded", under the section for "Loading", in the sixth sentence, replace the words "of the Code" with the words "of this Code"; add the following text at the end of the section:

> "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo.";

under the section for "Precautions", in the last sentence, after the words "adjacent spaces", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).";

and under the sections for "Carriage" and "Discharge", replace the words "(> 25% LEL)" with "(> 25% lower explosive limit (LEL))". Under the section for "Clean-up", in the third sentence, replace the word "should" with the word "shall".

DIRECT REDUCED IRON (B) Lumps, pellets, cold-moulded briquettes

70 In the individual schedule for "DIRECT REDUCED IRON (B) Lumps, pellets, cold-moulded briquettes", under the section for "Loading", in the sentence "Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code", replace the words "of the Code" with the words "of this Code"; add the following text:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

under the section for "Precautions", in the sentence "All precautions shall be taken when entering the cargo spaces", after the words "entering the cargo spaces", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).";

and under the sections for "Carriage" and "Discharge", replace the words "(> 25% LEL)" with "(> 25% lower explosive limit (LEL))". Under the section for "Clean-up", in the second sentence, replace the word "should" with the word "shall".

DIRECT REDUCED IRON (C) By-product fines

71 In the individual schedule for "DIRECT REDUCED IRON (C) (By-product fines)", under the section for "Loading", in the sentence "Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code", replace the words "of the Code" with the words "of this Code"; and add the following text:

> "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo.";

under the section for "Precautions", in the sixteenth sentence, after the words "to support life", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).";

and under the sections for "Carriage" and "Discharge", replace the words "(> 25% LEL)" with "(> 25% lower explosive limit (LEL))".

DISTILLERS DRIED GRAINS WITH SOLUBLES

72 In the individual schedule for "DISTILLERS DRIED GRAINS WITH SOLUBLES", under the section for "Loading", in the second sentence, replace the words "of the Code" with the words "of this Code".

DOLOMITE

73 In the individual schedule for "DOLOMITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

FELSPAR LUMP

74 In the individual schedule for "FELSPAR LUMP", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

FERROCHROME

75 In the individual schedule for "FERROCHROME", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERROCHROME, exothermic

76 In the individual schedule for "FERROCHROME, exothermic", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERROMANGANESE

77 In the individual schedule for "FERROMANGANESE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERRONICKEL

78 In the individual schedule for "FERRONICKEL", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERROPHOSPHORUS (including briquettes)

79 In the individual schedule for "FERROPHOSPHORUS (including briquettes)", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

FERROSILICON UN 1408 with 30% or more but less than 90% silicon (including briquettes)

80 In the individual schedule for "FERROSILICON UN 1408 with 30% or more but less than 90% silicon (including briquettes)", replace the table in the section for "Characteristics" with the following:

"

Angle of repose	Bulk density (kg/m^3)		Stowage factor (m^3/t)
Not applicable	1,389 to 2,083 (1,111 to 1,538 for briquettes)		0.48 to 0.72 (0.65 to 0.90 for briquettes)
Size	**Class**	**Subsidiary risk**	**Group**
Up to 300 mm briquettes	4.3	6.1	B

"

Under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code"; and replace the sentences "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo." with the following:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

and under the section for "Operational requirements" in the appendix, in (vii), after the words "below 18%", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

FERROSILICON 25% to 30% silicon, or 90% or more silicon (including briquettes)

81 In the individual schedule for "FERROSILICON 25% to 30% silicon, or 90% or more silicon (including briquettes)", the Bulk Cargo Shipping Name is replaced with following:

> "FERROSILICON with at least 25% but less than 30% silicon, or 90% or more silicon";

in the table of "Characteristics", under the section for "Size", the words "Diameter: 2.54" are replaced with "Up to 300 mm briquettes". Under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code"; and replace the sentences "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo." with the following:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

under the section for "Loading", replace the words "of the Code" with the words "of this Code"; add the following text:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Carriage", replace the sentence "No special requirements." with the following:

> "The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge."

FLY ASH, DRY

88 In the individual schedule for "FLY ASH, DRY", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Clean-up", replace the words "FLY ASH" with "fly ash".

FLY ASH, WET

89 In the individual schedule for "FLY ASH, WET", under the section for "Hazard", replace the first sentence with:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", replace the words "of the Code" with the words "of this Code".

under the section for "Loading", replace the words "of the Code" with the words "of this Code"; add the following text:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Carriage", replace the sentence "No special requirements." with the following:

> "The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge."

FLY ASH, DRY

88 In the individual schedule for "FLY ASH, DRY", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Clean-up", replace the words "FLY ASH" with "fly ash".

FLY ASH, WET

89 In the individual schedule for "FLY ASH, WET", under the section for "Hazard", replace the first sentence with:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", replace the words "of the Code" with the words "of this Code".

GLASS CULLET

90 In the existing individual schedule for "GLASS CULLET", at the end of the section for "Description", add the following text:

> "It may also be flint flat glass cullet which may have a grey or ochre appearance caused by adherent glass dust. May have a slight odour caused by organic impurities (plastics, foil). Used for glass production (bottle industry).";

and replace the existing table of "Characteristics", with the following:

"

Angle of repose	**Bulk density (kg/m3)**	**Stowage factor (m3/t)**
Not applicable	600 to 1,330	0.75 to 1.67
Size	**Class**	**Group**
Up to 2,000 mm	Not applicable	C

"

GRAIN SCREENING PELLETS

91 In the individual schedule for "GRAIN SCREENING PELLETS", under the section for "Loading", in the first sentence, replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code", and delete the words "in accordance with the shipper's declaration of the angle of repose".

GRANULAR FERROUS SULPHATE

92 In the individual schedule for "GRANULAR FERROUS SULPHATE", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

GRANULATED NICKEL MATTE (LESS THAN 2% MOISTURE CONTENT)

93 In the individual schedule for "GRANULATED NICKEL MATTE (LESS THAN 2% MOISTURE CONTENT)", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

GRANULATED SLAG

94 In the individual schedule for "GRANULATED SLAG", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

GRANULATED TYRE RUBBER

95 In the individual schedule for "GRANULATED TYRE RUBBER", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

GYPSUM

96 In the individual schedule for "GYPSUM", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

GYPSUM GRANULATED

97 In the individual schedule for "GYPSUM GRANULATED", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

ILMENITE CLAY

98 In the individual schedule for "ILMENITE CLAY", under the section for "Hazard", replace the first sentence with:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

ILMENITE (ROCK)

99 In the individual schedule for "ILMENITE (ROCK)", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

ILMENITE SAND

100 In the existing individual schedule for "ILMENITE SAND", under the Bulk Cargo Shipping Name, delete the sentence "This cargo can be categorized as Group A or C.". Under the section for "Description", delete the sentences "The moisture content of this cargo in Group C is 1% to 2%. When moisture content is above 2%, this cargo is to be categorized in Group A." In the table of "Characteristics", in the column for "Group", delete the words "or C". Replace the text under the section for "Hazard" with following:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code. This cargo is non-combustible or has a low fire-risk.";

and under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". Replace the text under the section for "Weather precautions" with the following:

> "When a cargo is carried in a ship other than a ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:
>
> .1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port."

ILMENITE (UPGRADED)

101 In the individual schedule for "ILMENITE (UPGRADED)", under the section for "Hazard", in the first sentence, add the word "a" before the words "moisture content". Under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

IRON ORE FINES

102 In the individual schedule for "IRON ORE FINES", under the section for "Hazard", add the word "a" before the words "moisture content". Under the section for "Carriage", in the second sentence, delete the words "as far as practicable".

IRON ORE PELLETS

103 In the individual schedule for "IRON ORE PELLETS", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

IRON OXIDE, SPENT or IRON SPONGE, SPENT UN 1376 obtained from coal gas purification

104 In the individual schedule for "IRON OXIDE, SPENT or IRON SPONGE, SPENT UN 1376 obtained from coal gas purification", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

IRON OXIDE TECHNICAL

105 In the individual schedule for "IRON OXIDE TECHNICAL", under the section for "Hazard", add the word "a" before the words "moisture content".

IRONSTONE

106 In the individual schedule for "IRONSTONE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

LABRADORITE

107 In the individual schedule for "LABRADORITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

LEAD NITRATE UN 1469

108 In the individual schedule for "LEAD NITRATE UN 1469", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

LEAD ORE

109 In the individual schedule for "LEAD ORE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code" and replace the text "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo." with the following:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo."

LIME (UNSLAKED)

110 In the individual schedule for "LIME (UNSLAKED)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

LIMESTONE

111 In the individual schedule for "LIMESTONE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

LINTED COTTON SEED with not more than 9% moisture and not more than 20.5% oil

112 In the individual schedule for "LINTED COTTON SEED with not more than 9% moisture and not more than 20.5% oil", under the section for "Loading", replace the words "of the Code" with the words "of this Code";

under the section for "Precautions", after the words "concentration of oxygen", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).";

and under the section for "Carriage", replace the word "should" with the word "shall".

MAGNESIA (DEADBURNED)

113 In the individual schedule for "MAGNESIA (DEADBURNED)", under the section for "Loading", replace the words "of the Code" with the words "of this Code"; and add the following text:

> "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo."

MAGNESIA (UNSLAKED)

114 In the individual schedule for "MAGNESIA (UNSLAKED)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

MAGNESITE, natural

115 In the individual schedule for "MAGNESITE, natural", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

MAGNESIUM NITRATE UN 1474

116 In the individual schedule for "MAGNESIUM NITRATE UN 1474", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

MAGNESIUM SULPHATE FERTILIZERS

117 In the individual schedule for "MAGNESIUM SULPHATE FERTILIZERS", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

MANGANESE ORE

118 In the individual schedule for "MANGANESE ORE", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". Replace the text "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo." with the following:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo."

MANGANESE ORE FINES

119 In the individual schedule for "MANGANESE ORE FINES", under the section for "Hazard", in the first sentence, add the word "a" before the words "moisture content".

MARBLE CHIPS

120 In the individual schedule for "MARBLE CHIPS", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

METAL SULPHIDE CONCENTRATES

121 In the individual schedule for "METAL SULPHIDE CONCENTRATES", in the table of "Characteristics", under "Class", after the word "MHB", add "(SH) and/or (CR) and/or (TX)". Under the section for "Hazard", add a first sentence as follows:

> "Some metal sulphide concentrates may have acute and long term health effects.";

add the following text at the beginning of the section:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

under the section for "Loading", replace the first sentence with the following:

> "This cargo shall be trimmed to ensure that the height difference between peaks and troughs does not exceed 5% of the ship's breadth and that the cargo slopes uniformly from the hatch boundaries to the bulkheads to avoid steep surfaces of cargo that could collapse during voyage.";

and under the section for "Precautions", after the words "concentration of oxygen", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

Mineral Concentrates

122 In the individual schedule for "Mineral Concentrates", under the section for "Hazard", replace the first and second sentence with:

> "The above materials may liquefy if shipped at a moisture content in excess of their transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Weather precautions", replace paragraphs .1 and .4 with the following sentences, respectively:

> ".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"
>
> and
>
> ".4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and";

and replace the text under the section for "Loading" with the following:

> "This cargo shall be trimmed to ensure that the height difference between peaks and troughs does not exceed 5% of the ship's breadth and that the cargo slopes uniformly from the hatch boundaries to the bulkheads to avoid steep surfaces of cargo that could collapse during voyage.

When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo."

MONOAMMONIUM PHOSPHATE (M.A.P.)

123 In the individual schedule for "MONOAMMONIUM PHOSPHATE (M.A.P.)", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

NICKEL ORE

124 In the individual schedule for "NICKEL ORE", under the section for "Weather precautions", replace paragraph .1 with following:

".1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;"

and under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

PEANUTS (in shell)

125 In the individual schedule for "PEANUTS (in shell)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

PEAT MOSS

126 In the individual schedule for "PEAT MOSS", under the section for "Hazard", add the following text at the beginning:

"This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

and under the section for "Loading", replace the words "of the Code" with the words "of this Code". Under the section for "Precautions", after the words "a normal level", add "*" with the following footnote:

"* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

PEBBLES (sea)

127 In the individual schedule for "PEBBLES (sea)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

PELLETS (concentrates)

128 In the individual schedule for "PELLETS (concentrates)", under the section for "Loading", replace the words "of the Code" with the words "of this Code"; and add the following text at the end of the section:

"As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo."

PERLITE ROCK

129 In the individual schedule for "PERLITE ROCK", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

PHOSPHATE (defluorinated)

130 In the individual schedule for "PHOSPHATE (defluorinated)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

PHOSPHATE ROCK (calcined)

131 In the individual schedule for "PHOSPHATE ROCK (calcined)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

PHOSPHATE ROCK (uncalcined)

132 In the individual schedule for "PHOSPHATE ROCK (uncalcined)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

PIG IRON

133 In the individual schedule for "PIG IRON", under the section for "Loading", in the third sentence, replace the words "of the Code" with the words "of this Code".

PITCH PRILL

134 In the individual schedule for "PITCH PRILL", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

POTASH

135 In the individual schedule for "POTASH", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

POTASSIUM CHLORIDE

136 In the individual schedule for "POTASSIUM CHLORIDE", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

POTASSIUM NITRATE UN 1486

137 In the individual schedule for "POTASSIUM NITRATE UN 1486", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

POTASSIUM SULPHATE

138 In the individual schedule for "POTASSIUM SULPHATE", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

PUMICE

139 In the individual schedule for "PUMICE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

PYRITE (containing copper and iron)

140 In the individual schedule for "PYRITE (containing copper and iron)", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

PYRITES, CALCINED (Calcined Pyrites)

141 In the individual schedule for "PYRITES, CALCINED (Calcined Pyrites)", under the section for "Hazard", replace the third sentence with the following:

> "This cargo may liquefy if shipped at a moisture content in excess of its transportable moisture limit (TML). See sections 7 and 8 of this Code.";

under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

PYROPHYLLITE

142 In the individual schedule for "PYROPHYLLITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code"; add the following text at the end of the section:

> "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo."

QUARTZ

143 In the individual schedule for "QUARTZ", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

QUARTZITE

144 In the individual schedule for "QUARTZITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile – excepted UN 2912

145 In the individual schedule for "RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile – excepted UN 2912", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I), non-fissile or fissile – excepted UN 2913

146 In the individual schedule for "RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I), non-fissile or fissile – excepted UN 2913", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

RASORITE (ANHYDROUS)

147 In the individual schedule for "RASORITE (ANHYDROUS)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

RUTILE SAND

148 In the individual schedule for "RUTILE SAND", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

SALT

149 In the individual schedule for "SALT", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SALT CAKE

150 In the individual schedule for "SALT CAKE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SALT ROCK

151 In the individual schedule for "SALT ROCK", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SAND

152 In the individual schedule for "SAND", under the section for "Loading", replace the words "of the Code" with the words "of this Code". Add the following text at the end of the section:

> "When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo."

SAND, HEAVY MINERAL

153 In the individual schedule for "SAND, HEAVY MINERAL", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SAWDUST

154 In the individual schedule for "SAWDUST", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SCALE GENERATED FROM THE IRON AND STEEL MAKING PROCESS

155 In the individual schedule for "SCALE GENERATED FROM THE IRON AND STEEL MAKING PROCESS", under the section for "Hazard", add the word "a" before the words "moisture content".

SEED CAKE, containing vegetable oil UN 1386 (a) mechanically expelled seeds, containing more than 10% of oil or more than 20% of oil and moisture combined

156 In the individual schedule for "SEED CAKE, containing vegetable oil UN 1386 (a) mechanically expelled seeds, containing more than 10% of oil or more than 20% of oil and moisture combined", under the section for "Loading", replace the words "of the Code" with the words "of this Code". Under the section for "Precautions", after the words "a normal level", add "*" with the following footnote:

"* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

SEED CAKE, containing vegetable oil UN 1386 (b) solvent extractions and expelled seeds, containing not more than 10% of oil and when the amount of moisture is higher than 10%, not more than 20% of oil and moisture combined

157 In the individual schedule for "SEED CAKE, containing vegetable oil UN 1386 (b) solvent extractions and expelled seeds, containing not more than 10% of oil and when the amount of moisture is higher than 10%, not more than 20% of oil and moisture combined", in the sentence "When, in solvent extracted seed cake, the oil or oil and moisture content exceeds the percentages stated above, guidance should be sought from the competent authorities." after BCSN, replace the word "should" with the word "shall". Under the section for "Loading", in the last sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Ventilation", replace the word "should" with the word "shall". Under the section for "Precautions", after the words "a normal level", add "*" with the following footnote:

"* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

SEED CAKE UN 2217 with not more than 1.5% oil and not more than 11% moisture

158 In the individual schedule for "SEED CAKE UN 2217 with not more than 1.5% oil and not more than 11% moisture", under the section for "Loading", in the second sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Ventilation", replace the word "should" with the word "shall". Under the section for "Precautions", after the words "a normal level", add "*" with the following footnote:

"* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

SEED CAKE (non-hazardous)

159 In the individual schedule for "SEED CAKE (non-hazardous)", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

SILICOMANGANESE (low carbon)

160 In the individual schedule for "SILICOMANGANESE (low carbon)", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Precautions", replace the word "should" with the word "shall"; after the words "has been effected", add "*" with the following footnote:

"* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

SILICON SLAG

161 In the individual schedule for "SILICON SLAG", in the table of "Characteristics", under the column "Bulk density (kg/m³)", the numerical value "2,300" is replaced with "1,500"; under the column for "Stowage factor (m³/t)", the numerical value "0.43" is replaced with "0.67". Under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code"; and the second and third sentences are replaced with following:

> "When the stowage factor of this cargo is equal or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo."

SODA ASH (Dense and light)

162 In the individual schedule for "SODA ASH (Dense and light)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SODIUM NITRATE UN 1498

163 In the individual schedule for "SODIUM NITRATE UN 1498", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE UN 1499

164 In the individual schedule for "SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE UN 1499", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

SOLIDIFIED FUELS RECYCLED FROM PAPER AND PLASTICS

165 In the individual schedule for "SOLIDIFIED FUELS RECYCLED FROM PAPER AND PLASTICS", under the section for "Loading", in the second sentence, replace the words "of the Code" with the words "of this Code". Under the section for "Precautions", after the words "sufficiently ventilated", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

SPODUMENE (UPGRADED)

166 In the individual schedule for "SPODUMENE (UPGRADED)", under the section for "Hazard", add the word "a" before the words "moisture content".

STAINLESS STEEL GRINDING DUST

167 In the individual schedule for "STAINLESS STEEL GRINDING DUST", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

STONE CHIPPINGS

168 In the individual schedule for "STONE CHIPPINGS", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SUGAR

169 In the individual schedule for "SUGAR", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SULPHUR (formed, solid)

170 In the individual schedule for "SULPHUR (formed, solid)", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

SULPHUR UN 1350 (crushed lump and coarse grained)

171 In the individual schedule for "SULPHUR UN 1350 (crushed lump and coarse grained)", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

SUPERPHOSPHATE

172 In the individual schedule for "SUPERPHOSPHATE", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

SUPERPHOSPHATE (triple, granular)

173 In the individual schedule for "SUPERPHOSPHATE (triple, granular)", under the section for "Loading", replace the words "of the Code" with the words "of this Code". Under the sections for "Precautions" and "Clean-up", respectively, replace the word "should" with the word "shall".

TACONITE PELLETS

174 In the individual schedule for "TACONITE PELLETS", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

TALC

175 In the individual schedule for "TALC", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

TANKAGE

176 In the individual schedule for "TANKAGE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

TAPIOCA

177 In the individual schedule for "TAPIOCA", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

UREA

178 In the individual schedule for "UREA", under the section for "Loading", replace the words "under sections 4, 5 and 6 of the Code" with the words "under sections 4 and 5 of this Code".

VANADIUM ORE

179 In the individual schedule for "VANADIUM ORE", under the section for "Loading", replace the words "of the Code" with the words "of this Code"; add the following text at the end of the section:

> "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.";

and under the section for "Precautions", replace the word "should" with the word "shall".

VERMICULITE

180 In the individual schedule for "VERMICULITE", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

WHITE QUARTZ

181 In the individual schedule for "WHITE QUARTZ", under the section for "Loading", replace the words "of the Code" with the words "of this Code".

WOODCHIPS

182 In the individual schedule for "WOODCHIPS", under the section for "Loading", replace the words "of the Code" with the words "of this Code". Under the section for "Precautions", in the first and second sentences, respectively, replace the word "should" with the word "shall"; after the words "oxygen level is 20.7%", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

WOOD PELLETS CONTAINING ADDITIVES AND/OR BINDERS

183 In the individual schedule for "WOOD PELLETS CONTAINING ADDITIVES AND/OR BINDERS", under the section for "Description", the fifth sentence is replaced with the following:

> "The raw material is compressed to approximately one-third of its original volume. The finished wood pellets typically have a moisture content of 4% to 8%.";

under the section for "Loading", replace the words "under sections 4, 5 and 6 of this Code" with the words "under sections 4 and 5 of this Code"; and under the section for "Precautions", after the words "carbon monoxide <100 ppm", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

WOOD PELLETS NOT CONTAINING ANY ADDITIVES AND/OR BINDERS

184 In the individual schedule for "WOOD PELLETS NOT CONTAINING ANY ADDITIVES AND/OR BINDERS", under the section for "Description", the fifth sentence is replaced with the following:

> "The raw material is compressed to approximately one-third of its original volume. The finished wood pellets typically have a moisture content of 4% to 8%.";

under the section for "Loading", replace the words "under sections 4, 5 and 6 of this Code" with the words "under sections 4 and 5 of this Code". Under the section for "Precautions", after the words "carbon monoxide <100 ppm", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

Wood Products – General

185 In the individual schedule for "Wood Products – General", under the section for "Precautions", after the words "oxygen level is 21%", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).";

and under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

WOOD TORREFIED

186 In the individual schedule for "WOOD TORREFIED", under the section for "Loading", replace the words "section 4, 5 and 6 of the Code" with the words "section 4 and 5 of this Code". Under the section for "Precautions", after the words "carbon monoxide < 100 ppm", add "*" with the following footnote:

> "* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

ZINC ASHES UN 1435

187 In the individual schedule for "ZINC ASHES UN 1435", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

ZINC SLAG

188 In the individual schedule for "ZINC SLAG", under the section for "Hazard", add the word "a" before the words "moisture content". Under the section for "Loading", replace the first sentence with the following:

> "This cargo shall be trimmed to ensure that the height difference between peaks and troughs does not exceed 5% of the ship's breadth and that the cargo slopes uniformly from the hatch boundaries to the bulkheads to avoid steep surfaces of cargo that could collapse during the voyage."

and under the section for "Carriage", add the following text at the end of the section:

> "The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during the voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge."

ZIRCON KYANITE CONCENTRATE

189 In the individual schedule for "ZIRCON KYANITE CONCENTRATE", under the section for "Hazard", add the word "a" before the words "moisture content". Under the section for "Loading", replace the second and the third sentences with the following text:

> "As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo."

ZIRCONSAND

190 In the individual schedule for "ZIRCONSAND", under the section for "Loading", in the first sentence, replace the words "of the Code" with the words "of this Code".

New individual schedules

191 Insert the following new individual schedules accordingly in alphabetical order:

"**FOAM GLASS GRAVEL**

Description
Foam glass gravel is a lightweight insulation product used in the construction/building industry. This cargo is odourless and of grey anthracite colour.

Characteristics

Angle of repose	Bulk density (kg/m³)	Stowage factor (m³/t)
Not applicable	130 to 250	4.0 to 7.6
Size	**Class**	**Group**
Varies	Not applicable	C

Hazard
Dust may cause skin and eye irritation.
This cargo is non-combustible or has a low fire-risk.

Stowage & segregation
No special requirements.

Hold cleanliness
No special requirements.

Weather Precautions
No special requirements.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

Precautions
Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks as well as protective clothing, as necessary. Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

Ventilation
No special requirements.

Carriage
No special requirements.

Discharge
Entry into the cargo spaces containing this cargo shall only be permitted for trained personnel wearing protective clothing and goggles or other equivalent dust eye-protection as well as dust filter masks.

Clean-up
No special requirements."

"**IRON SMELTING BY-PRODUCTS**

Description
This cargo is a by-product from the smelting of iron ore, ilmenite and titanomagnetite. Grey or black, small to large size lumps (up to 45 tonnes), granulated iron included. Depending on the dominant size, Iron by-products from smelting of iron ore, ilmenite and titanomagnetite is called variously:

Iron pan edges
Separation of iron
Granulated iron
Plate iron
Pool iron
Flat iron
K1-K3 bears
Steel bears
Pig iron by-product
Beach iron
Iron skulls

Characteristics

Angle of repose	**Bulk density (kg/m³)**	**Stowage factor (m³/t)**
Not applicable	Varies	Varies
Size	**Class**	**Group**
Varies	Not applicable	C

Hazard
No special hazards.
This cargo is non-combustible or has a low fire-risk.

Stowage & segregation
No special requirements.

Hold cleanliness
No special requirements.

Weather precautions
No special requirements.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

The tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo. Large pieces shall not be dropped in the cargo hold and placement of very large lumps shall be such that the tank top is not overstressed by point loads. The weight distribution in the hold shall be considered during loading.

Precautions
Bilge wells of the cargo spaces shall be protected from ingress of the cargo.

Ventilation
No special requirements.

Carriage
No special requirements.

Discharge
When this cargo is discharged by magnet or spider grab:

.1 the deck and deck machineries shall be protected from falling cargo; and

.2 damages to the ship shall be checked, after the completion of discharge.

Clean-up
No special requirements."

"**METAL SULPHIDE CONCENTRATES, CORROSIVE UN 1759**
(see also Mineral Concentrates schedule)

This schedule shall only apply to cargoes that would fall under Packing Group (PG) III as specified in the IMDG Code if they were carried in a packaged form.

Description
Mineral concentrates are refined ores in which the valuable components have been enriched by eliminating the bulk of waste materials. Generally the particle size is small, although agglomerates sometimes exist in concentrates which have not been freshly produced.

The most common concentrates in this category are: zinc concentrates, lead concentrates, copper concentrates and low grade middling concentrates.

Characteristics

Angle of repose	Bulk density (kg/m³)	Stowage factor (m³/t)
Not applicable	1,700 to 3,230	0.31 to 0.59
Size	**Class**	**Group**
Various	8*	A and B

*This material may also meet MHB criteria of self-heating solids and/or solids that evolve toxic gas when wet.

Hazard
This cargo may liquefy if shipped at a moisture content in excess of its Transportable Moisture Limit (TML). See sections 7 and 8 of this Code.

Some sulphide concentrates are liable to oxidation and may have a tendency to self-heat, with associated oxygen depletion and emission of toxic fumes. Moisture in the cargo will form sulphurous acid which is corrosive to steel.

Stowage & Segregation
Unless determined by the competent authority, segregation as required for class 4.2 and Class 8 materials.

"Separated from" foodstuffs.

Hold cleanliness
Clean and dry as relevant to the hazards of the cargo.

Weather precautions
When this cargo is carried in a ship other than a ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation under the conditions stated in the procedures required in subsection 4.3.3 of this Code; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

When the stowage factor of this cargo is equal or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo forming.

Precautions
Entry into the cargo space for this cargo shall not be permitted until the space has been ventilated and the atmosphere tested for concentration of oxygen*. Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of this cargo. Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

Bilge system of a cargo space to which this cargo is to be loaded shall be tested to ensure it is working. Persons who may be exposed to the dust of the cargo shall wear gloves, goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

When a Metal Sulphide Concentrate is considered as presenting a low fire-risk, the carriage of such cargo on a ship not fitted with a fixed gas fire-extinguishing system shall be subject to the Administration's authorization as provided by SOLAS regulation II-2/10.7.1.4.

Ventilation
The cargo shall not be ventilated during the voyage.

Carriage
The appearance of the surface of the cargo shall be checked regularly during the voyage. If free water above the cargo or fluid state of the cargo is observed during the voyage, the master shall take appropriate action to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

For quantitative measurements of oxygen and toxic fumes liable to be evolved by the cargo, suitable detectors for each gas and fume or combination of these shall be on board while this cargo is carried. The detectors shall be suitable for use in an atmosphere without oxygen.

The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly during voyage, and the results of the measurements shall be recorded and kept on board.

Discharge
No special requirements.

Clean-up
Ensure that all residues are washed away and the holds thoroughly dried. Wet dust or residues will form corrosive sulphurous acid, which is dangerous to personnel and will corrode steel.

Emergency procedures

Special emergency equipment to be carried
Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus.
Emergency procedures Wear protective clothing and self-contained breathing apparatus. **Emergency action in the event of fire** Batten down; use ship's fixed firefighting installation, if fitted. Exclusion of air may be sufficient to control the fire. **Do not use water**. **Medical first aid** Refer to the Medical First Aid Guide (MFAG), as amended.

Remarks
Fire may be indicated by the smell of sulphur dioxide.

***** Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

"**MONOAMMONIUM PHOSPHATE (M.A.P.), MINERAL ENRICHED COATING**

Description
This cargo is monoammonium phosphate (M.A.P.) with a mineral enriched coating. Odourless, brownish-grey granules. It is hygroscopic and can be very dusty.

Characteristics

Angle of repose	**Bulk density (kg/m³)**	**Stowage factor (m³/t)**
35° to 40°	826 to 1,000	1.0 to 1.21
Size	**Class**	**Group**
Up to 4 mm	MHB (CR)	B

Hazard
This cargo has a pH of 4.5 and in the presence of moisture can be highly corrosive to eyes and skin.
This cargo is non-combustible or has a low fire-risk.
This cargo will cake if wet.
This cargo will decompose burlap or canvas cloth covering bilge wells. Continuous carriage of this cargo may have detrimental structural effects over a long period of time.

Stowage & Segregation
No special requirements.

Hold cleanliness
Clean and dry as relevant to the hazards of the cargo.

Weather precautions
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

Precautions
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear gloves, goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

Ventilation
The cargo spaces carrying this cargo shall not be ventilated during voyage.

Carriage
Condensation in the cargo spaces carrying this cargo, sweating of this cargo and entering of water from hatch covers to the cargo spaces shall be checked regularly during the voyage. Due attention shall be paid to the sealing of hatches of the cargo spaces.

Discharge
This cargo is hygroscopic and may cake in overhangs, impairing safety during discharge. If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

Clean-up
After discharge of this cargo, particular attention shall be paid to bilge wells of the cargo spaces.

Emergency procedures

Special emergency equipment to be carried Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus.
Emergency procedures Wear protective clothing and self-contained breathing apparatus. **Emergency action in the event of fire** Batten down; use ship's fixed firefighting installation, if fitted. **Medical first aid** Refer to the Medical First Aid Guide (MFAG), as amended.

"

"**MONOCALCIUMPHOSPHATE (MCP)**

Description
The product consists of Monocalciumphosphate, monohydrate. Granulated. Light grey. Odourless.

Characteristics

Angle of repose	Bulk density (kg/m3)	Stowage factor (m3/t)
Approximately 32°	900 to 1,100	0.91 to 1.11
Size	**Class**	**Group**
0.2 to 2 mm	MHB (CR)	A and B

Hazard
This cargo is non-combustible or has a low fire-risk.
Potential inhalation hazard and eye irritation from Monocalciumphosphate dust during handling, placement and transportation.

Stowage & segregation
No special requirements.

Hold cleanliness
No special requirements.

Weather precautions
When a cargo is carried in a ship other than a ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation under the conditions stated in the procedures required in subsection 4.3.3 of this Code; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

Precautions
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, gloves, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

Ventilation
No special requirements.

Carriage
The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

Discharge
No special requirements.

Clean-up
Avoid handling which creates dust.

Emergency procedures

Special emergency equipment to be carried
Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus.
Emergency procedures Wear protective clothing and self-contained breathing apparatus. **Emergency action in the event of fire** Batten down; use ship's fixed firefighting installation, if fitted. Exclusion of air may be sufficient to control the fire. **Medical first aid** Refer to the Medical First Aid Guide (MFAG), as amended.

"

"**OLIVINE SAND**

Description
Olivine sand is a naturally occurring mineral and the colour can be pale greenish-grey to brownish.

Characteristics

Angle of repose	**Bulk density (kg/m3)**	**Stowage factor (m3/t)**
30° to 45°	1,600 to 1,900	0.53 to 0.63
Size	**Class**	**Group**
Up to 20 mm	Not applicable	A

Hazard
This cargo may liquefy if shipped at a moisture content in excess of its Transportable Moisture Limit (TML). See sections 7 and 8 of this Code.

This cargo is non-combustible or has a low fire-risk.

Stowage & segregation
No special requirements.

Hold cleanliness
No special requirements.

Weather precautions
When a cargo is carried in a ship other than a ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.

Precautions
No special requirements.

Ventilation
No special requirements.

Carriage
The appearance of the surface of the cargo shall be checked regularly during the voyage. If free water above the cargo or fluid state of the cargo is observed during the voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

Discharge
No special requirements.

Clean-up
No special requirements."

"**OLIVINE GRANULAR AND GRAVEL AGGREGATE PRODUCTS**

This schedule shall only apply to cargoes containing less than 5% of fine particles less than 0.5 mm.

Description
Olivine granular and gravel aggregate products are naturally occurring minerals and the colour can be pale greenish-grey to brownish.

Characteristics

Angle of repose	Bulk density (kg/m3)	Stowage factor (m3/t)
30° to 45°	1,600 to 1,900	0.53 to 0.63
Size	**Class**	**Group**
Up to 100 mm	Not applicable	C

Hazard
No special hazards.
This cargo is non-combustible or has a low fire-risk.

Stowage & segregation
No special requirements.

Hold cleanliness
No special requirements.

Weather precautions
No special requirements.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

When the stowage factor of this cargo is equal to or less than 0.56 m^3/t, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.

Precautions
No special requirements.

Ventilation
No special requirements.

Carriage
No special requirements.

Discharge
No special requirements.

Clean-up
No special requirements."

"SAND, MINERAL CONCENTRATE, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I) UN 2912

Description
This cargo is generally a concentrate stream resulting from the processing of heavy mineral sands. Such mineral sand concentrates are characterized by their heavy bulk density and relatively fine grain size. This schedule includes concentrates of sands containing natural or depleted uranium and thorium, including metals, mixtures and compounds.

Abrasive. May be dusty. This cargo is cohesive if moisture content is above 1%.

Characteristics

Angle of repose	Bulk density (kg/m³)	Stowage factor (m³/t)
Approximately 35°	2,200 to 3,225	0.31 to 0.45
Size	**Class**	**Group**
Fine Particles up to 2 mm	7*	A and B

***** This material also meets MHB criteria of toxic solids and corrosive solids.

Hazard
This cargo may liquefy if shipped at a moisture content in excess of its Transportable Moisture Limit (TML). See sections 7 and 8 of this Code.
Low radiotoxicity.
May cause long-term health effects and skin irritation.
Prolonged and repeated exposure to silica dust can result in respiratory disease.
This cargo is non-combustible or has a low fire-risk.

Stowage & segregation
"Separated from" foodstuffs.

Hold cleanliness
Clean and dry as relevant to the hazards of the cargo.

Weather precautions
When a cargo is carried in a ship other than a ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation under the conditions stated in the procedures required in subsection 4.3.3 of this Code; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code. As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during voyage and during loading by a pile of the cargo.

Precautions
Personnel shall not be unnecessarily exposed to dust of this cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and facemasks. There shall be no leakage outside the cargo space in which this cargo is stowed.

Ventilation
The cargo spaces carrying this cargo shall not be ventilated during voyage.

Carriage
All instructions provided by the shipper shall be followed for the carriage of this cargo. The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

Discharge
All instructions provided by the shipper shall be followed for the discharge of this cargo.

Clean-up
Cargo spaces used for this cargo shall not be used for other goods until decontaminated. Refer to subsection 9.3.2.3 of this Code.

Emergency procedures

Special emergency equipment to be carried Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus.
Emergency procedures Wear protective clothing and self-contained breathing apparatus. **Emergency action in the event of fire** Batten down; use ship's fixed firefighting installation, if fitted. Use water spray to control spread of dust, if necessary. **Medical first aid** Refer to the Medical First Aid Guide (MFAG), as amended.

Remarks
Most materials are likely to be non-combustible. Speedily collect and isolate potentially contaminated equipment and cover. Seek expert advice."

"**SILICOMANGANESE (carbo-thermic)**

Description
This material is a result of a carbo-thermic reduction process. A ferroalloy comprising principally manganese and silicon, mainly used as a deoxidizer and alloying element in the steel-making process. Particles or lumps of metallic-silver to dark-grey colour metal.

Characteristics

Angle of repose	Bulk density (kg/m³)	Stowage factor (m³/t)
Not applicable	3,100 to 4,000	0.25 to 0.32
Size	**Class**	**Group**
Fines up to 80 mm	Not applicable	C

Hazard
No special hazards.
This cargo is non-combustible or has a low fire-risk.

Stowage & segregation
"Separated from" acids, alkalis, oxidizing and reducing agents and foodstuffs.

Hold cleanliness
No special requirements.

Weather precautions
No special requirements.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code. As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be paid to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.

Precautions
No special requirements.

Ventilation
No special requirements.

Carriage
No special requirements.

Discharge
No special requirements.

Clean-up
No special requirements."

"**SUGARCANE BIOMASS PELLETS**

Description
Sugarcane Biomass Pellets are light blonde to chocolate brown in colour; very hard and cannot be easily squashed. Sugarcane Biomass Pellets are made of bagasse, straw and leaves left over from industrial and agricultural activities. Normally there are no additives or binders blended into the pellet. This schedule is also applicable to Sugarcane Biomass Pellets produced with the use of up to 2% of oxide-based mineral additives such as calcium, magnesium and aluminium oxides. The raw material is fragmented, dried and extruded into pellet form. The raw material is compressed to approximately one-third of its original volume and the finished Sugarcane Biomass Pellets typically have a moisture content of 6 to 10%.

Characteristics

Angle of repose	Bulk density (Kg/m³)	Stowage factor (m³/t)
Approximately 30°	600 to 700	1.43 to 1.67
Size	**Class**	**Group**
Cylindrical with Diameter: 6 to 12 mm. Length: 10 to 50 mm.	MHB (CB, WT, WF and OH)	B

Hazard

Shipments are subject to oxidation leading to depletion of oxygen and increase of carbon monoxide and carbon dioxide in cargo and communicating spaces (also see Weather precautions).

Swelling occurs if exposed to moisture. Sugarcane Biomass Pellets may ferment over time if moisture content is over 15% leading to generation of asphyxiating and flammable gases which may cause spontaneous combustion. Handling of Sugarcane Biomass Pellets may cause dust to develop. Risk of explosion at high dust concentration.

Stowage & segregation

Segregation as required for class 4.1 materials.

Hold cleanliness

Clean and dry as relevant to the hazards of the cargo.

Weather precautions

This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed. There is a high risk of renewed oxygen depletion and carbon monoxide formation in previously ventilated adjacent spaces after closure of the hatch covers.

Loading

Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

Precautions

Entry of personnel into the cargo spaces containing this cargo or the connecting spaces shall not be permitted until tests have been carried out and it has been established that the oxygen content and carbon monoxide levels have been restored to the following levels: oxygen 21% and carbon monoxide <100 ppm.* Close or direct contact of this cargo and cargo hold lighting such as hot halogen lamps shall be avoided. Fuses to such lights shall be removed or secured while this cargo is present in the cargo space. Precautions shall be taken to prevent generation of high concentrations of dust during handling and cleaning of this cargo.

Ventilation

Cargo spaces carrying this cargo shall not be ventilated during voyage. Ventilation of enclosed spaces adjacent to a cargo hold before entry may be necessary even if these spaces are apparently sealed from the cargo hold.

Carriage
Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.

Discharge
No special requirements.

Clean-up
No special requirements.

Emergency Procedures

Special emergency equipment to be carried
Self-contained breathing apparatus and combined or individual oxygen and carbon monoxide meters should be available.
Emergency procedures
Nil
Emergency action in the event of fire
Batten down; use ship's fixed firefighting installation, if fitted. Exclusion of air may be sufficient to control fire. Extinguish fire with carbon dioxide, foam or water.
Medical first aid
Refer to the Medical First Aid Guide (MFAG), as amended.

* Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

"**SYNTHETIC CALCIUM FLUORIDE**

Description
Odourless white-light brown material containing up to 70-80% calcium fluoride, 5-10% aluminium fluoride and 10-20% silicon dioxide.

The product consists of large particles and lumps which may break up during transport generating powder.

The product is insoluble in water.

Characteristics

Angle of repose	**Bulk density (kg/m3)**	**Stowage factor (m3/t)**
Not applicable	700 to 900	1.11 to 1.43
Size	**Class**	**Group**
Up to 30 mm	Not applicable	A

Hazard
This cargo may liquefy if shipped at a moisture content in excess of its Transportable Moisture Limit (TML). See sections 7 and 8 of this Code.

This cargo is non-combustible or has a low fire-risk.

Stowage & segregation
"Separated from" hydrofluoric acid, chlorine fluoride, manganese fluoride and oxygen difluoride.

Hold cleanliness
No special requirements.

Weather precautions
When a cargo is carried in a ship other than a ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation under the conditions stated in the procedures required in subsection 4.3.3 of this Code; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

Precautions
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo.

Ventilation
No special requirements.

Carriage
The appearance of the surface of the cargo shall be checked regularly during the voyage. If free water above the cargo or fluid state of the cargo is observed during the voyage, the master shall take appropriate action to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

Discharge
No special requirements.

Clean-up
No special requirements."

"**SYNTHETIC SILICON DIOXIDE**

Description:
Odourless white powder containing up to 85% silicon dioxide, about 7% aluminium fluoride and up to 8% crystal water in dry weight.
The product has very low solubility in water.

Characteristics:

Angle of repose	Bulk density (kg/m3)	Stowage factor (m3/t)
Approximately 40°	300 to 500	2.00 to 3.33
Size	**Class**	**Group**
Up to 0.1 mm	Not applicable	A

Hazard
This cargo may liquefy if shipped at a moisture content in excess of its Transportable Moisture Limit (TML). See sections 7 and 8 of this Code.
This cargo is non-combustible or has a low fire-risk.

Stowage & segregation
"Separated from" hydrofluoric acid, chlorine fluoride, manganese fluoride and oxygen difluoride.

Hold cleanliness
No special requirements.

Weather precautions
When a cargo is carried in a ship other than a ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation under the conditions stated in the procedures required in subsection 4.3.3 of this Code; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

Loading
Trim in accordance with the relevant provisions required under sections 4 and 5 of this Code.

Precautions
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo.

Due consideration shall be paid to protect equipment from the dust of the cargo.

Ventilation
No special requirements.

Carriage
The appearance of the surface of the cargo shall be checked regularly during the voyage. If free water above the cargo or fluid state of the cargo is observed during the voyage, the master shall take appropriate action to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

Discharge
No special requirements.

Clean-up
No special requirements."

"**TITANOMAGNETITE SAND**

Description
Titanomagnetite Sand has a nominal iron content of 57%.

Characteristics

Angle of repose	Bulk density (kg/m3)	Stowage factor (m3/t)
Not Applicable	2,740 to 2,820	0.35 to 0.36
Size	**Class**	**Group**
Up to 0.4 mm	Not applicable	A

Hazard
This cargo may liquefy if shipped at a moisture content in excess of its Transportable Moisture Limit (TML). See sections 7 and 8 of this Code.
This cargo is non-combustible or has a low fire-risk.

Stowage & Segregation
No special requirements.

Hold Cleanliness
No special requirements.

Weather Precautions
When a cargo is carried in a ship other than a ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during loading operations and the voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation under the conditions stated in the procedures required in paragraph 4.3.3 of this Code; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

Loading
Cargo shall be trimmed to avoid steep surfaces of cargo that could collapse during voyage. As the density of the cargo is extremely high, the tank top may be overstressed unless the cargo is evenly spread across the tank top to equalize the weight distribution. Due consideration shall be given to ensure that the tank top is not overstressed during the voyage and during loading by a pile of the cargo.

Precautions
Bilge wells shall be clean, dry and covered to prevent ingress of cargo. Bilge covers shall not significantly degrade the capacity or operation of the bilge system. Bilges shall be sounded and pumped out, as necessary, throughout the voyage.

Ventilation
No special requirements.

Carriage
Unless this cargo is carried in a ship complying with the requirements in subsection 7.3.2 of this Code, the appearance of the surface of the cargo shall be checked regularly during the voyage. If free water above the cargo or fluid state of the cargo is observed during the voyage, the master shall take appropriate action to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

Discharge
No special requirements.

Clean-up
After discharge of this cargo, the bilge wells shall be checked and any blockage shall be removed. If the ship is fitted with a de-watering system of the cargo spaces, after discharge of this cargo, the system shall be checked and any blockage in the systems shall be removed."

APPENDIX 2

Laboratory test procedures, associated apparatus and standards

1 Test procedures for materials which may liquefy and associated apparatus

192 In the beginning of the first sentence, replace the term "Three" with "Five". After the sentence "As each method has its advantages, the selection of the test method should be determined by local practices or by the appropriate authorities", add two new sub-paragraphs as follows:

.4 Modified Proctor/Fagerberg test procedure for Iron Ore Fines; and

.5 Modified Proctor/Fagerberg test procedure for Coal.

193 Add a new paragraph 1.5 as follows:

"**1.5 Modified Proctor/Fagerberg test procedure for Coal**

1.5.1 Scope

This procedure details the laboratory determination of Transportable Moisture Limit (TML) for coals up to a nominal top size of 50 mm. The procedure is based on a modification of the Proctor/Fagerberg test described in section 1.3 of this appendix.

Key modifications to the original test procedure contained in section 1.3 of this appendix are:

.1 Sample preparation to facilitate the testing of 0 x 50 mm coal through reconstitution to -25 mm;

.2 Use of a 150 mm diameter compaction cylinder; and

.3 Sample compaction using a hammer equivalent to the Proctor/Fagerberg "D" energy hammer.

The Transportable Moisture Limit is the moisture content corresponding to the intersection of the 70% degree saturation curve and the test sample compaction curve.

In the case of coals where moisture freely drains from the sample such that the test sample compaction curve does not extend to or beyond 70% saturation, the test is taken to indicate a cargo where water passes through the spaces between particles and there is no increase in pore water pressure. Therefore, the cargo is not liable to liquefy. (See subsection 7.2.2 of this Code).

The procedure commences with a drum of coal containing a sample of not less than 170 kg delivered to the testing laboratory and terminates with the laboratory reporting the test result for the coal. Details of the sample collection process are excluded from this procedure. However it is important that the sample accurately represents the size distribution of the cargo and reference should be made to the normative reference list below.

1.5.2 Normative references

The following documents are referenced in this procedure. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

– AS 1289.3.5.1:2006, Methods of testing soils for engineering purposes. Method 3.5.1: Soil classification tests – Determination of the soil particle density of a soil – Standard method;

– ISO 589:2008, Hard Coal – Determination of total moisture;

– ISO 3319-2:2013, Test requirements and testing – Part 2: Test sieves of perforated metal plate; and

– ISO 13909-4:2001, Hard coal and coke – Mechanical sampling – Part 4 – Coal – Preparation of test samples.

1.5.3 Definitions

(1) Transportable Moisture Limit (TML)

The Transportable Moisture Limit (TML) of a cargo which may liquefy means the maximum moisture content of the cargo which is considered safe for carriage in a ship not complying with the requirements in subsection 7.3.2 of this Code.

(2) Test outcomes

The Transportable Moisture Limit determined by this procedure is the moisture content corresponding to the intersection of the 70% degree saturation curve and the test sample compaction curve. This is also referred to as the PFD70 value (Proctor/Fagerberg – D energy hammer – 70% saturation).

Where moisture freely drains from the sample or the cylindrical mould at moisture content such that the test sample compaction curve does not extend to or beyond 70% saturation (as described in paragraph 1.5.5.3(4)), the test is taken to indicate a cargo where water passes through the spaces between particles and there is no increase in pore water pressure. Therefore, the cargo is not liable to liquefy. (See subsection 7.2.2 of this Code).

(3) Optimum Moisture Content (OMC)

The Optimum Moisture Content is the moisture content corresponding to the maximum compaction (maximum dry density) under the specified compaction condition.

(4) Gross water content or total moisture (W^1)

The moisture content of a sample is calculated as the mass of water divided by the total mass of solids plus water and is referred to as either the gross water content or the total moisture content. Gross water content is to be determined using the method for determining total moisture defined in the standard ISO 589:2008.

1.5.4 Determination of the TML of blends of two or more coals

In circumstances where a shipper intends to load a cargo consisting of a blend of two or more coals, the shipper may:

.1 determine the TML of the blend by direct application of the test method described within this procedure to a representative sample of the blended product; or

.2 declare the TML of the blend based on TML determinations on each of the component coals.

.1 Where all component coals in the blend are known to be Group A and B coals:

.1.1 The blended cargo should be declared as Group A and B, and

.1.2 The TML of the blended cargo should be determined as the lowest TML value of any of the component coals.

.2 Where a Group A and B cargo component is blended with a coal which is designated as Group B only:

.2.1 The blended cargo should be declared as Group A and B, and

.2.2 The TML should be taken as the lowest TML of the Group A and B component coals contained within the blend.

.3 Where all component coals are determined to be Group B only coals, the blended cargo may be declared as a Group B only cargo.

1.5.5 Modified Proctor/Fagerberg test procedure for coal

1.5.5.1 Apparatus

(1) Work area

The work area should be located where the samples are protected from excessive temperatures, air currents and humidity variations. All samples should be stored in suitable sample containers, including plastic sample bags, and the containers should be sealed.

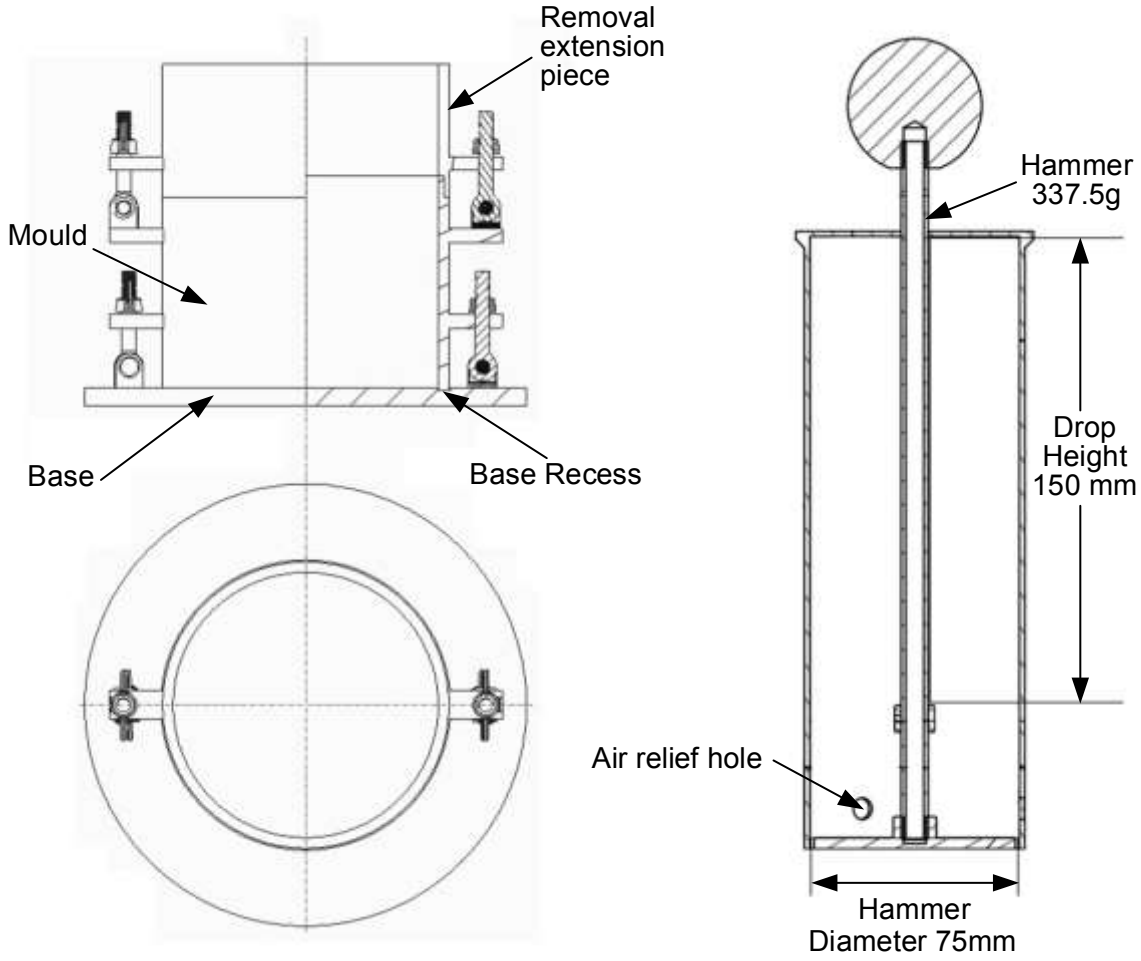
(2) Standard sieves

Square aperture laboratory sieves of 16 mm and 25 mm aperture as nominated in ISO 3319-2:2013 are required for reconstitution of the sample at 25 mm top size. A 2.36 mm sieve is required for generation of + 2.36 mm and –2.36 mm fractions for particle density determination. Optionally a 2 mm sieve may be used for this purpose.

(3) Proctor/Fagerberg apparatus

The Proctor/Fagerberg apparatus consists of a cylindrical stainless steel mould having 150 mm diameter and 120 mm height with a removable extension piece (the compaction cylinder) and a compaction tool guided by a pipe at its lower end (the compaction hammer), which are shown in figure 1.5.1. A schematic diagram of the Proctor/Fagerberg apparatus is shown in figure 1.5.2 with dimensions and tolerances indicated in table 1.5.5.

Figure 1.5.1 Example of Proctor/Fagerberg test apparatus, hammer and hammer guide



Compaction Cylinder **Compaction Hammer**

Figure 1.5.2 Schematic of a Proctor/Fagerberg apparatus

(4) Compaction hammer

A "D" energy equivalent compaction hammer is used for this test. Dimensions are shown in figure 1.5.2 and table 1.5.5. (Note: the compaction hammer has been modified to match the mould used.)

(5) Drying oven

The drying oven should be ventilated, with forced circulation of air or inert gas, typically with a stainless steel interior and capable of maintaining a temperature within the range of 105°C ± 5°C.

(6) Weighing balance

The weighing balance should be capable of weighing the sample and the container, as received, with an accuracy of better than ± 5 g.

(7) Pycnometer

Water pycnometry equipment is used to determine the density of the full sized coal (non-crushed) in accordance with AS 1289.3.5.1:2006. Specific equipment required is as follows:

- a conical flask or density bottle of 250 ml capacity;
- a vacuum desiccator or other vacuum equipment;
- a drying oven set to 105°C to 110°C;
- balances – one with ± 0.05 g accuracy and the second with ± 1 g accuracy;
- a 0°C to 100°C thermometer;
- a 2.36 mm sieve (as noted in paragraph 1.5.5.1(2))
- a vacuum source;
- a water bath set at 60°C;
- distilled, demineralized or deionized water;
- a wash bottle containing water;
- a wire basket to hold the + 2.36 mm sample;
- a container filled with water to hold the wire basket without interference; and
- a scale to weigh the basket both suspended in water and drained.

(8) Containers for hand mixing and sample preparation

Sufficient heavy-duty plastic buckets with lids of not less than 10 litres capacity are required for storage and handling. Heavy-duty plastic bags (200 micron thick or greater) are required for storage and hand mixing of samples.

(9) Flat scraping device

A thin steel scraper is required for separating the remnant sample formed in the extension piece lying above the top level of the mould. For ease of use, the scraper should have dimensions of 160 mm wide, 200 mm long and 3 mm to 5 mm thick, such as that shown in figure 1.5.3.

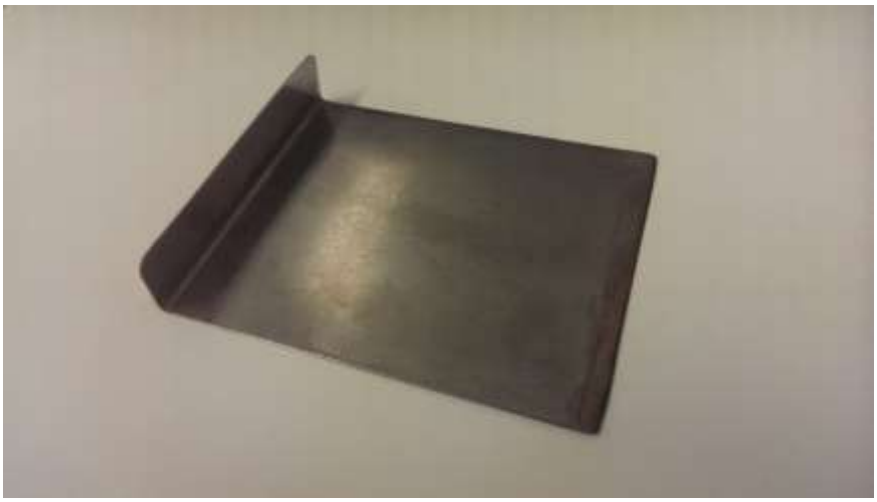


Figure 1.5.3 Typical scraping device

(10) Drying trays

Drying trays or pans should have a smooth surface, be free from contamination and heat resistant, for example stainless steel or enamel. Dimensions should be suitable to fit in the drying oven and ensure that the total sample can be contained at a loading of about 1 g/cm^2 of surface area.

(11) Spray bottle

A suitable plastic bottle is required to add a mist spray of water to the sample.

(12) Gloves

Heat resistant gloves are required for removal of hot trays and dishes.

(13) Sample divider

A suitable sample divider as specified in ISO 13909-4:2001 is required for sub-sampling the primary sample and blending the reconstituted sample for testing.

1.5.5.2 Sampling and sample preparation

(1) General

This procedure commences with receipt of sample of not less than 170 kg, sealed in a heavy duty (200 micron thick) plastic bag and contained in a suitable drum (e.g. 220 litres). This packaging ensures the sample does not dry prior to TML determination.

(2) Sample preparation

Representative samples are required that have been obtained using ISO 13909-4:2001 and if required may be partially air dried or partially dried at a temperature of 40°C or less to reduce the water content to a starting point suitable for dry sieving the coal with minimal fines adhering to the oversize fraction. For this purpose, samples should not be dried below 6% total moisture. The representative subsamples for the test should not be fully dried, except in the case of gross water content determination.

(2.1) Sample homogenization and division

Take the as-received sample and divide into individual sub-samples using a sample dividing apparatus as specified in ISO 13909-4:2001. Place these subsamples into heavy-duty plastic bags.

(2.2) Reconstituted sample preparation procedure

When the sample contains particles above 25 mm, the reconstitution process below should be applied.

In this process, particles above 25 mm are removed from the sample and replaced by an equivalent mass of particles in the range 16 mm to 25 mm. Through this process a final reconstituted sample of sufficient mass for TML testing is generated which contains a maximum particle size of 25 mm.

One of two methods may be selected to generate the reconstituted sample:

.1 Split the entire as-received sample and then reconstitute; or

.2 Scalping off particles above 25 mm and substituting particles between 16 mm and 25 mm from a separate sub-sample.

Method 1 Splitting the full as received sample and reconstitution

(i) Take the full as-received sample;

(ii) Screen at 25 mm, 16 mm and 2.36 mm. If a 2.36 mm screen is not available, a 2 mm screen may be used;

(iii) Weigh each of the four size fractions and calculate the percentage represented by each size fraction;

(iv) Sub-divide from each size fraction below 25 mm the required mass to create a 25 kg reconstituted sample using the sample size components specified in table 1.5.1:

Table 1.5.1 Reconstitution size proportions (Method 1)

Size fraction	Quantity
-2.36 mm (or -2 mm)	percentage of this fraction in the original sample
2.36 mm (or 2 mm) to 16 mm	percentage of this fraction
16 mm to 25 mm	percentage of this fraction plus the percentage of + 25 mm coal

(v) Combine each size fraction;

(vi) Fully mix the reconstituted sample;

(vii) Split the sample into approximately eight representative sub-samples and place each into a heavy duty plastic bag. These bags now contain the sample for Proctor/Fagerberg testing.

(viii) A sample of particles passing a 2.36 mm screen (or 2.0 mm if 2.36 mm is not available) is required for particle density pycnometry.

Method 2 Scalping particles above 25 mm and replacement with 16 mm to 25 mm particles

This method is described in figure 1.5.4 and table 1.5.2. The reconstitution process commences where the coal is initially sieved into particle sizes larger than 25 mm and smaller than 25 mm. Coal particles in the size range of 16 mm to 25 mm are extracted from separate subsamples and reconstituted back into the original -25 mm screened coal based on a mass equivalent to the + 25 mm sized coal removed from the initial sample to provide a final reconstituted sample of sufficient mass for TML testing.

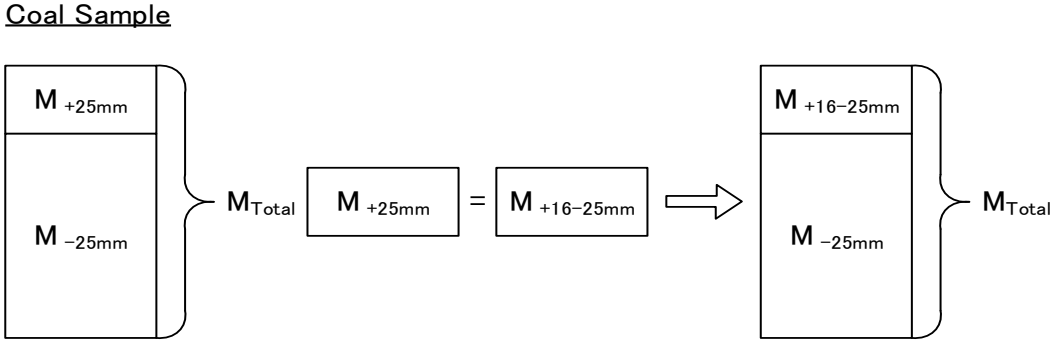


Figure 1.5.4 Overview of sample reconstitution (Method 2)

Table 1.5.2 Sample reconstitution (Method 2)

Step	Example
a) Generate a sample of approximately 25 kg which is sufficient to complete approximately eight Proctor/Fagerberg tests.	Assumes each subsample bag contains 8 kg to 10 kg.
b) Screen this sample at 25 mm, ensuring minimal adhering fines on the +25 mm fraction. Weigh the +25 mm coal.	For a coal containing 20% +25 mm material, approximately 5 kg of initial sample is removed.
c) Create sufficient 16 mm to 25 mm coal by screening one or more further subsample bags of coal at 16 mm and 25 mm.	In the above example, 5 kg of 16 mm to 25 mm coal is required.
d) Extract an amount of 16 mm to 25 mm coal of mass equal to the mass of +25 mm removed in step b) within ± 0.05 kg using a rotary sample divider or similar device, recombining sector trays as required to obtain the required mass.	5 kg in the above case.
e) Add the mass of 16 mm to 25 mm coal from step d) to the -25 mm coal from step b). Blend and divide into approximately eight test portions using a rotary sample divider or similar device.	
f) Place each reconstituted test portion in heavy duty plastic bags, label and seal. **These now become the test portions used for Proctor/Fagerberg testing.**	Each bag should contain approximately 2.5 kg to 3 kg of reconstituted -25 mm coal.
g) Discard the +25 mm and -16 mm coal.	

(3) Initial moisture

Initial moisture is to be determined on a test portion from table 1.5.2 step e) using the method provided in ISO 589:2008. This moisture value provides a guide to the moisture steps required to develop the Proctor/Fagerberg compaction curve.

(4) Particle density measurement

In accordance with water pycnometer standard AS 1289.3.5.1:2006, measure the density of solids on the full size range (non-crushed) coal. The density of solids is used for determining the void ratio for plotting compaction curves. The recommended methodology is described below:

(a) Generate a full particle size sample of approximately 10 kg, weigh and then screen the entire contents at 2.36 mm. If a 2.36 mm screen is not available, a 2 mm screen may be substituted. Record the following:

(i) The total mass of the material;

(ii) The mass of +2.36 mm material; and

(iii) The mass of -2.36 mm material.

(b) Calculate the percentage of -2.36 mm coal in the sample.

(c) Divide the +2.36 mm coal into two test portions using sample dividing apparatus as specified in ISO 13909-4:2001 such as a rotary sample divider. Place each test portion in a heavy duty plastic bag and label.

(d) Divide the -2.36 mm coal into two test portions, place each test portion in a heavy duty plastic bag and label.

(e) Determine the density of solids of the +2.36 mm fraction following the method described in Section 5.2 of AS 1289.3.5.1:2006. As noted in the standard, duplicate determinations are required.

(f) Determine the density of solids of the -2.36 mm fraction using the method described in Section 5.1 of the above standard with the following clarifications:

(i) Use of 250 mm conical or pycnometry flasks is recommended.

(ii) From the sample bag pour 1 litre of coal into a beaker of known tare weight.

(iii) Weigh the 1 litre sample and calculate the approximate bulk density of the material.

(iv) Remove a portion of the sample (nominally a mass in kilograms of 0.18 x bulk density) and place into the flask, and complete the pycnometry analysis.

(v) A water bath temperature of 60°C is recommended.

(g) Calculate the density of solids using the method in Section 6 of AS 1289.3.5.1:2006.

1.5.5.3 Test procedure

(1) Variables and definitions

The variables and definitions used in the determination of TML are summarized in table 1.5.3 with some key variables as illustrated in figure 1.5.5.

Table 1.5.3 Summary of variables and definitions

Variable	Unit	Symbol / value used in calculations
Mass of empty cylinder and base	g	A
Mass of cylinder, base and tamped test portion	g	B
Wet mass of test portion in the mould	g	$C = B - A$
Wet mass of test portion removed from the mould	g	C_1
Dry mass of test portion removed from the mould	g	D_1
Gross water content	%	W^1
Dry mass of test portion in the mould	g	D
Mass of water in the mould	g	E
Volume of cylinder	cm^3	V
Density of solids	g/cm^3	d
Density of water	g/cm^3	ρ_w

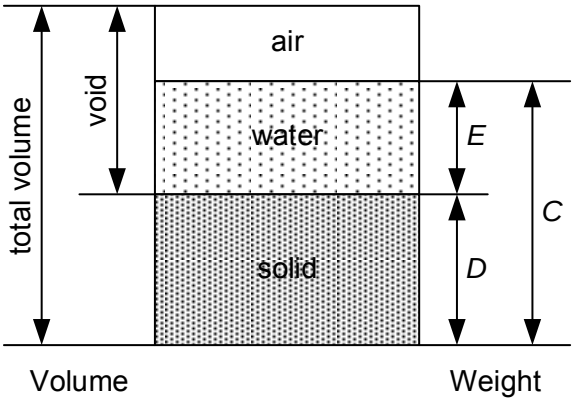


Figure 1.5.5 Illustration of key variables

(2) Establishment of the initial compaction point

The initial compaction point is obtained using the first test portion of the reconstituted material at the initial moisture content. For each compaction point determination, all steps in the procedure from packing the mould to weighing the mould and sample are to be completed at the same time without breaks. In any case, coal should not be left in the mould for longer than thirty minutes prior to weighing.

The test procedure is as follows:

(a) Clean the mould, collar and base plate. Inspect and clean the hammer and ensure that it moves freely in the guide tube.

(b) Determine the mass, *A*, of the empty cylinder, comprising the mould plus base plate.

(c) Assemble the mould, collar and base plate and place the assembly on a stable bench.

(d) Place approximately 0.5 litre (one fifth of the full 2.5 litres) of the test portion into the mould, level, and then tamp uniformly over the surface by dropping the hammer 25 times vertically through the full height of the guide pipe, moving the guide pipe to a new position after each drop. The required pattern for even compaction of each layer in the mould is shown in figure 1.5.6.

(e) Repeat step (d) four more times so that there are 5 layers of material in the mould. Ensure that the compacted test portion with the final layer is above the top of the compaction mould whilst the extension piece is still attached.

(f) When the last layer has been tamped, remove the extension piece taking care not to disturb the compacted test portion inside. Level the compacted test portion to the top of the mould using the flat scraping device, ensuring that any large particles that may hinder levelling of the test portion are removed and replaced with material contained in the extension piece and re-level. If any holes in the surface are still observed after levelling, they should be manually filled with finer material contained in the extension piece. Care should be taken to avoid any further compaction of the test portion.

(g) Determine the mass, *B*, of the mould and compacted coal and then calculate the mass, *C*, of the wet test portion using the equation:

$$C = B - A \quad (1)$$

(h) When the weight of the cylinder with the tamped test portion has been determined, remove the test portion from the mould, determine the mass of the wet test portion, C_1, and dry the entire test portion in an oven at 105°C until constant mass is achieved. After drying, determine the weight, D_1, of the dried test portion and then calculate the percentage gross water content, W^1, as follows:

$$W^1 = (C_1 - D_1)/C_1 \times 100\% \quad (2)$$

(i) Using the calculated gross water content, calculate the mass of the dry test portion in the mould, D, using the equation:

$$D = C - C \times W^1/100 \quad (3)$$

(j) Calculate the mass, E, of water in the mould using the equation:

$$E = C - D \quad (4)$$

(k) Discard the used coal sample. Coal from a previously compacted test portion should not be reused.

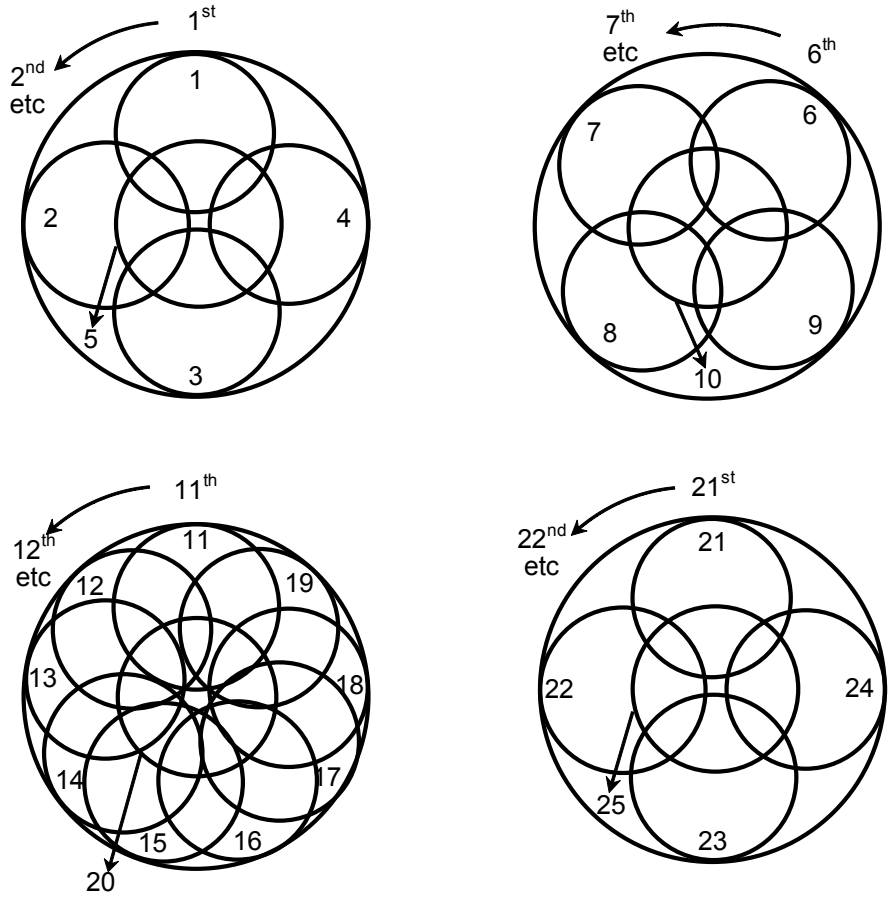


Figure 1.5.6 Recommended compaction patterns

(3) Establishment of complete compaction curve

The range of water contents should be adjusted so that partially dry to almost saturated test portions are obtained. Care should be taken to follow the precaution in paragraph 1.5.5.3(2) above regarding prompt completion of each point in the compaction curve.

The test procedure is as follows:

(a) For each compaction test, a predetermined amount of water is added to the test portion (approximately 2.5 kg) in a heavy duty plastic bag. The water quantity added is that required to increase the moisture content to the target value for the next test. The water should be added as a mist spray to the surface of the individual test portions. The water at this point should be added slowly and in small quantities, as the introduction of large amounts of water may induce localized compaction behaviour.

(b) After the calculated water addition, the test portion should then be mixed thoroughly in the plastic bag by sealing the bag and turning it over repeatedly for 5 minutes.

(c) The test portion should then be allowed to equilibrate for a minimum of 12 hours prior to compaction testing.

(d) Repeat steps (a) to (k) from paragraph 1.5.5.3(2).

(e) Repeat the test between four and seven times using the other prepared test portions with different water contents to obtain at least five points on the compaction curve. The water contents should be chosen so that:

.1 at least one point corresponds to moisture content higher than the Optimum Moisture Content (OMC) or than the value corresponding to 70% of degree of saturation (S), in order to satisfactorily define the compaction curve; and

.2 at least one point corresponds to the degree of saturation (S) between 70% and 80%, in order to effectively assess the PFD70 value.

A point close to a degree of saturation (S) of 80% will also assist accurate assessment if the OMC is greater than 70%.

(4) Visual appearance of coal in the cylindrical mould

In order for the test to obtain a PFD70 value, all tests conducted at or below the PFD70 moisture value should have an even moisture distribution throughout the cylindrical mould.

Two examples of tests using samples of the same coal at different moisture contents are shown in figure 1.5.7. The left hand photograph shows a coal specimen at a relatively low degree of saturation. Note that the coal remains in place following removal of the collar. The right hand photograph shows a specimen near or possibly above 70% degree of saturation. Once again the coal remains in place following removal of the collar. Both tests provided valid points on the compaction curve.

Figure 1.5.7 Photographs showing valid tests for a partially saturated test portion (left) and a near fully saturated test portion (right)

Coals where water passes through the spaces between particles exhibit moisture migration within the Proctor/Fagerberg cylindrical mould. Moisture migration may take place when the degree of saturation of the specimen is less than 70%.

Evidence of moisture migration is from visual observation at the completion of each test as follows:

.1 Moisture leakage from the base of the mould is evident as shown in figure 1.5.8; and

.2 The portion above the top of the cylindrical mould appears unsaturated and the test portion maintains its structure without deformation or movement.

In this case, moisture migration has occurred and hence for this coal water passes through the spaces between particles.

Figure 1.5.8 Test showing water leakage from the base of the cylindrical mould indicating moisture migration

(5) Calculation of key parameters for determination of compaction curve

Carry out the following calculations for each compaction test:

d = density of solids, g/cm^3 (t/m^3) by pycnometry (see 1.5.5.2(4)).

γ = dry bulk density, g/cm^3 (t/m^3)
= D/V

e_v = net water content (percentage by volume)
= $(E/D) \times 100 \times d/\rho_w$

where ρ_w= density of water, g/cm^3 (t/m^3)

e = void ratio (volume of voids divided by volume of solids)
= $(d/\gamma) - 1$

S = degree of saturation (percentage by volume)
= e_v/e

W[1] = gross (total) water content (percentage by mass) (see 1.5.5.3(2)(h)).

(6) Presentation of compaction results

Record all the compaction test results in a suitable spreadsheet (such as that shown in table 1.5.4) and from this spreadsheet create a compaction curve as shown in figure 1.5.9 by plotting the calculated void ratio (e) for each compaction test on the ordinate against either the net or gross water content plotted on the abscissa.

The lines in figure 1.5.9 correspond to plots of void ratio (e) versus net water content (e_v) at 20%, 40%, 60%, 70%, 80% and 100% degree of saturation (S). These lines are calculated at five values of void ratio using the formulae in section 1.5.5.3(7). (Note: These lines corresponding to degree of saturation will be curved in the case of plotting gross water content on the abscissa.)

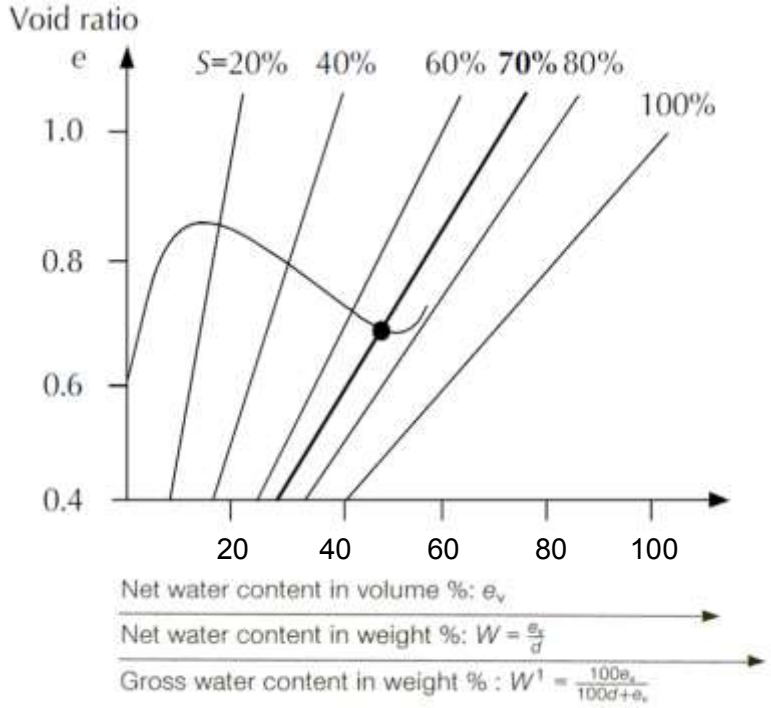


Figure 1.5.9 Typical compaction curve

(7) Sample compaction curve

An example of the results obtained when applying the Modified Proctor/Fagerberg test to a coal sample is provided in table 1.5.4, with the corresponding compaction curve and the 70% degree of saturation line plotted as described below.

The preferred approach to presenting the results is to plot the void ratio (e) against the gross water content (W^1) allowing moisture for any saturation level to be read directly from the plot as gross water content. This approach is shown in figure 1.5.10. The saturation lines are plotted according to the equation:

$$e = W^1/(100 - W^1) \times 100 \times d / S$$

The intercept of the compaction curve with the 70% degree of saturation line in figure 1.5.10 occurs at a gross water content of 15.4%, which is the Transportable Moisture Limit (TML). For this example, the Optimum Moisture Content (OMC) occurs at a degree of saturation of about 85%.

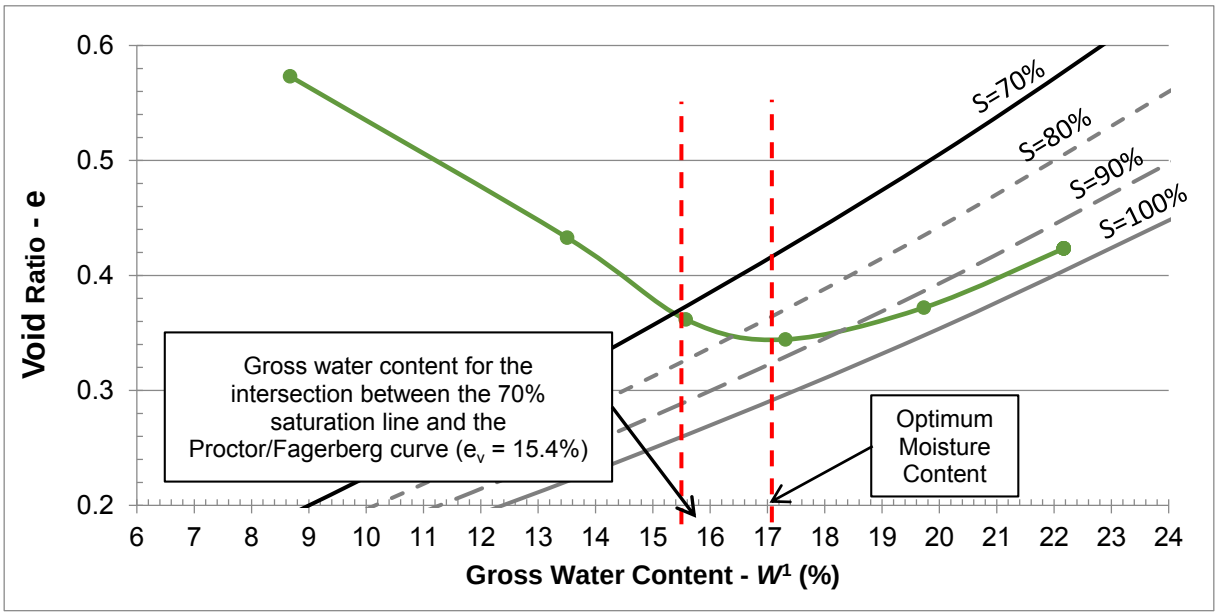


Figure 1.5.10 Example of a measured compaction curve for void ratio versus gross water content with the 70%, 80%, 90% and 100% degree of saturation lines plotted

(8) Determination of transportable moisture limit

(8.1) Determination of PFD70 moisture content

The PFD70 value is determined as the gross (total) water content corresponding to the intersection of the compaction curve and the line S = 70% saturation. The Optimum Moisture Content (OMC) is the gross (total) moisture content corresponding to the maximum compaction (maximum dry density and minimum void ratio) under the specified compaction condition.

The test procedure is applicable for determination of coal TML where the degree of saturation corresponding to the OMC of the coal is at or greater than 70%. Where the OMC lies below 70% degree of saturation, this test is not applicable for the specific coal and the PFD70 may overstate the TML. In such cases, the certificate of analysis should state that the OMC is below 70% saturation and the shipper should consult with an appropriate authority.

(8.2) Cases where the highest determinable point on the compaction curve lies below 70% saturation

In coals where there is visual evidence that water passes through the spaces between particles and the compaction curve does not extend to or beyond the 70% degree of saturation line, the coal is deemed to be free-draining and a TML value is not applicable. By reference to section 7.2.2 of this Code, such coals are cargoes which are not liable to liquefy, and hence are classified as Group B only.

1.5.6 Test report

The test report from application of the Modified Proctor/Fagerberg test procedure should include the following information:

(a) Identification of the sample;

(b) A unique reference to this test procedure;

(c) Reference to the appropriate standard adopted for determining the density of the solids:

(d) Either:

(i) The Transportable Moisture Limit (TML) of the sample, expressed as the gross water content as a percentage of the sample by mass;

(ii) The OMC lies below 70% degree of saturation and this test procedure is not applicable; or

(iii) A statement that the test indicated that water passes through the spaces between particles at moisture content below the value corresponding to 70% degree of saturation, and the coal is therefore Group B only.

(e) The solids density d in g/cm^3.

Table 1.5.4 Example of TML determination for a coal sample using the Modified Proctor/Fagerberg test procedure for coal

Date		Diameter of cylinder	150 mm
Product		Height of cylinder	120 mm
Sample		Volume of cylinder	2121 ml
Initial gross water content (%)	5.6	TML	15.4%
Density of solids	1416 kg/m^3		
Laboratory temperature	25°C	Size fraction	
Mass of mould (***A***)	7271 g	Operator	
Initial Dry density	899 kg/m^3	Tamper	337.5 g

Test number	Water added	Mass of mould + sample	Tray No.	Mass of tray	Mass of wet sample + tray	Mass of dry sample + tray	Measured gross water content	Gross water content	Net water content	Void ratio	Dry density	Degree of saturation	Wet bulk density	Mass of wet sample	Mass of dry sample	Mass of water
	(ml)	(g)		(g)	(g)	(g)	(%)	(%)	(%v)		(g/cm^3)	(%)	(g/cm^3)	(g)	(g)	(g)
		B						W^1	e_V	***e***	γ	***S***		***C***	***D***	***E***
1	0.00	9360.00	T1	602.5	1656.8	1565.7	8.64	8.67	13.437	0.573	0.899	23.4	0.985	2089.0	1907.8	181.2
			T2	602.3	1643.1	1552.5	8.70									
2	150.00	9692.70	T3	630.7	1811.7	1649.6	13.73	13.51	22.097	0.433	0.988	51.1	1.142	2421.7	2094.6	327.1
			T4	882.9	2126.9	1961.6	13.29									
3	250.00	9881.60	T5	638.7	2081.4	1849.7	16.06	15.58	26.104	0.362	1.039	72.2	1.231	2610.6	2204.0	406.6
			T6	632.4	1822.6	1643.0	15.09									
4	350.00	9971.00	T7	882.2	2349.9	2095.4	17.34	17.31	29.630	0.344	1.053	86.1	1.273	2700.0	2232.5	467.5
			T8	637.9	1868.8	1656.0	17.29									
5	450.00	9996.20	T9	654.3	2013.2	1746.5	19.63	19.73	34.780	0.372	1.031	93.5	1.285	2725.2	2187.5	537.7
			T10	639.6	1999.4	1729.7	19.83									
6	550.00	9980.00	T11	885.0	2251.5	1931.6	23.41	22.17	40.311	0.423	0.994	95.2	1.277	2709.0	2108.4	600.6
			T12	883.5	2181.9	1910.1	20.93									
7																
8																
9																
10																

Note: The example above uses two drying trays for each test.

Table 1.5.5 Specifications and tolerances for Proctor/Fagerberg cylindrical mould and hammer

Parameter	Units	Dimension	Tolerance
Hammer mass	g	337.5	± 2
Hammer diameter	mm	75	± 0.2
Drop height	mm	150	± 2
Tube ID	mm	78	± 0.2
Tube OD	mm	82	± 0.2
Tube wall thickness	mm	2	± 0.2
Tube clearance	mm	1.5	± 0.2
Mould inner diameter	mm	150	± 0.5
Mould inner height	mm	120	± 1
Mould inner volume	cm^3	2121	± 18
Removable extension piece height	mm	75	± 1
Depth of recess into base to seat	mm	1	± 0.2
Gap between mould and base	mm	≤ 0.1	
Gap between mould and extension piece	mm		(0 to + 0.1)
Clearance between mould and hammer	mm	≤ 6	

"

APPENDIX 3

Properties of solid bulk cargoes

1 Non-cohesive cargoes

1.1 The following cargoes are non-cohesive when dry:

194 In the list, add the following new entries in alphabetical order:

"MONOAMMONIUM PHOSPHATE (M.A.P.), MINERAL ENRICHED COATING"
"MONOCALCIUMPHOSPHATE (MCP)"
"OLIVINE SAND"
"OLIVINE GRANULAR AND GRAVEL AGGREGATE PRODUCTS"
"SAND, MINERAL CONCENTRATE, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I) UN 2912"
"SUGARCANE BIOMASS PELLETS"
"SYNTHETIC SILICON DIOXIDE"

APPENDIX 4

INDEX

195 In the entry for "ILMENITE SAND", in the column of "Group", delete the words "or C".

196 Insert the following new entries in alphabetical order:

Material	Group	References
Beach iron	C	*see* IRON SMELTING BY-PRODUCTS
Bottom ash	A and B	*see* CLINKER ASH
Flat iron	C	*see* IRON SMELTING BY-PRODUCTS
Flint flat glass cullet	C	*see* GLASS CULLET
FOAM GLASS GRAVEL	C	
Granulated iron	C	*see* IRON SMELTING BY-PRODUCTS
K1-K3 bears	C	*see* IRON SMELTING BY-PRODUCTS
Iron pan edges	C	*see* IRON SMELTING BY-PRODUCTS
Iron skulls	C	*see* IRON SMELTING BY-PRODUCTS
IRON SMELTING BY-PRODUCTS	C	
METAL SULPHIDE CONCENTRATES, CORROSIVE UN 1759	A and B	
MONOAMMONIUM PHOSPHATE (M.A.P.), MINERAL ENRICHED COATING	B	
MONOCALCIUMPHOSPHATE (MCP)	A and B	
OLIVINE SAND	A	
OLIVINE GRANULAR AND GRAVEL AGGREGATE PRODUCTS	C	
Pig iron by-product	C	*see* IRON SMELTING BY-PRODUCTS
Plate iron	C	*see* IRON SMELTING BY-PRODUCTS
Pool iron	C	*see* IRON SMELTING BY-PRODUCTS
SAND, MINERAL CONCENTRATE, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I) UN 2912	A and B	
Separation of iron	C	*see* IRON SMELTING BY-PRODUCTS
Silicon dross	C	*see* SILICON SLAG
Steel bears	C	*see* IRON SMELTING BY-PRODUCTS
SUGARCANE BIOMASS PELLETS	B	
SYNTHETIC CALCIUM FLUORIDE	A	
SYNTHETIC SILICON DIOXIDE	A	
TITANOMAGNETITE SAND	A	

"

APPENDIX 5

Bulk Cargo Shipping Names in three languages (English, Spanish and French)

197 In Appendix 5 insert the following new entries in the corresponding alphabetical order:
"

ENGLISH	FRENCH	SPANISH
Beach iron	Fer de type grès dits "beach iron"	Hierro de tipo arenisco conocido como ("beach iron")
Bottom ash	Cendres résiduelles	Cenizas de fondo
Flat iron	Fer plat	Hierro plano
Flint flat glass cullet	Calcin de verre de silex plat	Desperdicios gruesos de vidrio flint
FOAM GLASS GRAVEL	GRANULAT DE VERRE CELLULAIRE	GRAVA DE VIDRIO CELULAR
Granulated iron	Granulats ferreux	Hierro granulado
K1-K3 bears	Pièces en forme d'ours des groupes K1-K3 dites "bears"	Cuescos K1 – K3
Iron pan edges	Fer en forme de poêles dits "Iron pan edges"	Hiero en forma de sartenes denominado ("Iron pan edges")
Iron skulls	Fer en forme de crânes ("iron skulls")	Hierro en forma de cráneos conocido como ("iron skulls")
IRON SMELTING BY-PRODUCTS	PRODUITS DE LA FUSION DU FER	PRODUCTOS DERIVADOS DE LA FUNDICIÓN DEL HIERRO
METAL SULPHIDE CONCENTRATES, CORROSIVE UN 1759	CONCENTRÉS DE SULFURES MÉTALLIQUES, CORROSIFS, ONU 1759	CONCENTRADOS DE SULFUROS METÁLICOS, CORROSIVOS (ONU 1759)
MONOAMMONIUM PHOSPHATE (M.A.P.), MINERAL ENRICHED COATING	MONOPHOSPHATE D'AMMONIUM, REVÊTEMENT ENRICHI EN MINÉRAUX	FOSFATO MONOAMÓNICO CON RECUBRIMIENTO DE MINERAL ENRIQUECIDO
MONOCALCIUMPHOSPHATE (MCP)	PHOSPHATE MONOCALCIQUE EN VRAC	FOSFATO MONOCÁLCICO (MCP)
OLIVINE SAND	SABLE D'OLIVINE	ARENA DE OLIVINO
OLIVINE GRANULAR AND GRAVEL AGGREGATE PRODUCTS	OLIVINE GRANULEUX ET PRODUITS D'AGREGATS DE GRAVIER	PRODUCTOS AGREGADOS GRANULARES Y DE GRAVA DE OLIVINO
Pig iron by-product	Sous-produits de la fonte brute	Productos derivados del hierro en lingotes
Plate iron	Plaques de fer	Placas de hierro
Pool iron	Résidus de hauts fourneaux	Residuos de altos hornos

ENGLISH	FRENCH	SPANISH
SAND, MINERAL CONCENTRATE, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I) UN 2912	MATIÈRES RADIOACTIVES DE FAIBLE ACTIVITÉ SPÉCIFIQUE (LSA-I), ONU 2912, SABLES, CONCENTRÉS DE MINÉRAUX	ARENAS DE CONCENTRADOS DE MINERALES (MATERIAL RADIACTIVO DE BAJA ACTIVIDAD ESPECÍFICA (BAE-I), ONU 2912)
Separation of iron	Résidus du processus de séparation	Residuos del proceso de separación
Steel bears	Pièces d'acier en forme d'ours dites "steel bears"	Cuescos de acero
SILICOMANGANESE (carbo-thermic)	SILICOMANGANÈSE (carbothermique)	SILICOMANGANESO (CARBOTÉRMICO)
SUGARCANE BIOMASS PELLETS	Biomasse de la canne à sucre en pellets	Pellets de biomasa de caña de azúcar
SYNTHETIC CALCIUM FLUORIDE	FLUORURE DE CALCIUM DE SYNTHÈSE	FLUORURO DE CALCIO SINTÉTICO
SYNTHETIC SILICON DIOXIDE	DIOXYDE DE SILICIUM DE SYNTHÈSE	DIÓXIDO DE SILICIO SINTÉTICO
TITANOMAGNETITE SAND	SABLE TITANOMAGNÉTITE	ARENA DE TITANOMAGNETITA

"

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ANNEX 9

RESOLUTION MSC.427(98)
(adopted on 15 June 2017)

AMENDMENTS TO THE REVISED RECOMMENDATION ON TESTING OF LIFE-SAVING APPLIANCES (RESOLUTION MSC.81(70), 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 resolution A.689(17) entitled *Testing of life-saving appliances*, by which the Assembly, at its seventeenth session, adopted the *Recommendation on testing of life-saving appliances*,

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

NOTING resolution MSC.81(70), by which, at its seventieth session, it adopted the *Revised recommendation on testing of life-saving appliances*, introducing more precise provisions for the testing of life-saving appliances based on the requirements of the International Life-Saving Appliances (LSA) Code,

RECOGNIZING the need to appropriately align the relevant provisions of the *Revised recommendation on testing of life-saving appliances* with the associated amendments to the LSA Code adopted by resolution MSC.425(98),

HAVING CONSIDERED, at its ninety-eighth session, proposed amendments to the *Revised recommendation on testing of life-saving appliances*, prepared by the Sub-Committee on Ship Systems and Equipment at its third session,

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

2 RECOMMENDS Member States to apply the annexed amendments when testing life-saving appliances.

ANNEX

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

Part 1 – Prototype tests for life-saving appliances

8 LAUNCHING AND EMBARKATION APPLIANCES

8.1 Testing of davits and launching appliances

1 The first sentence of paragraph 8.1.1 is amended to read as follows:

"For lifeboats other than free-fall lifeboats, davits and launching appliances, except winches, should be subjected to a static proof load of 2.2 times their maximum working load."

***

ANNEX 10

RESOLUTION MSC.428(98)
(adopted on 16 June 2017)

MARITIME CYBER RISK MANAGEMENT IN SAFETY MANAGEMENT SYSTEMS

THE MARITIME SAFETY COMMITTEE,

RECOGNIZING the urgent need to raise awareness on cyber risk threats and vulnerabilities to support safe and secure shipping, which is operationally resilient to cyber risks,

RECOGNIZING ALSO that Administrations, classification societies, shipowners and ship operators, ship agents, equipment manufacturers, service providers, ports and port facilities, and all other maritime industry stakeholders should expedite work towards safeguarding shipping from current and emerging cyber threats and vulnerabilities,

BEARING IN MIND MSC-FAL.1/Circ.3 on *Guidelines on maritime cyber risk management* approved by the Facilitation Committee, at its forty-first session (4 to 7 April 2017), and by the Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), which provides high-level recommendations for maritime cyber risk management that can be incorporated into existing risk management processes and are complementary to the safety and security management practices established by this Organization,

RECALLING resolution A.741(18) by which the Assembly adopted the International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management (ISM) Code) and recognized, inter alia, the need for appropriate organization of management to enable it to respond to the need of those on board ships to achieve and maintain high standards of safety and environmental protection,

NOTING the objectives of the ISM Code which include, inter alia, the provision of safe practices in ship operation and a safe working environment, the assessment of all identified risks to ships, personnel and the environment, the establishment of appropriate safeguards, and the continuous improvement of safety management skills of personnel ashore and aboard ships,

1 AFFIRMS that an approved safety management system should take into account cyber risk management in accordance with the objectives and functional requirements of the ISM Code;

2 ENCOURAGES Administrations to ensure that cyber risks are appropriately addressed in safety management systems no later than the first annual verification of the company's Document of Compliance after 1 January 2021;

3 ACKNOWLEDGES the necessary precautions that could be needed to preserve the confidentiality of certain aspects of cyber risk management;

4 REQUESTS Member States to bring this resolution to the attention of all stakeholders.

***

ANNEX 12

RESOLUTION MSC.429(98)
(adopted on 9 June 2017)

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,

HAVING CONSIDERED, at its ninety-eighth session, the recommendations made by the Sub-Committee on Ship Design and Construction, at its fourth session,

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 should take effect on ships as defined in SOLAS regulation II-1/1.1.1, as adopted by resolution MSC.421(98).

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 was 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* undergoes alterations or modifications of major character that don't 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 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.

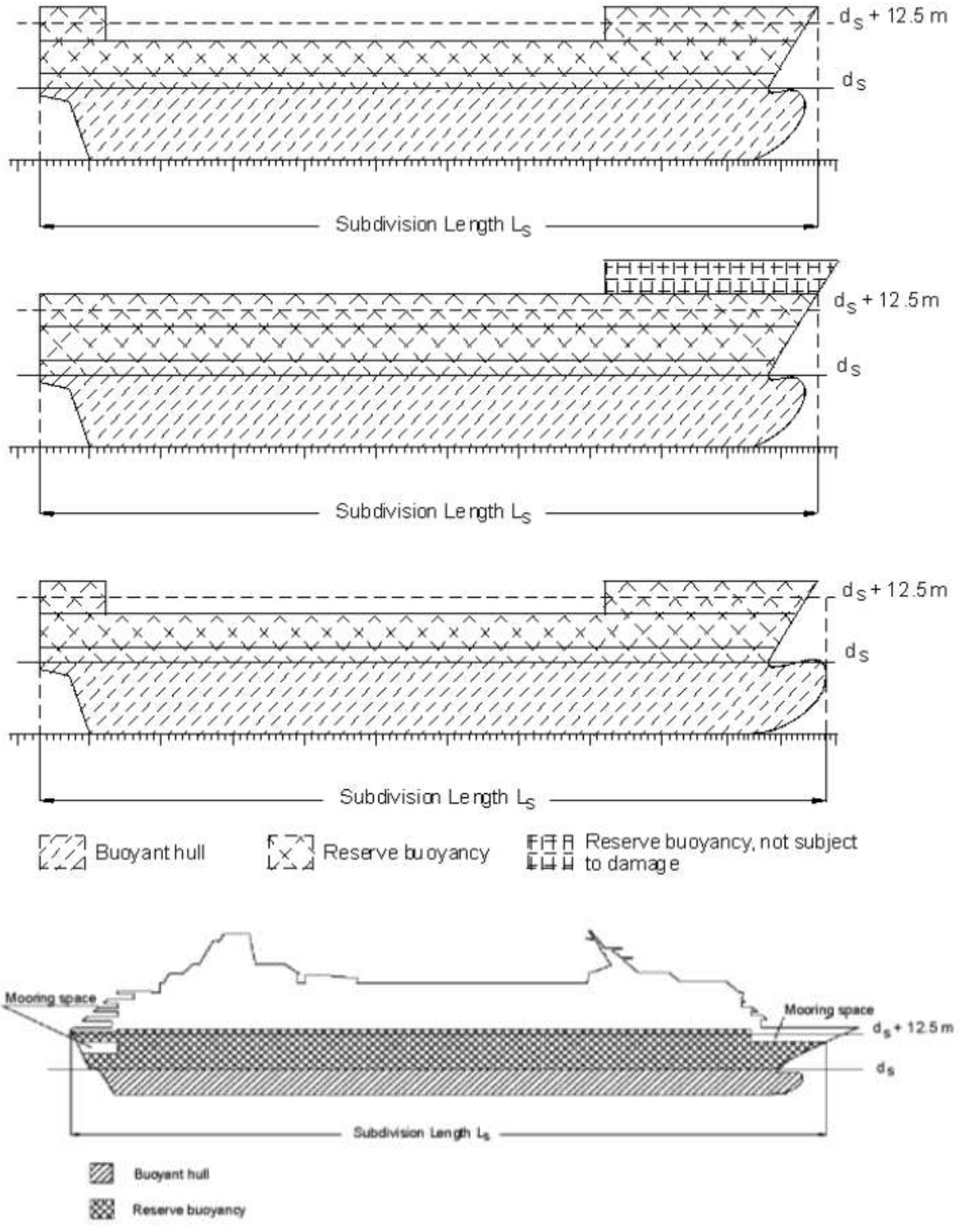
REGULATION 2 – DEFINITIONS

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.

* 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 alternation 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

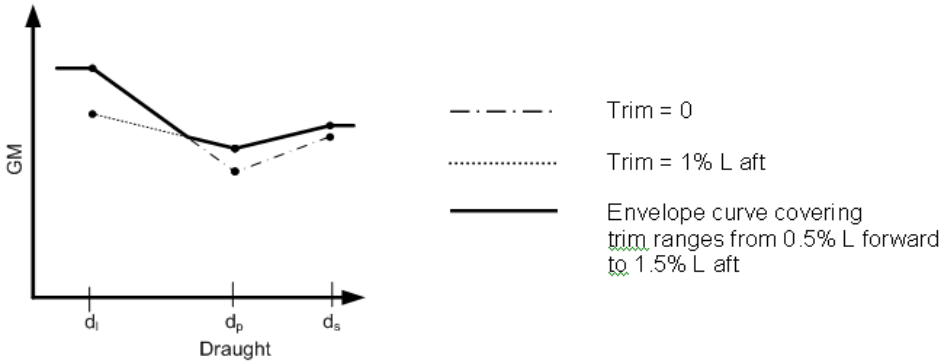
The requirement that applied trim values shall coincide in all stability information intended for use on board, is intended to address initial stability calculations as well as those that may be necessary during the service life of the ship.

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*.

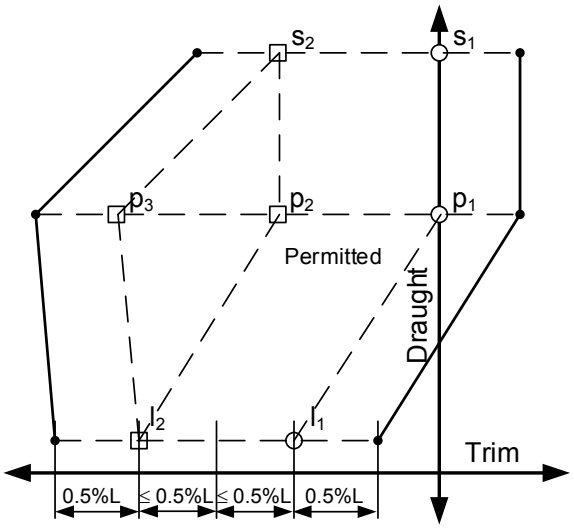


4 Temporary loading conditions may occur with a draught less than the light service draught d_l due to ballast water exchange requirements, etc. In these cases, for draughts below d_l, the *GM* limit value at d_l is to be used.

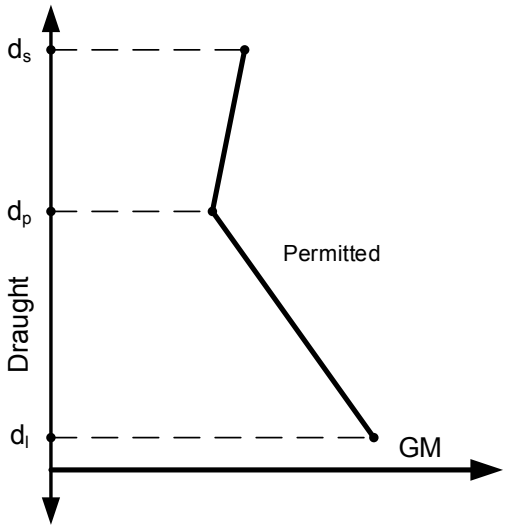
5 Ships may be permitted to sail at draughts above the deepest subdivision draught d_s according to the International Convention on Load Lines, e.g. using the tropical freeboard. In these cases, for draughts above d_s the *GM* limit value at d_s is to be used.

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.

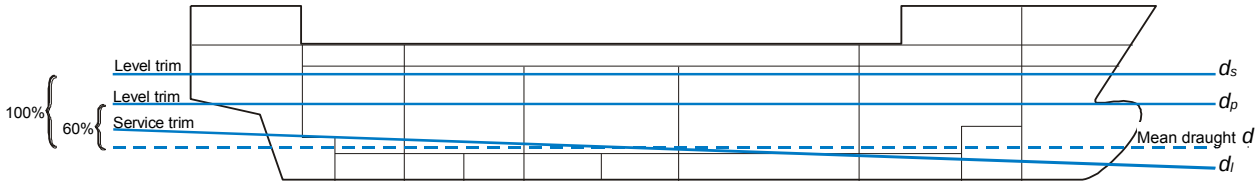
4 The index *A* is divided into partial factors as follows:

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

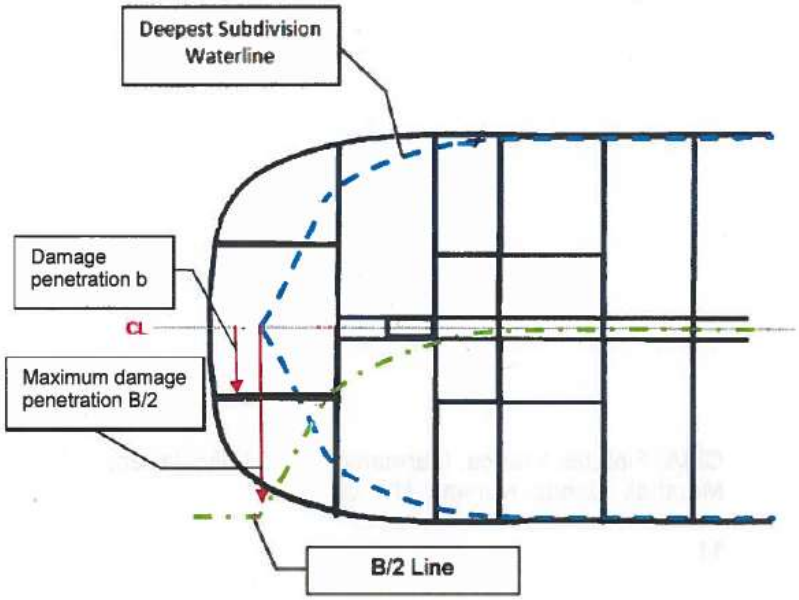
When additional calculations of *A* are performed for different trims, for a given set of calculations the difference between trim values for d_s, d_p and d_l may not exceed 1% *L*.

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 centre line. 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.

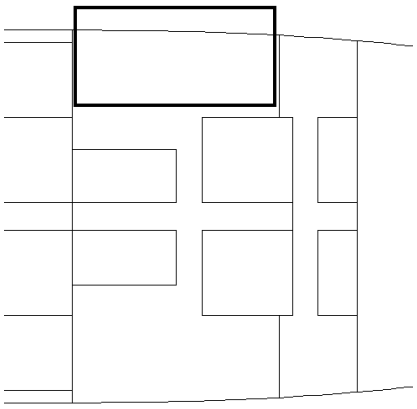
5 Space – a combination of rooms.

6 Compartment – a space within watertight boundaries.

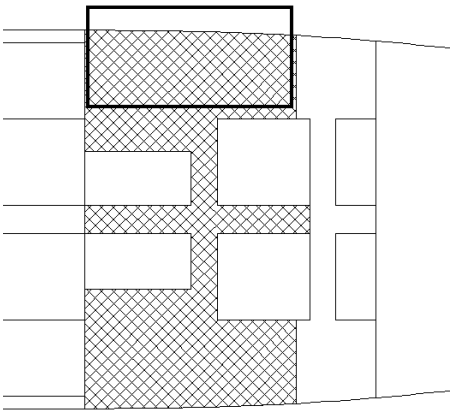
7 Damage – the three dimensional extent of the breach in the ship.

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:



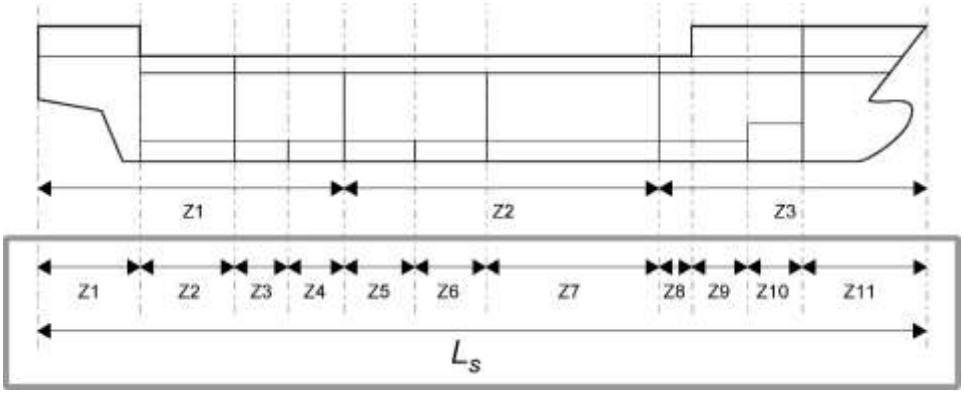
Regulation 7-1.1.1

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.

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 will be the attained index, 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.

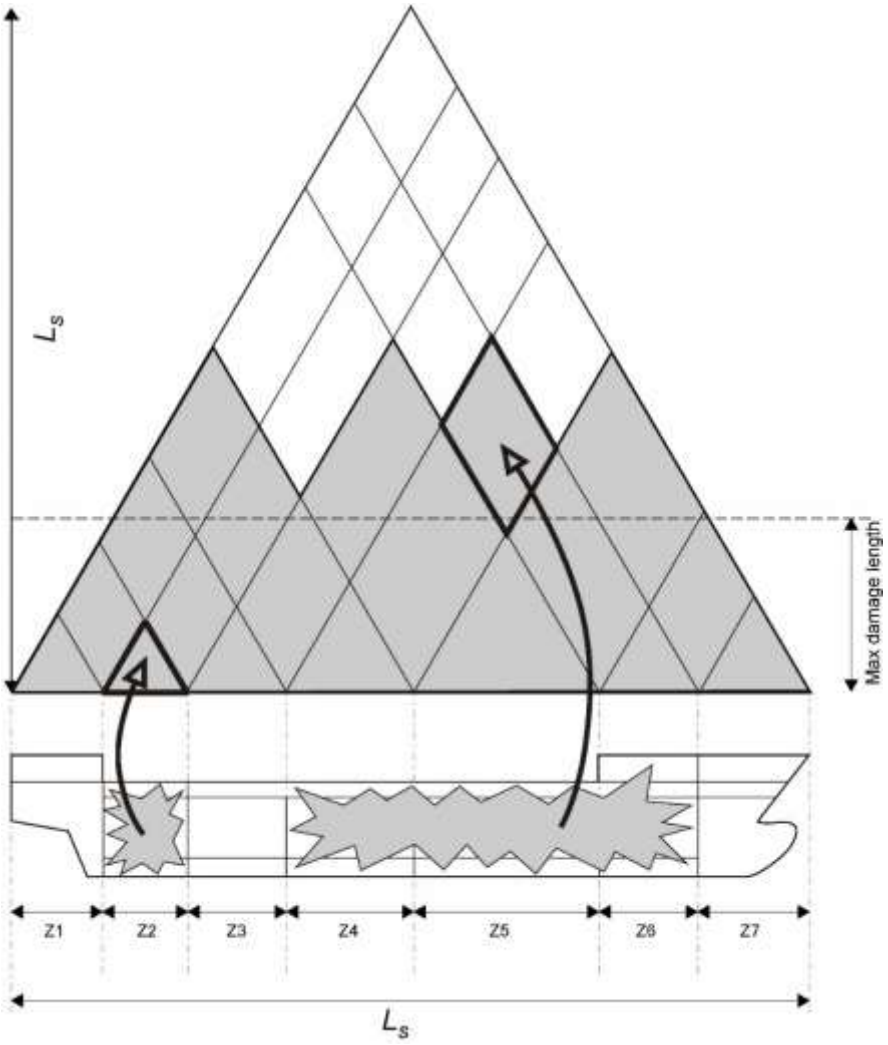
5 In the second example the zones have been placed in accordance with the watertight arrangement, including minor subdivision (as in double bottom, etc.). In this case there is a much better chance of obtaining higher *s*-factors.

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 the 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:

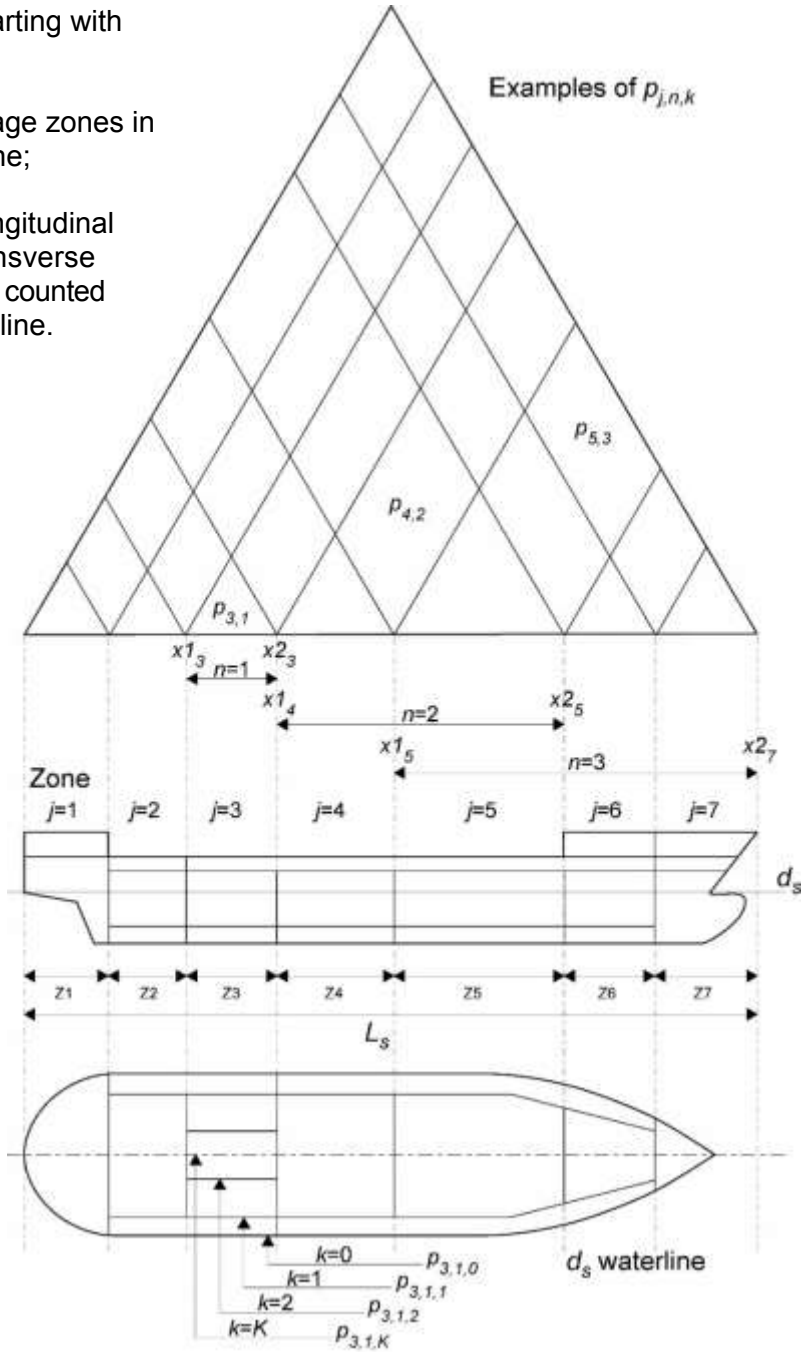
j: the damage zone number starting with No.1 at the stern;

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;

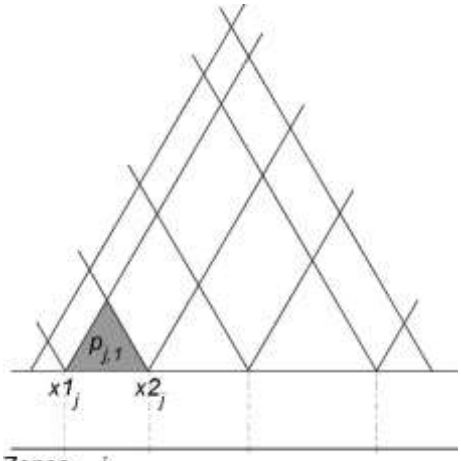
$p_{j,n,k}$: the *p*-factor for a damage in zone *j* and next (*n*-1) zones forward of *j* damaged to the longitudinal bulkhead *k*.



Pure longitudinal subdivision

Single damage zone, pure longitudinal subdivision:

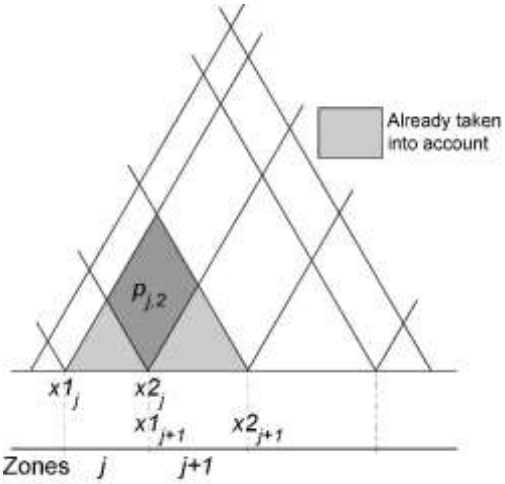
$p_{j,1} = p(x1_j, x2_j)$



n=1: damage to 1 Zone

Two adjacent zones, pure longitudinal subdivision:

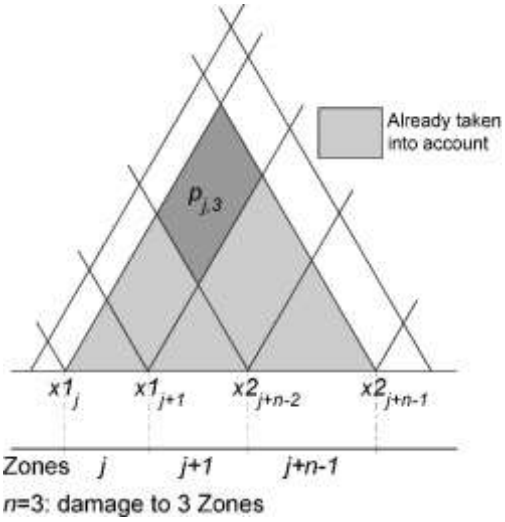
$p_{j,2} = p(x1_j, x2_{j+1}) - p(x1_j, x2_j) - p(x1_{j+1}, x2_{j+1})$



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

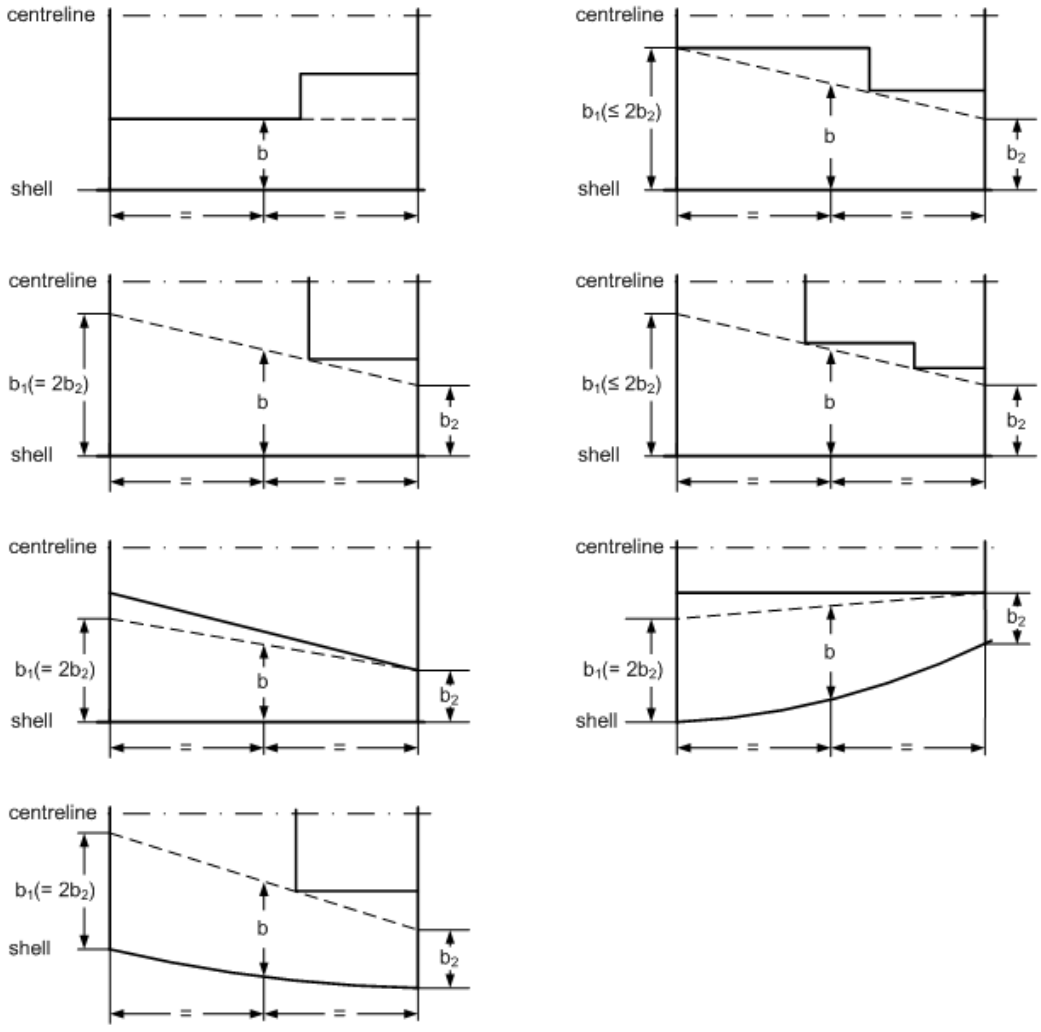
Transverse subdivision in a damage zone

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.

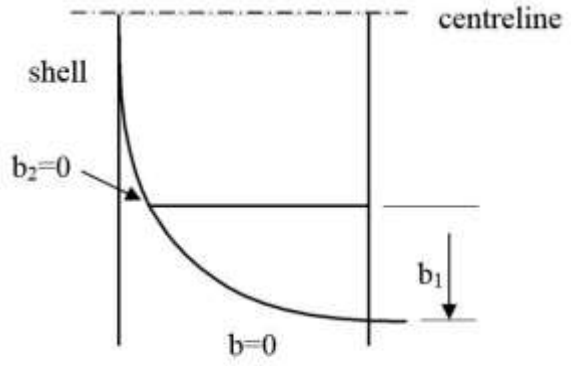


Figure 1

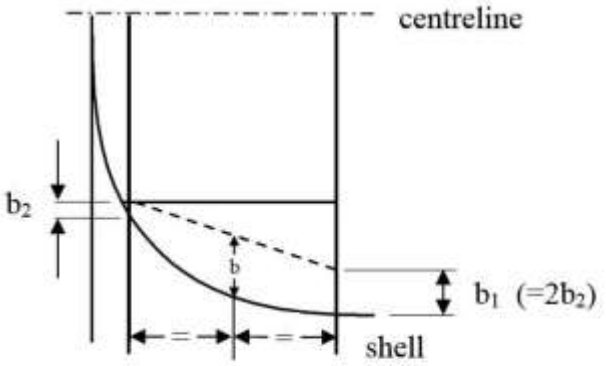


Figure 2

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.

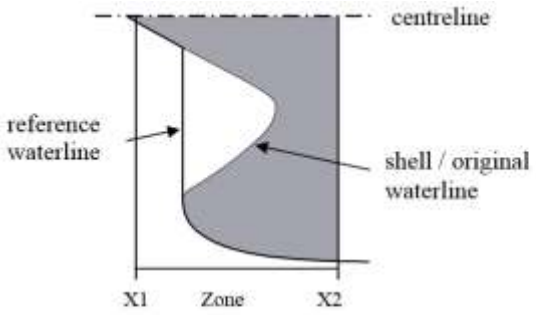


Figure 1

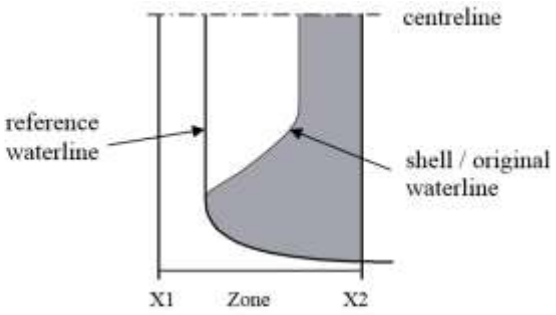


Figure 2

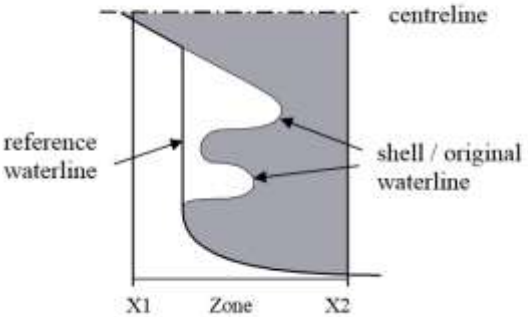


Figure 3

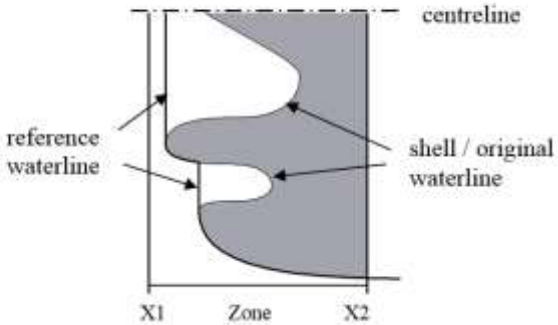


Figure 4

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:

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

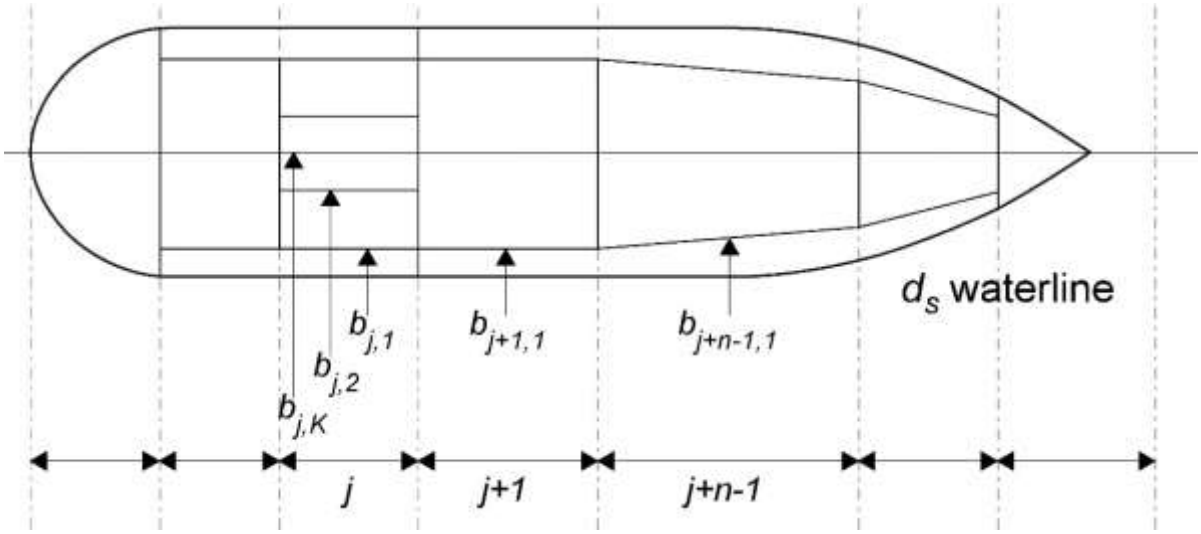
where: $n =$ number of wing compartments in that group;
$b_1, b_2, \ldots, b_n =$ mean values of *b* for individual wing compartments contained in the group.

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.

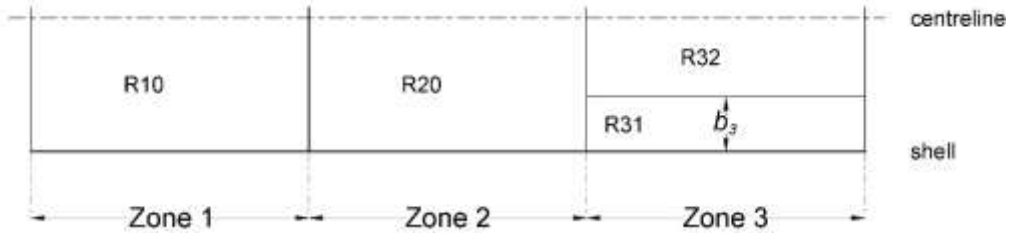


Figure: Combined damage of zones 1 + 2 + 3 includes a limited penetration to b_3, taken into account generating two damages:

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

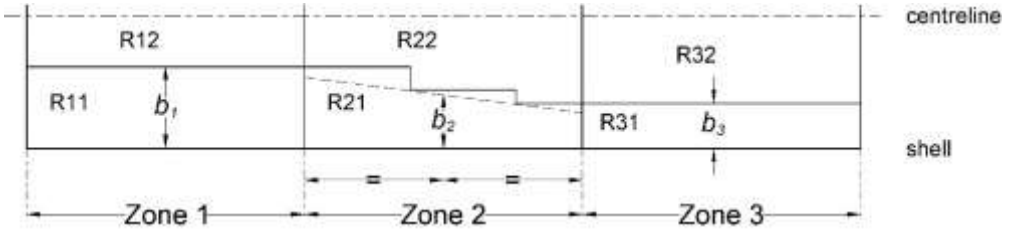


Figure: Combined damage of zones 1 + 2 + 3 includes 3 different limited damage penetrations generating four damages:

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.

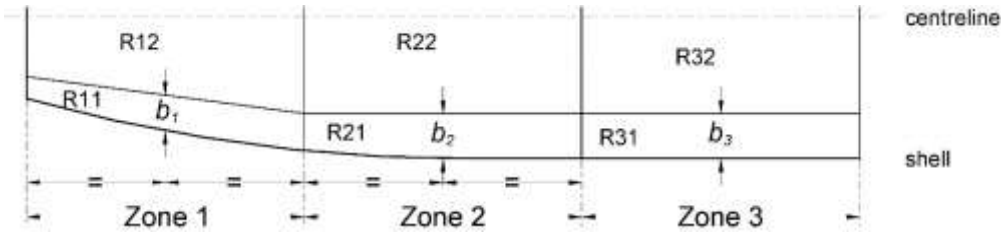
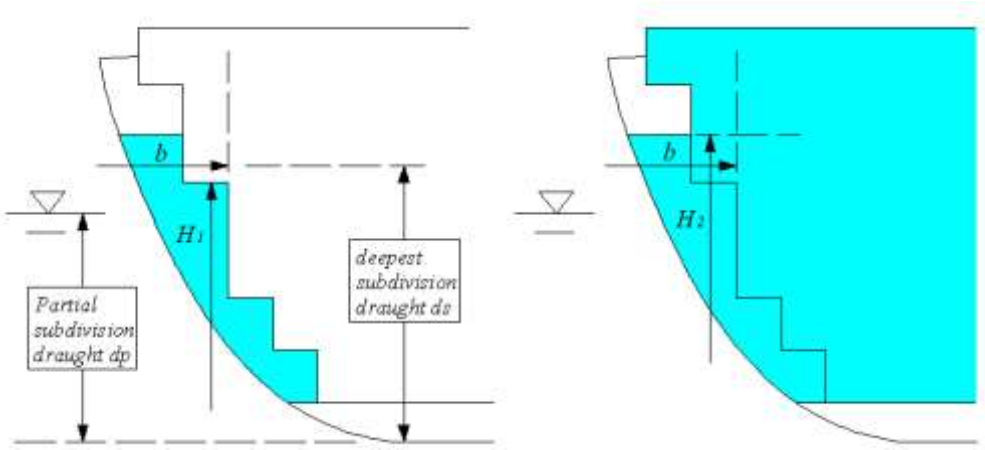


Figure: Combined damage of zone 1 + 2 + 3 including 2 different limited damage penetrations ($b_1 < b_2 = b_3$) generating three damages:

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 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

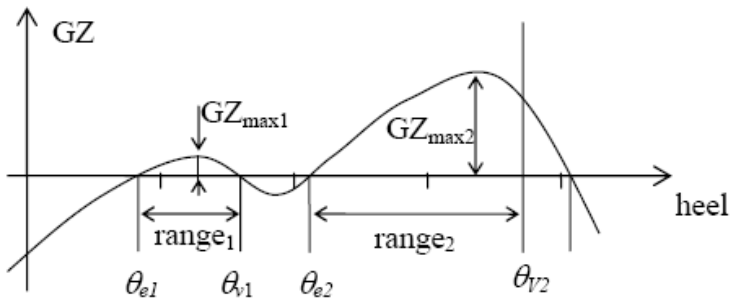
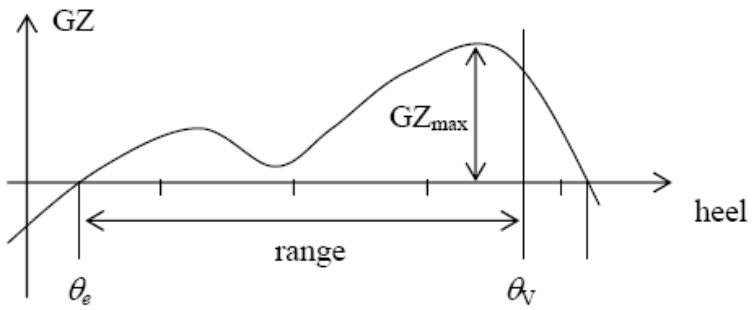


Figure 2



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 of 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.

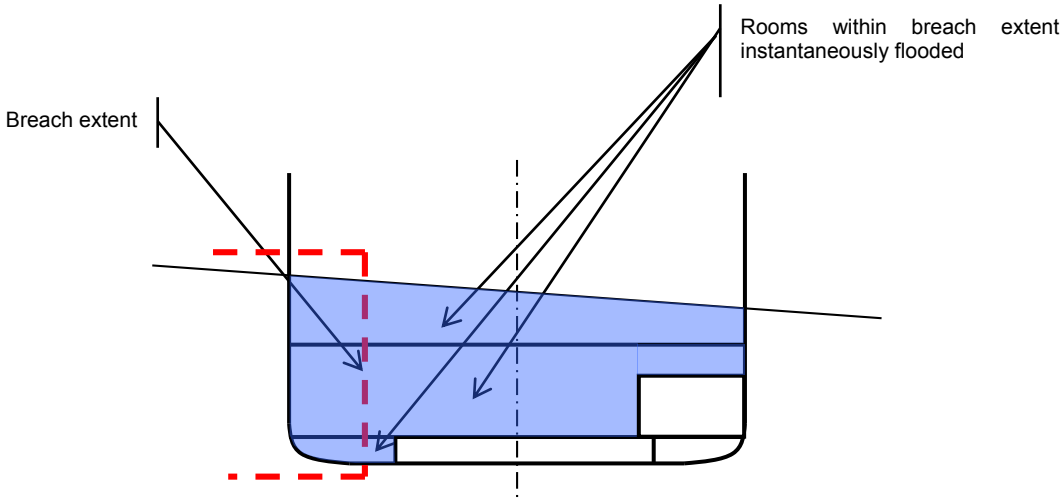
3.1 For each phase of a flooding stage (except the final full phase), the instantaneous transverse moment of this floodwater is calculated by assuming a constant volume of water at each heeling angle. The *GZ* curve is calculated with a constant intact displacement at all stages of flooding. Only one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

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.

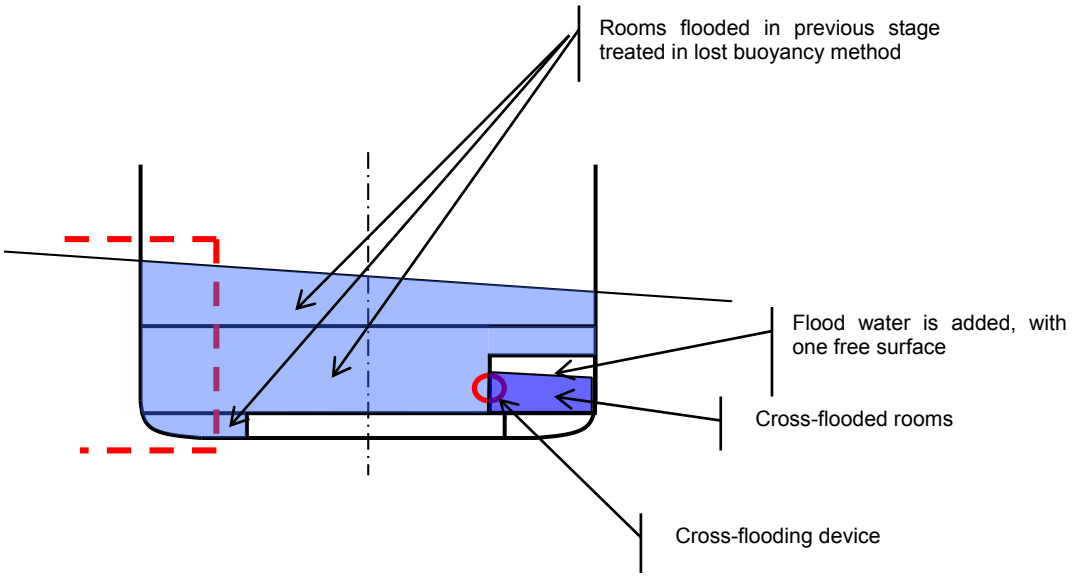
The examples below present a simplified, sequential approach to intermediate stage down-flooding and cross-flooding. Because simultaneous down-flooding and cross-flooding is not accounted for, any time-to-flood calculated with this sequential approach should be conservative. Alternative approaches, such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

Example 1: Major damage with cross-flooding device

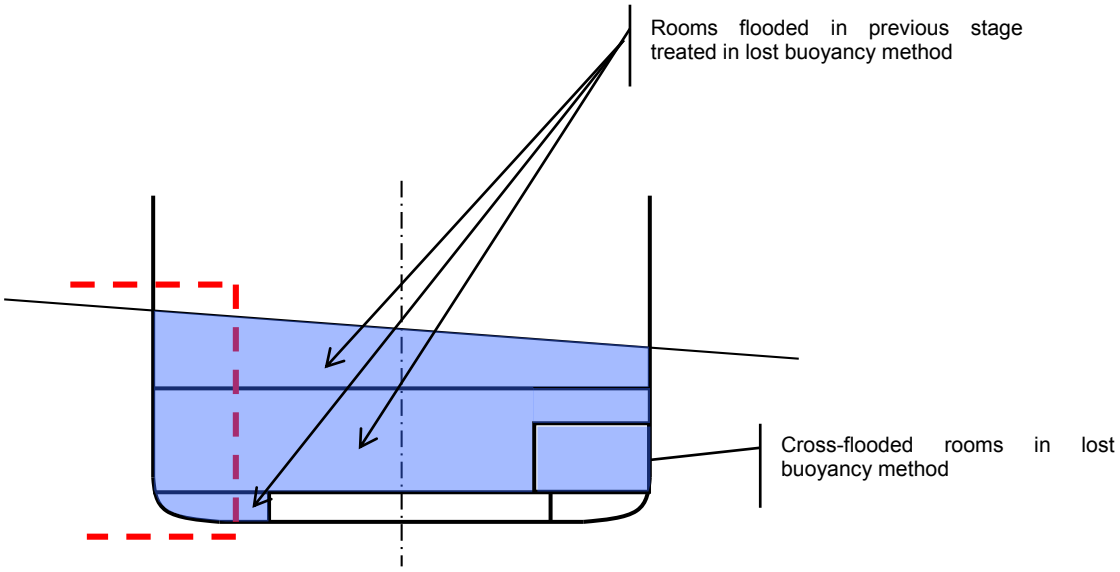
Stage 0: Unrestricted spaces in way of damage should be considered as flooded immediately (intermediate phases are not considered). The lost buoyancy method is applied as this is a full (final) phase. Provided the ship does not capsize and remains at a floating position from which cross-flooding can 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 seconds. See cross-flooding/equalization explanatory note 5 below.



Stage 1: Cross-flooding of opposite room



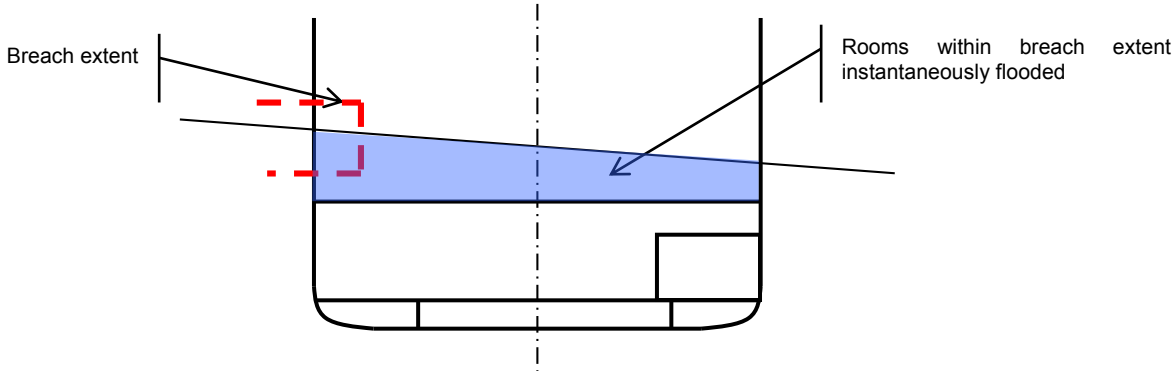
An intermediate phase



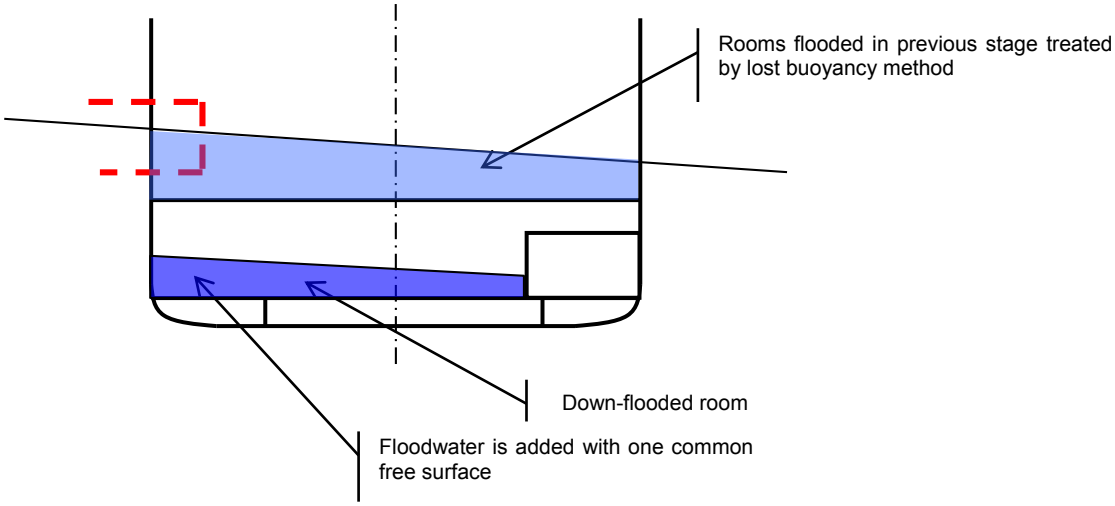
Full (final) phase of flooding stage 1

Example 2: Minor damage with down-flooding and cross-flooding

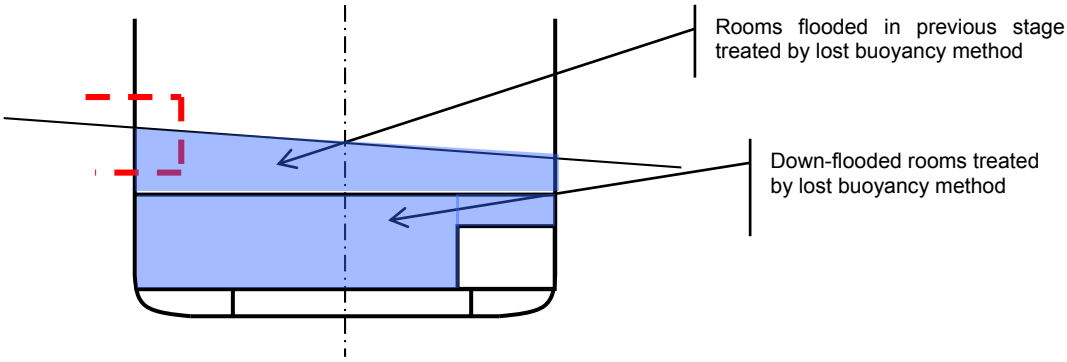
Stage 0: Unrestricted spaces in way of damage should be considered as flooded immediately (intermediate phases are not considered). The lost buoyancy method is applied as this is a full (final) phase. Provided the ship does not capsize and remains at a floating position from which cross-flooding can 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 seconds. See cross-flooding/equalization explanatory note 5 below.



Stage 1: Down-flooding through non-watertight deck

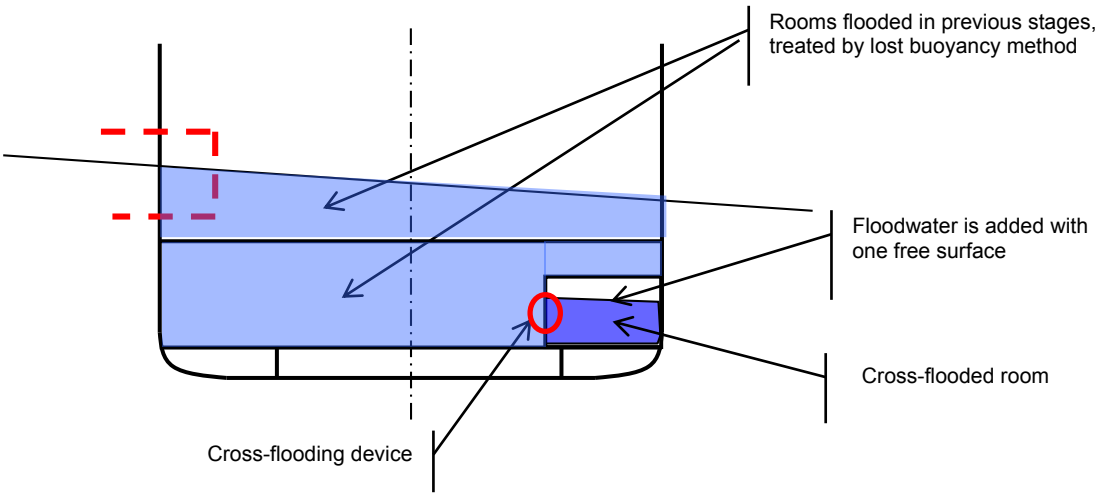


An intermediate phase

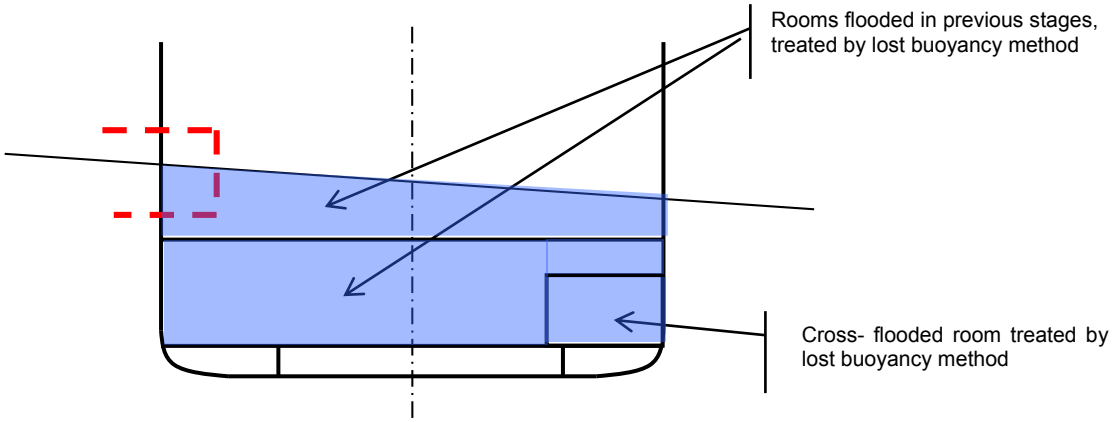


Final (full) phase of stage 1

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 seconds.

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 mean 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.

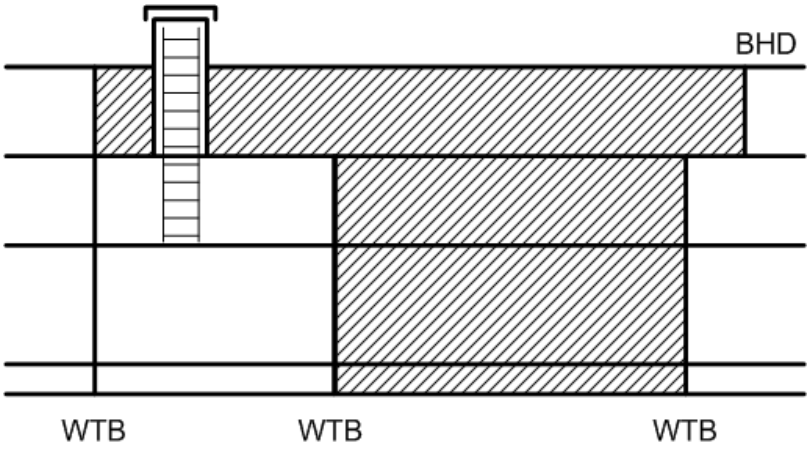
2 Horizontal evacuation routes on the bulkhead deck include only escape routes (designated as category 2 stairway spaces according to SOLAS regulation II-2/9.2.2.3 or as category 4 stairway spaces according to SOLAS regulation II-2/9.2.2.4 for passenger ships carrying not more than 36 passengers) used 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

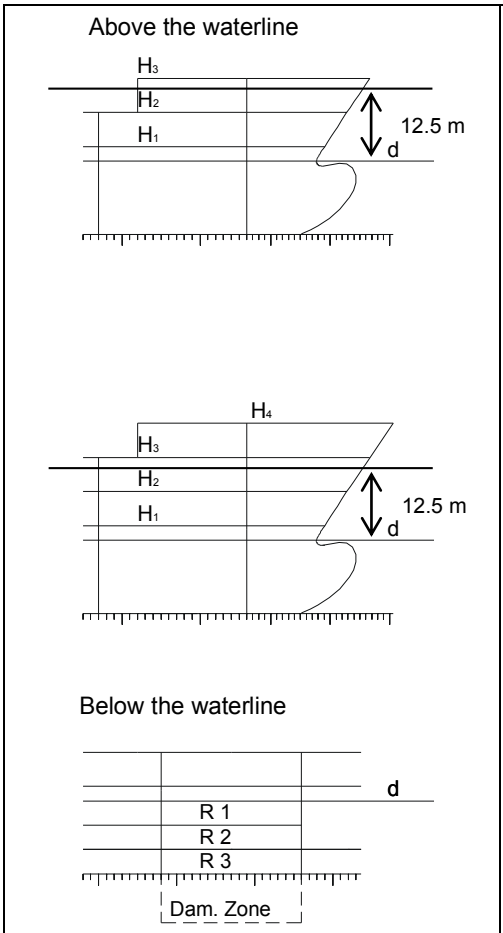
1 The purpose of this paragraph is to provide an incentive to ensure that evacuation through a vertical escape will not be obstructed by water from above. The paragraph is intended for smaller emergency escapes, typically hatches, where fitting of a watertight or weathertight means of closure would otherwise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

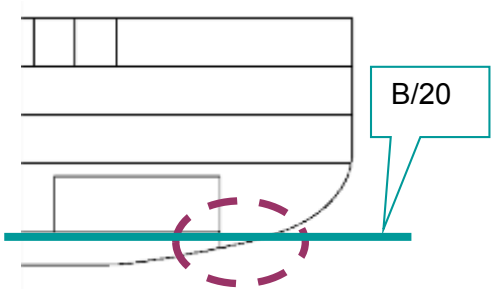
1 This regulation is intended to minimize the impact of flooding from a minor grounding. Special attention should be paid to the vulnerable area at the turn of the bilge. When justifying a deviation from fitting an inner bottom an assessment of the consequences of allowing a more extensive flooding than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

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.

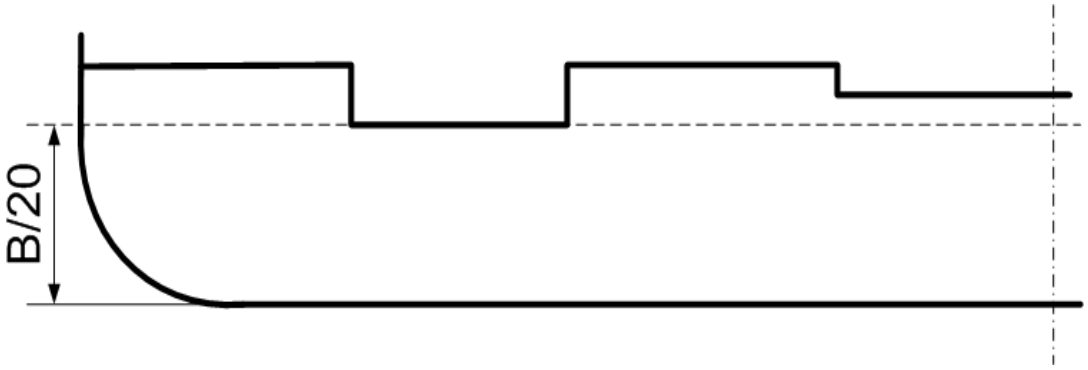
Regulation 9.6

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

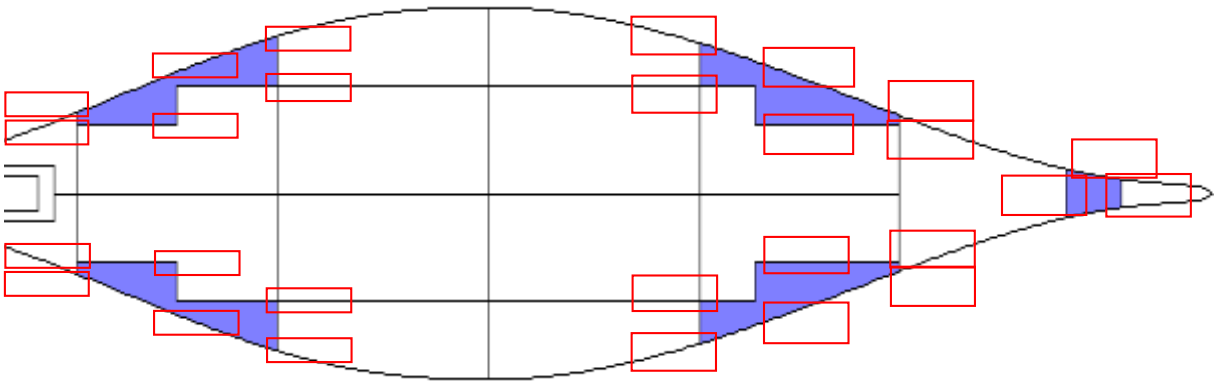
The reference to a "plane" in regulation 9.2 does not imply that the surface of the inner bottom may not be stepped in the vertical direction. Minor steps and recesses need not be considered unusual arrangements for the purpose of this paragraph as long as no part of the inner bottom is located below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

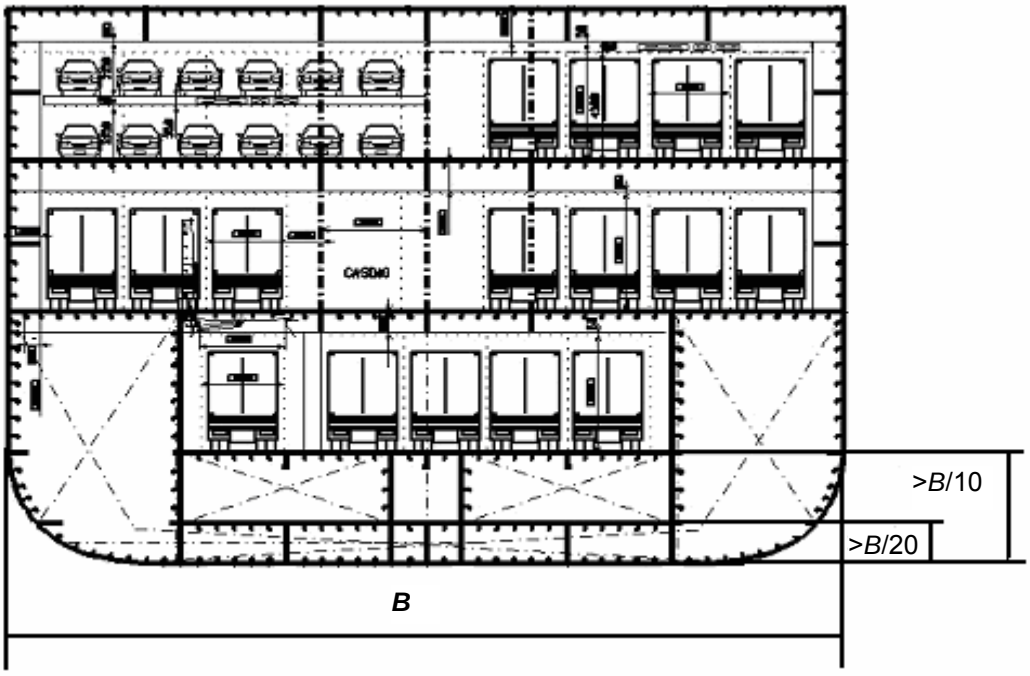
2 The damage extents specified in this paragraph should be applied to all parts of the ship where no double bottom is fitted, as permitted by regulations 9.1, 9.4 or 9.5, and include any adjacent spaces located within the extent of damage. Small wells in accordance with regulation 9.3.1 do not need to 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:

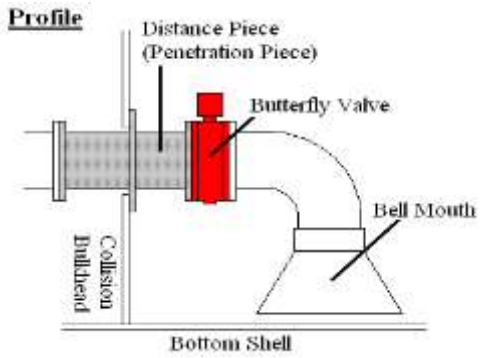


Figure 1

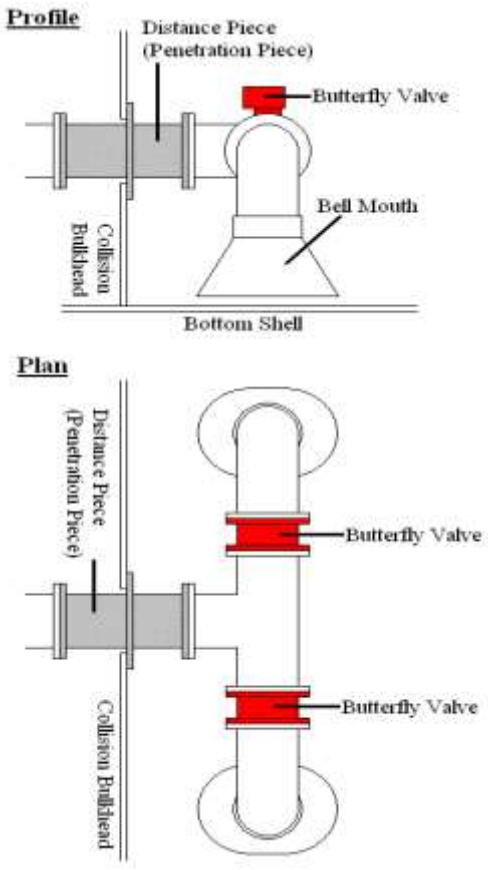


Figure 2

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

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

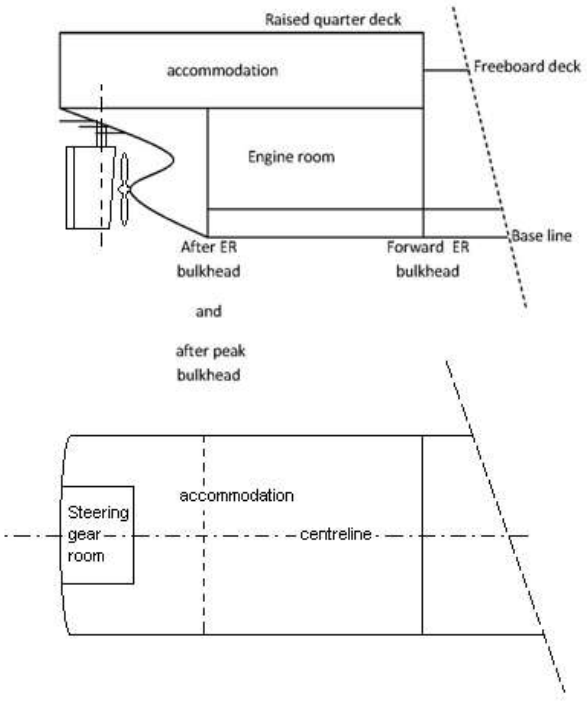
.2 when subject to loss of power, the actuator shall remain in its current position; and

.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

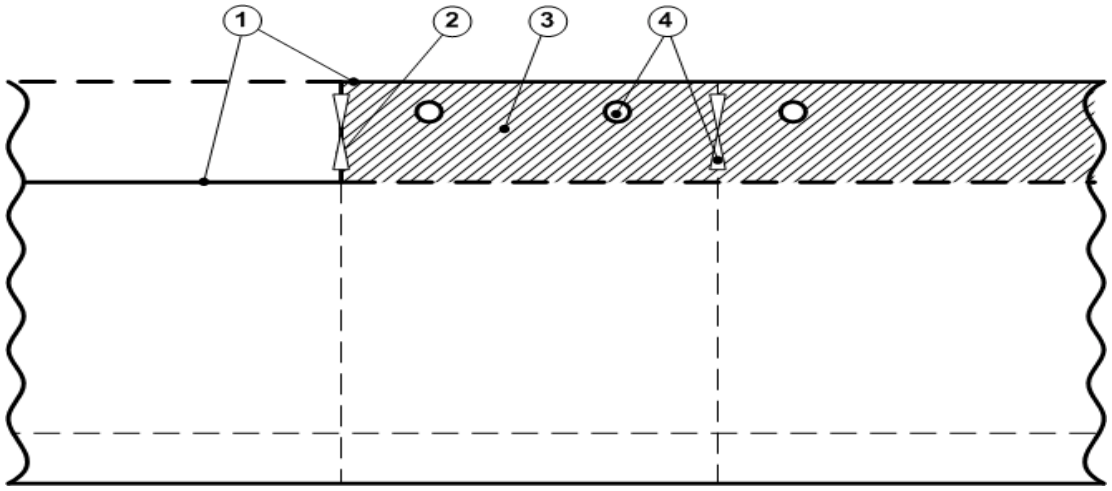
In cargo ships a stern tube enclosed in a watertight space of moderate volume, such as an afterpeak tank, where the inboard end of the stern tube extends through the afterpeak/engine room watertight bulkhead into the engine room is considered to be an acceptable solution satisfying the requirement of 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.

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.

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 bulkheads 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[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.

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

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

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.

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

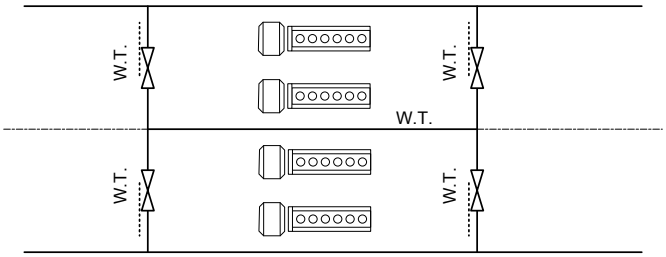
Any pipe insulation fitted for the purpose of the fire test may be removed before the pressure test.

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.

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

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.



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.

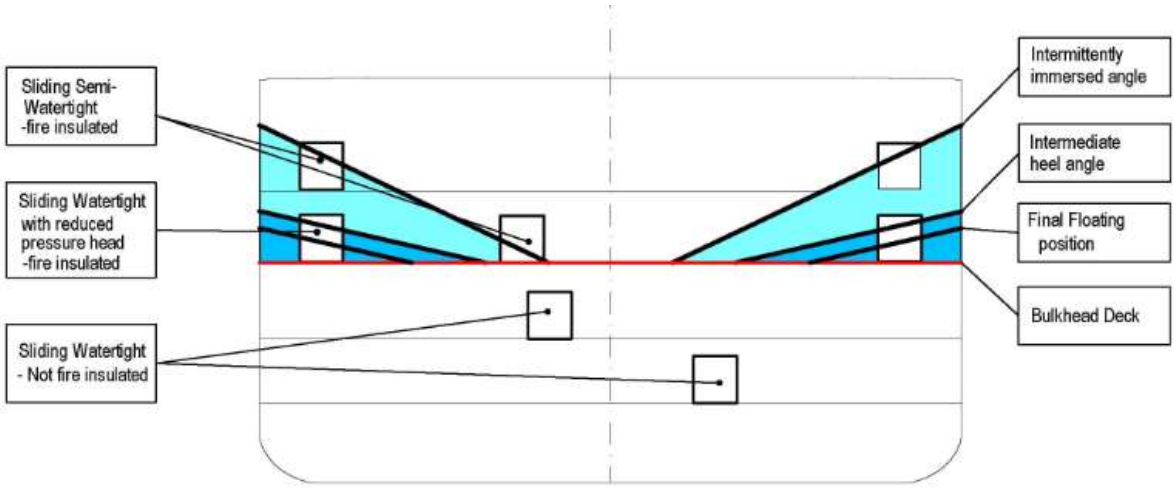


Figure 1

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.

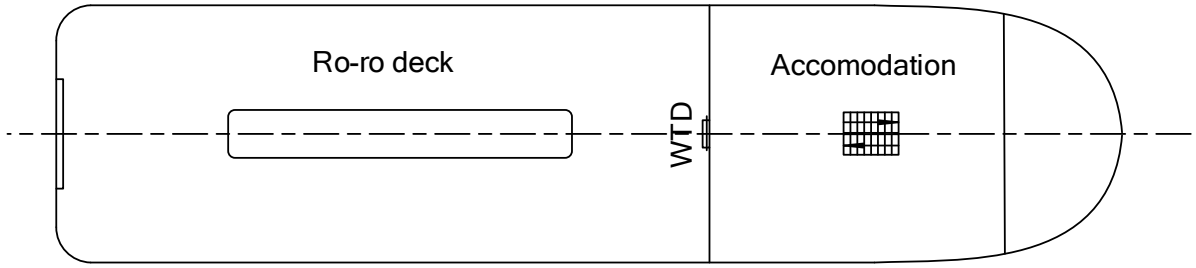
4 Doors fitted above the bulkhead deck, which are required to meet both fire protection and watertight requirements should comply with the fire requirements in regulation II-2/9.4.1.1 and the watertight requirements in paragraphs 1 and 2 above. Notwithstanding the ultimate sentence of regulation II-2/9.4.1.1.2, 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. 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

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 to provide 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 numerically;

.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

RESOLUTION MSC.430(98)
(adopted on 16 June 2017)

AMENDMENTS TO THE REVISED PERFORMANCE STANDARDS FOR NARROW-BAND DIRECT-PRINTING TELEGRAPH EQUIPMENT FOR THE RECEPTION OF NAVIGATIONAL AND METEOROLOGICAL WARNINGS AND URGENT INFORMATION TO SHIPS (NAVTEX) (RESOLUTION MSC.148(77))

THE MARITIME SAFETY COMMITTEE,

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

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

HAVING CONSIDERED, at its ninety-eighth session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its fourth session,

1 ADOPTS the amendments to resolution MSC.148(77) on *Revised Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (NAVTEX),* set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that NAVTEX receiver equipment installed on or after 1 July 2019 conforms to performance standards not inferior to those set out in the annex to resolution A.148(77), as amended by the annex to the present resolution.

ANNEX

AMENDMENTS TO THE REVISED PERFORMANCE STANDARDS FOR NARROW-BAND DIRECT-PRINTING TELEGRAPH EQUIPMENT FOR THE RECEPTION OF NAVIGATIONAL AND METEOROLOGICAL WARNINGS AND URGENT INFORMATION TO SHIPS (NAVTEX) (RESOLUTION MSC.148(77))

In the existing section 9 the following new paragraph is added:

"9.4 The equipment should include an interface for alert management in accordance with resolution MSC.302(87) on *Performance standards for bridge alert management*."

***

ANNEX 15

RESOLUTION MSC.431(98)
(adopted on 16 June 2017)

AMENDMENTS TO THE REVISED PERFORMANCE STANDARDS FOR ENHANCED GROUP CALL (EGC) EQUIPMENT (RESOLUTION MSC.306(87))

THE MARITIME SAFETY COMMITTEE,

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

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

HAVING CONSIDERED, at its ninety-eighth session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its fourth session,

1 ADOPTS the amendments to resolution MSC.306(87) on *Revised Performance standards for enhanced group call (EGC) equipment*, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that EGC equipment installed on or after 1 July 2019 conforms to performance standards not inferior to those set out in the annex to resolution MSC.306(87), as amended by the annex to the present resolution.

ANNEX

AMENDMENTS TO THE REVISED PERFORMANCE STANDARDS FOR ENHANCED GROUP CALL (EGC) EQUIPMENT (RESOLUTION MSC.306(87))

1 INTRODUCTION

1 The following new paragraph 1.3 is inserted after the existing paragraph 1.2:

> "1.3 Alternatively to the requirement in paragraph 1.2, the equipment need not provide means to produce a printed copy of received information if it is installed in combination with an interface connecting it to navigation equipment that is compliant with resolution MSC 252(83), as amended, on *Revised Performance standards for integrated navigation systems*. Provisions for interconnection to a shipborne integrated radiocommunication system (IRCS) when used in the GMDSS (resolution A.811(19)) should also be included."

and the remaining paragraph is renumbered accordingly.

5 ANTENNA SITING

2 After the existing section 5, insert a new section 6 as follows:

"6 INTERFACES

6.1 The equipment should include at least one interface for the transfer of received data to other navigation display or integrated communications equipment.

6.2 The equipment should include an interface for alert management in accordance with resolution MSC.302(87) on *Performance standards for bridge alert management.*

6.3 All interfaces provided for communication with other navigation or communication equipment should comply with the relevant international standards[1].

[1] Refer to IEC standards 61162"

***

ANNEX 16

RESOLUTION MSC.432(98)
(adopted on 16 June 2017)

AMENDMENTS TO PERFORMANCE STANDARDS FOR MULTI-SYSTEM SHIPBORNE RADIONAVIGATION RECEIVERS (RESOLUTION MSC.401(95))

THE MARITIME SAFETY COMMITTEE,

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

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

HAVING CONSIDERED, at its ninety-eighth session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its fourth session,

1 ADOPTS the amendments to resolution MSC.401(95) on Performance standards for multi-system shipborne radionavigation receivers, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that multi-system shipborne radionavigation receivers installed on or after 31 December 2017, conform to performance standards not inferior to those specified in the annex to resolution MSC.401(95), as amended by annex to the present resolution.

ANNEX

AMENDMENTS TO PERFORMANCE STANDARDS FOR MULTI-SYSTEM SHIPBORNE RADIONAVIGATION RECEIVERS (RESOLUTION A.401(95))

After exiting paragraph 1.7, a new paragraph 1.8 is inserted as follows, and the remaining paragraphs are renumbered accordingly:

> "1.8 Type-specific performance standards for stand-alone shipborne radionavigation receivers should be taken into account when conducting type approval for multi-system receivers in accordance with this resolution."

***

ANNEX 23

RESOLUTION MSC.435(98)
(adopted on 9 June 2017)

AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF MOBILE OFFSHORE DRILLING UNITS, 2009 (2009 MODU 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 that the Assembly, when adopting resolution A.1023(26) on the Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009 (2009 MODU Code), authorized the Committee to amend the 2009 MODU Code, as appropriate, taking into consideration developments in design and technology, in consultation with appropriate organizations,

RECOGNIZING that these requirements and provisions are very similar to the SOLAS requirements and that some of them, being applied to mobile offshore units, may lead to potentially hazardous situations, due to the fact that they have been developed on the basis of typical operations for conventional ships,

RECOGNIZING FURTHER the tragic loss of life and lessons learned from the explosion, fire, and sinking of the mobile offshore drilling unit **Deepwater Horizon** in the Gulf of Mexico, which occurred from 20 to 22 April 2010,

HAVING CONSIDERED, at its ninety-eighth session, the recommendation made by the Sub-Committee on Ship Systems and Equipment, at its fourth session,

1 ADOPTS, the amendments to the Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009 (2009 MODU Code), as set out in the annex to the present resolution, for mobile offshore drilling units, the keels of which are laid or which are at a similar stage of construction on or after 1 January 2020;

2 INVITES Member States concerned to take appropriate action to give effect to these amendments.

ANNEX

AMENDMENTS TO THE CODE FOR CONSTRUCTION AND EQUIPMENT OF MOBILE OFFSHORE DRILLING UNITS, 2009 (2009 MODU CODE)

CHAPTER 1

GENERAL

1.3 Definitions

1 The following new paragraph 1.3.26, and the associated footnote, are inserted after existing 1.3.25:

"1.3.26 'H' class divisions are those divisions which meet the same requirements as "A" class divisions, as defined in SOLAS regulation II-2/3, except that, when tested according to the Fire Test Procedures Code, the furnace control temperature curve is replaced with the furnace control temperature curve for hydrocarbon fires defined in national or international standards.[1]

[1] Refer to national standards such as: BS EN 1363-2:1999 *Fire resistance tests. Alternative and additional procedures*; or ASTM 1529-14a *Standard Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies;* or ISO/DIS 20902-1 *Fire test procedures for divisional elements that are typically used in oil, gas and petrochemical industries – Part 1: General requirements.*"

2 Existing paragraphs 1.3.26 to 1.3.59 are renumbered accordingly.

CHAPTER 6

MACHINERY AND ELECTRICAL INSTALLATIONS IN HAZARDOUS AREAS FOR ALL TYPES OF UNITS

6.5 Emergency conditions due to drilling operations

3 The text of existing paragraph 6.5.2 is amended to read as follows:

"6.5.2 In the case of units using dynamic positioning systems disconnection or shutdown of machinery and equipment necessary for maintaining the operability of the dynamic positioning system should be based on a shutdown logic system designed to preserve the capability to maintain operational control over the integrity of the well and station keeping capability. Shutdown of generators and related power supply equipment needed for the operation of the dynamic positioning system should be divided into independent groups to allow response to gas detection alarms while maintaining position keeping."

6.6 Electrical installations in hazardous areas

4 In paragraph 6.6.3, the following sentences, and the associated footnote, are added after the existing table 6-1 and its footnote:

"Repairs, maintenance and overhaul of hazardous area certified equipment should be performed by suitably qualified personnel in accordance with appropriate international standards.[27]

There should be maintained a register of electrical equipment installed in the designated hazardous areas, including a description of the equipment, applicable degree of protection and ratings.

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[27] Refer to the following International Electrotechnical Commission publications or equivalent for reference to appropriate personnel qualification criteria:

IEC 60079-14:2007 Explosive atmospheres − Part 14: Electrical installations design, selection and erection.

IEC 60079-17:2007 Explosive atmospheres − Part 17: Electrical installations inspection and maintenance.

IEC 60079-19: 2006 Explosive atmospheres − Part 19: Equipment repair, overhaul and reclamation."

CHAPTER 8

PERIODICALLY UNATTENDED MACHINERY SPACES FOR ALL TYPES OF UNITS

8.3 Fire protection

5 In paragraph 8.3.8, the reference to section "9.8" is replaced with "9.9".

CHAPTER 9

FIRE SAFETY

6 In the second sentence of existing paragraph 9.2.4, the reference to "A-60" is replaced with "H-60".

7 The text of existing footnote (e) to tables 9-1 and 9-2 is amended to read:

"(e) Additional provisions for fire boundaries should be assessed in accordance with paragraph 9.3.1."

8 The text of existing paragraph 9.3.1 is amended to read:

"9.3.1 In general, accommodation spaces, service spaces, control stations and spaces containing vital machinery and equipment[30] should not be located adjacent to hazardous areas. However, where this is not practicable, an engineering evaluation should be performed in accordance with national or international standards[31] to ensure that the level of fire protection and blast resistance of the bulkheads and decks separating these spaces from the hazardous areas are adequate for the likely hazard. Where it is shown that

these spaces may be exposed to a radiant heat flux in excess of 100 kw/m^2, the bulkhead or deck should be constructed to at least an "H-60" standard.

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30 Vital machinery and equipment are those that are essential to the safety of the MODU and all personnel on board. They include, but are not limited to, fire pumps, emergency sources of power, dynamic positioning systems, remote blowout preventer activation controls, and other operational or safety systems the sudden failure of which may result in hazardous situations. This does not include spaces (e.g. the driller's cabin) located on the drill floor.

31 Refer to standards such as: ISO 13702:2015, or API RP 2 FB."

9 The text of existing paragraph 9.4.5 is amended to read:

"9.4.5 Superstructures and deckhouses should be sited such that, in the event of fire at the drill floor, at least one escape route to the embarkation position and survival craft is protected against radiant heat flux levels in excess of 2.5 kW/m^2 emanating from the drill floor."

10 The following new section 9.8 is inserted after existing section 9.7:

"9.8 Fire-extinguishing arrangements for the drill floor

9.8.1 The drill floor should be protected by a fixed pressure water-spraying system designed to provide a minimum water application rate of 20 l/m^2/min to the drill floor and related equipment, including emergency shutdown equipment, critical structural components, and enclosure fire barriers. Alternatively, multiple fixed monitors discharging at a minimum flow rate and pressure 1,900 l/min at 1 N/mm^2 may be provided and arranged such that all areas and equipment can be reached by at least two monitors which are widely separated.

9.8.2 The system should be designed for manual release from release stations located outside the protected area. Any section valves necessary for the operation of the system should be located outside the protected area. Automatic release may be accepted by the Administration.

9.8.3 Nozzles, piping, fittings and related components should be designed to withstand exposure to temperatures up to 925°C.

9.8.4 The main fire pumps may be used to supply the fixed pressure water-spraying system if they have sufficient capacity to simultaneously supply the fire main at the required flow and pressure."

11 Existing sections 9.8 to 9.19 are renumbered accordingly.

12 In the renumbered subparagraph 9.9.2.1, the reference to subparagraph "9.8.1.1" is replaced with "9.9.1.1".

13 In the renumbered paragraph 9.9.4, the reference to paragraphs "9.8.1 to 9.8.3" is replaced with "9.9.1 to 9.9.3".

14 In the renumbered paragraph 9.10.1, the reference to paragraph "9.9.2" is replaced with "9.10.2".

15 In table 9-3, references to sections "9.16" and "9.8" are replaced with "9.17" and "9.9", respectively.

16 In the renumbered subparagraph 9.17.4.6, the reference to subparagraphs "9.16.4.3 to 9.16.4.5" is replaced with "9.17.4.3 to 9.17.4.5".

17 In the renumbered subparagraph 9.17.4.7, the reference to section "9.13" is replaced with "9.14".

18 In the renumbered paragraph 9.20.2, the reference to paragraph "9.19.1" is replaced with "9.20.1".

CHAPTER 10

LIFE-SAVING APPLIANCES AND EQUIPMENT

10.3 Survival craft

19 Add a new chapeau and new paragraphs 10.3.7 and 10.3.8 following existing paragraph 10.3.6:

"***Accounting for anthropomorphic differences in average body mass***

10.3.7 Except as provided in 10.3.8, in applying the provisions of paragraph 4.4.2.2 of the LSA Code and paragraph 6.7.1 of resolution MSC.81(70), part 1, the average body mass of the lifeboat occupant should be assumed to be 95 kg, with a corresponding seat radius of 265 mm.

10.3.8 Where it can be demonstrated that the average body mass of the lifeboat occupants differs from 95 kg, the provisions of paragraph 4.4.2.2 of the LSA Code and paragraph 6.7.1 of resolution MSC.81(70), part 1, may be increased or decreased accordingly. The seat width should be adjusted by 4 mm for each 1 kg difference in average body mass."

10.8 Rescue boats

20 The text of existing section 10.8 is amended to read:

Each unit should carry at least one rescue boat complying with the requirements of the LSA Code. A lifeboat may not be accepted as a rescue boat."

10.9 Stowage of rescue boats

21 The existing paragraph 10.9.5 is deleted and the semicolon at the end of subparagraph 10.9.4 is replaced with a period.

10.10 Rescue boat embarkation, launching and recovery arrangements

22 In paragraph 10.10.3, the second sentence is deleted.

CHAPTER 13

HELICOPTER FACILITIES

13.4 Arrangements

23 In paragraph 13.4.4, the reference to paragraph "9.16.5" is replaced with "9.17.5".

CHAPTER 14

OPERATIONS

14.10 Emergency procedures

24 The following new paragraph 14.10.3 is inserted after existing paragraph 14.10.2:

"14.10.3 For units where a master is assigned, the master should be designated as the person in charge at all times."

25 Existing paragraphs 14.10.3 to 14.10.16 are renumbered accordingly.

14.13 Practice musters and drills

26 In paragraph 14.13.1, the following new sentence is inserted after the existing first sentence:

"A man overboard drill should be conducted at least quarterly."

27 The text of the existing footnote associated to paragraph 14.13.2 and to the title of section 14.15 is replaced with the following:

"Refer to the *Recommendations for the training and certification of personnel on mobile offshore units (MOUs)* (resolution A.1079(28))."

28 The following new paragraph 14.13.5 is inserted after existing paragraph 14.13.4:

"14.13.5 Davit-launched liferafts for MODUs

.1 a liferaft should be lowered at least quarterly during abandon unit drills. Whenever practicable this may include the inflation of a liferaft. This liferaft may be a special liferaft intended for training purposes only and should not be boarded;

.2 the dedicated training liferaft should be identical in size, shape and mass to the actual liferaft cases used on board the unit, but of a different colour and prominently marked 'training aid – not for use in emergency'; and

.3 during such drills, emphasis should be placed on ensuring the crew's familiarity with handling all necessary lashings, painters, connecting the training liferaft to the davit, swinging out the davit and lowering the liferaft."

29 Existing paragraphs 14.13.5 to 14.13.7 are renumbered accordingly.

30 The text of renumbered paragraph 14.13.6 is amended to read as follows:

"14.13.6 As far as is reasonably practicable, rescue boats should be launched each month with the assigned crew aboard and manoeuvred in the water. In all cases these provisions should be complied with at least once every three months during a man overboard drill to simulate the recovery of a person from the water."

31 The text of renumbered paragraph 14.13.7 is amended to read as follows:

"14.13.7 For lifeboats, the provisions of SOLAS regulation III/19.3.4.3 should be applied.[64]

[64] Refer to the *Guidelines on alternative methods for lifeboat drills on MODUs* (MSC.1/Circ.1486)."

14.16 Records

32 In subparagraph 14.16.2.5, the reference to paragraph "9.19.4" is replaced with "9.20.4".

33 In paragraph 14.16.2, the following new subparagraphs .10 and .11 are inserted after existing subparagraph .9, the word "and" at the end of subparagraph 8 is deleted and the period at the end of subparagraph 9 is replaced with a semicolon:

".10 the electrical equipment register under paragraph 6.6.3.

.11 maintenance and repair of all electrical equipment in hazardous areas for continued certification in accordance with the international standards referred to in paragraph 6.6.1."

34 The following new section 14.17 is inserted after existing section 14.16:

"14.17 Hazardous areas

14.17.1 Portable and transportable electrical equipment or spark-producing equipment should not be introduced into, or remain in, any area classified as hazardous area zone 0, zone 1 or zone 2 in accordance with section 6.2 unless it has been determined that:

.1 the equipment is certified as suitable for use in the area in question; or

.2 the area is free of ignitable concentrations of flammable vapours and appropriate controls have been put in place to prevent the introduction of flammable vapours into the area.

14.17.2 Repairs, maintenance and overhaul of certified electrical equipment in hazardous areas should be performed by suitably qualified personnel in accordance with appropriate international standards."

35 All existing footnotes of the Code are renumbered accordingly.

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ANNEX 1

RESOLUTION MSC.436(99)
(adopted on 24 May 2018)

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 (SOLAS), 1974 ("the Convention"), concerning the amendment procedure applicable to the annex to the Convention, other than to the provisions of chapter I,

RECALLING FURTHER resolution MSC.421(98), by which it adopted, inter alia, amendments to regulations II-1/1 and II-1/8-1 of the Convention,

HAVING CONSIDERED, at its ninety-ninth 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 AGREES that the amendments to regulations II-1/1 and II-1/8-1 of the Convention, as adopted by resolution MSC.421(98), shall be superseded by the amendments to regulations II-1/1 and II-1/8-1 of the Convention, set out in the annex to the present resolution;

3 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that said amendments shall be deemed to have been accepted on 1 July 2019, 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;

4 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 2020 upon their acceptance in accordance with paragraph 2 above;

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

6 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 following new paragraphs 1.1.1 and 1.1.2 are inserted after the existing paragraph 1.1:

"1.1.1 Unless expressly provided otherwise, parts B, B-1, B-2 and B-4 of this chapter shall only apply to ships:

.1 for which the building contract is placed on or after 1 January 2020; 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 2020; or

.3 the delivery of which is on or after 1 January 2024.

1.1.2 Unless expressly provided otherwise, for ships not subject to the provisions of sub-paragraph 1.1.1 but constructed on or after 1 January 2009, the Administration shall:

.1 ensure that the requirements for parts B, B-1, B-2 and B-4 which are applicable under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974, as amended by resolutions MSC.216(82), MSC.269(85) and MSC.325(90) are complied with; and

.2 ensure that the requirements of regulations 8-1.3 and 19-1 are complied with."

2 The existing paragraph 1.3.4 is deleted.

3 The existing paragraph 2 is replaced with the following:

"2 Unless expressly provided otherwise, for ships constructed before 1 January 2009, the Administration shall:

.1 ensure that the requirements which are applicable under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.11(55), MSC.12(56), MSC.13(57), MSC.19(58), MSC.26(60), MSC.27(61), Resolution 1 of the 1995 SOLAS Conference, MSC.47(66), MSC.57(67), MSC.65(68), MSC.69(69), MSC.99(73), MSC.134(76), MSC.151(78) and MSC.170(79) are complied with; and

.2 ensure that the requirements of regulations 8-1.3 and 19-1 are complied with."

PART B-1
STABILITY

Regulation 8-1 – System capabilities and operational information after a flooding casualty on passenger ships

4 The existing text of regulation 8-1 is amended to read as follows:

"1 Application

Passenger ships having length, as defined in regulation II-1/2.5, of 120 m or more or having three or more main vertical zones shall comply with the provisions of this regulation.

2 Availability of essential systems in case of flooding damage[*]

A passenger ship shall be designed so that the systems specified in regulation II-2/21.4 remain operational when the ship is subject to flooding of any single watertight compartment.

3 Operational information after a flooding casualty

3.1 For the purpose of providing operational information to the master for safe return to port after a flooding casualty, passenger ships, as specified in paragraph 1, shall have:

.1 an onboard stability computer; or

.2 shore-based support,

based on the guidelines developed by the Organization.[**]

3.2 Passenger ships constructed before 1 January 2014 shall comply with the provisions in paragraph 3.1 not later than the first renewal survey after 1 January 2025.

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* Refer to the *Interim Explanatory Notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty* (MSC.1/Circ.1369).

** Refer to the *Guidelines on operational information for Masters of passenger ships for safe return to port by own power or under tow* (MSC.1/Circ.1400) for ships constructed on or after 1 January 2014 but before 13 May 2016, or the *Revised Guidelines on operational information for masters of passenger ships for safe return to port* (MSC.1/Circ.1532/Rev.1) for ships constructed on or after 13 May 2016, or the *Guidelines on operational information for masters in case of flooding for passenger ships constructed before 1 January 2014* (MSC.1/Circ.1589)."

CHAPTER IV
RADIOCOMMUNICATIONS

PART A
GENERAL

Regulation 2 – Terms and definitions

5 In paragraph 1, the existing sub-paragraph .16 is amended and new sub-paragraph .17 is added as follows:

".16 *Global maritime distress and safety system (GMDSS) identities* means maritime mobile services identity, the ship's call sign, recognized mobile satellite service identities and serial number identity which may be transmitted by the ship's equipment and used to identify the ship.

.17 *Recognized mobile satellite service* means any service which operates through a satellite system and is recognized by the Organization, for use in the global maritime distress and safety system (GMDSS)."

PART C
SHIP REQUIREMENTS

Regulation 7 – Radio equipment: General

6 In paragraph 1, the existing sub-paragraph .5 is amended to read as follows:

".5 a radio facility for reception of maritime safety information by a recognized mobile satellite service enhanced group calling system if the ship is engaged in voyages in sea area A1, or A2 or A3 but in which an international NAVTEX service is not provided. However, ships engaged exclusively in voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and fitted with equipment capable of receiving such service, may be exempt from this requirement.*

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* Refer to the *Recommendation on promulgation of maritime safety information* adopted by the Organization by resolution A.705(17), as amended."

Regulation 8 – Radio equipment: Sea area A1

7 In paragraph 1, the existing sub-paragraph .5 is amended to read as follows:

".5 through a recognized mobile satellite service; this requirement may be fulfilled by:

.5.1 a ship earth station;* or

.5.2 the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

* This requirement can be met by recognized mobile satellite service ship earth stations capable of two-way communications, such as Fleet-77 (resolutions A.808(19) and MSC.130(75)) or Inmarsat-C (resolution A.807(19), as amended) ship earth stations. Unless otherwise specified, this footnote applies to all requirements for a recognized mobile satellite service ship earth station prescribed by this chapter."

Regulation 9 – Radio equipment: Sea areas A1 and A2

8 In paragraph 1, the existing sub-paragraph .3.3 is amended to read as follows:

".3.3 through a recognized mobile satellite service by a ship earth station."

9 In paragraph 3, the existing sub-paragraph .2 is amended to read as follows:

".2 a recognized mobile satellite service ship earth station."

Regulation 10 – Radio equipment: Sea areas A1, A2 and A3

10 In paragraph 1, the existing chapeau of sub-paragraph .1 is amended to read as follows:

".1 a recognized mobile satellite service ship earth station capable of:".

11 In paragraph 1, the existing sub-paragraph .4.3 is amended to read as follows:

".4.3 through a recognized mobile satellite service by an additional ship earth station."

12 In paragraph 2, the existing sub-paragraph .3.2 is amended to read as follows:

".3.2 through a recognized mobile satellite service by a ship earth station; and".

Regulation 12 – Watches

13 In paragraph 1, the existing sub-paragraph .4 is amended to read as follows:

".4 for satellite shore-to-ship distress alerts, if the ship, in accordance with the requirements of regulation 10.1.1, is fitted with a recognized mobile satellite service ship earth station."

Regulation 13 – Sources of energy

14 In paragraph 2, the word "Inmarsat" is deleted from the second sentence.

APPENDIX
CERTIFICATES

RECORD OF EQUIPMENT FOR PASSENGER SHIP SAFETY (FORM P)

15 In section 3, the existing description of item 1.4 is amended to read as follows:

"Recognized mobile satellite service ship earth station".

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY RADIO (FORM R)

16 In section 2, the existing description of item 1.4 is amended to read as follows:

"Recognized mobile satellite service ship earth station".

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM C)

17 In section 3, the existing description of item 1.4 is replaced by the following:

"Recognized mobile satellite service ship earth station".

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ANNEX 2

RESOLUTION MSC.437(99)
(adopted on 24 May 2018)

AMENDMENTS TO THE INTERNATIONAL CODE FOR APPLICATION OF FIRE TEST PROCEDURES, 2010 (2010 FTP CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.61(67), by which it adopted the International Code for Application of Fire Test Procedures, which has become mandatory under chapter II-2 of the International Convention for the Safety of Life at Sea (SOLAS), 1974 ("the Convention"),

NOTING ALSO resolution MSC.307(88), by which it adopted the International Code for Application of Fire Test Procedures, 2010 ("2010 FTP Code"),

NOTING FURTHER article VIII(b) and regulation II-2/3.23 of the Convention concerning the procedure for amending the 2010 FTP Code,

HAVING CONSIDERED, at its ninety-ninth session, amendments to the 2010 FTP 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 2010 FTP 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 said amendments shall be deemed to have been accepted on 1 July 2019, 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 2020 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 CODE FOR APPLICATION OF FIRE TEST PROCEDURES, 2010 (2010 FTP CODE)

ANNEX 3

FIRE PROTECTION MATERIALS AND REQUIRED APPROVAL TEST METHODS

1 The existing title of table 1 is amended to read as follows:

"**Table 1 – Fire protection materials and required approval test methods for passenger ships and high-speed craft**".

2 In table 1, the existing column "Applicable regulation" is amended as follows:

.1 in rows ""A" class bulkhead", ""B" class bulkhead", ""C" class bulkhead", ""A" class deck", ""B" class deck", ""B" class lining" and ""B" class ceilings", the reference to "9.2.2.4" is added;

.2 in row ""B" class continuous ceilings", the reference to "9.2.2.4.3" is added;

.3 in row "Partial bulkheads", the reference to "5.3.1.2.1" is replaced with the reference to "5.3.1.3.1"; and

.4 in row "Fire Door Control System", the reference to "9.4.1.1.4.15" is replaced with the reference to "9.4.1.1.5.15".

***

ANNEX 3

RESOLUTION MSC.438(99)
(adopted on 24 May 2018)

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

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.36(63), by which it adopted the International Code of Safety for High-Speed Craft ("the 1994 HSC Code"), which has become mandatory under chapter X of the International Convention for the Safety of Life at Sea (SOLAS), 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation X/1.1 of the Convention concerning the procedure for amending the 1994 HSC Code,

HAVING CONSIDERED, at its ninety-ninth session, amendments to the 1994 HSC 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 1994 HSC 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 said amendments shall be deemed to have been accepted on 1 July 2019, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments, the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2020 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 CODE OF SAFETY FOR HIGH-SPEED CRAFT, 1994 (1994 HSC CODE)

CHAPTER 14
RADIOCOMMUNICATIONS

14.2 Terms and definitions

1 In paragraph 14.2.1, the following new sub-paragraph .16 is added after the existing sub-paragraph .15:

".16 *Recognized mobile satellite service* means any service which operates through a satellite system and is recognized by the Organization, for use in the global maritime distress and safety system (GMDSS)."

14.6 Radio equipment: General

2 In paragraph 14.6.1, the existing sub-paragraph .5 is amended to read as follows:

".5 a radio facility for reception of maritime safety information by a recognized mobile satellite service enhanced group calling system if the craft is engaged in voyages in sea area A1, or A2 or A3 but in which an international NAVTEX service is not provided. However, craft engaged exclusively in voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and fitted with equipment capable of receiving such service, may be exempt from this requirement.[*]

[*] Refer to the *Recommendation on promulgation of maritime safety information* adopted by the Organization by resolution A.705(17), as amended."

3 In paragraph 14.6.1, the existing sub-paragraph .6.1 is amended to read as follows:

".6.1 capable of transmitting a distress alert through the polar orbiting satellite service operating in the 406 MHz band;".

14.7 Radio equipment: Sea area A1

4 In paragraph 14.7.1, the existing sub-paragraph .5 is amended to read as follows:

".5 through a recognized mobile satellite service; this requirement may be fulfilled by:

.5.1 a ship earth station;[*] or

.5.2 the satellite EPIRB, required by 14.6.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the craft is normally navigated.

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* This requirement can be met by recognized mobile satellite service ship earth stations capable of two-way communications, such as Fleet 77 (resolution A.808(19) and MSC.130(75)) or Inmarsat-C (resolution A.807(19), as amended) ship earth stations. Unless otherwise specified, this footnote applies to all requirements for a recognized mobile satellite service ship earth station prescribed by this chapter."

14.8 Radio equipment: Sea areas A1 and A2

5 In paragraph 14.8.1, the existing sub-paragraph .3.3 is amended to read as follows:

".3.3 through a recognized mobile satellite service by a ship earth station.".

6 In paragraph 14.8.3, the existing sub-paragraph .2 is amended to read as follows:

".2 a recognized mobile satellite service ship earth station."

14.9 Radio equipment: Sea areas A1, A2 and A3

7 In paragraph 14.9.1, the chapeau of existing sub-paragraph .1 is amended to read as follows:

".1 a recognized mobile satellite service ship earth station capable of:".

8 In paragraph 14.9.1, the existing sub-paragraph .4.3 is amended to read as follows:

".4.3 through a recognized mobile satellite service by an additional ship earth station."

9 In paragraph 14.9.2, the existing sub-paragraph .3.2 is amended to read as follows:

".3.2 through a recognized mobile satellite service by a ship earth station; and".

14.11 Watches

10 In paragraph 14.11.1, the existing sub-paragraph .4 is amended to read as follows:

".4 for satellite shore-to-ship distress alerts, if the craft, in accordance with the requirements of 14.9.1.1, is fitted with a recognized mobile satellite service ship earth station."

14.12 Sources of energy

11 In paragraph 14.12.2, the word "Inmarsat" is deleted from the second sentence.

Annex

FORM OF SAFETY CERTIFICATE FOR HIGH-SPEED CRAFT

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT

12 In section 3, the existing description of item 1.4 is amended to read as follows:

"Recognized mobile satellite service ship earth station".

***

ANNEX 4

RESOLUTION MSC.439(99)
(adopted on 24 May 2018)

AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.97(73), by which it adopted the International Code of Safety for High-Speed Craft, 2000 ("the 2000 HSC Code"), which has become mandatory under chapter X of the International Convention for the Safety of Life at Sea (SOLAS), 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation X/1.2 of the Convention concerning the procedure for amending the 2000 HSC Code,

HAVING CONSIDERED, at its ninety-ninth session, amendments to the 2000 HSC 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 2000 HSC 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 said amendments shall be deemed to have been accepted on 1 July 2019, 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 2020 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 CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)

CHAPTER 14
RADIOCOMMUNICATIONS

14.2 Terms and definitions

1 In paragraph 14.2.1, the existing sub-paragraph .6 is amended to read as follows:

".6 *Global maritime distress and safety system (GMDSS) identities* means maritime mobile services identity, the craft's call sign, recognized mobile satellite service identities and serial number identity which may be transmitted by the craft's equipment and used to identify the craft."

2 In paragraph 14.2.1, the following new sub-paragraph .17 is added after existing sub-paragraph .16:

".17 *Recognized mobile satellite service* means any service which operates through a satellite system and is recognized by the Organization, for use in the global maritime distress and safety system (GMDSS)."

14.7 Radio equipment: General

3 In paragraph 14.7.1, the existing sub-paragraph .5 is amended to read as follows:

".5 a radio facility for reception of maritime safety information by a recognized mobile satellite service enhanced group calling system if the craft is engaged in voyages in sea area A1, or A2 or A3 but in which an international NAVTEX service is not provided. However, craft engaged exclusively in voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and fitted with equipment capable of receiving such service, may be exempt from this requirement.[*]

[*] Refer to the *Recommendation on promulgation of maritime safety information,* adopted by the Organization by resolution A.705(17), as amended."

4 In paragraph 14.7.1, the existing sub-paragraph .6.1 is amended to read as follows:

".6.1 capable of transmitting a distress alert through the polar orbiting satellite service operating in the 406 MHz band;".

14.8 Radio equipment: Sea area A1

5 In paragraph 14.8.1, the existing sub-paragraph .5 is amended to read as follows:

".5 through a recognized mobile satellite service; this requirement may be fulfilled by:

.5.1 a ship earth station;[*] or

.5.2 the satellite EPIRB, required by 14.7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the craft is normally navigated.

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* This requirement can be met by recognized mobile satellite service ship earth stations capable of two-way communications, such as Fleet-77 (resolution A.808(19) and MSC.130(75)) or Inmarsat-C (resolution A.807(19), as amended) ship earth stations. Unless otherwise specified, this footnote applies to all requirements for a recognized mobile satellite service ship earth station prescribed by this chapter."

14.9 Radio equipment: Sea areas A1 and A2

6 In paragraph 14.9.1, the existing sub-paragraph .3.3 is amended to read as follows:

".3.3 through a recognized mobile satellite service by a ship earth station."

7 In paragraph 14.9.3, the existing sub-paragraph .2 is amended to read as follows:

".2 a recognized mobile satellite service ship earth station."

14.10 Radio equipment: Sea areas A1, A2 and A3

8 In paragraph 14.10.1, the chapeau of existing sub-paragraph .1 is amended to read as follows:

".1 a recognized mobile satellite service ship earth station capable of:".

9 In paragraph 14.10.1, the existing sub-paragraph .4.3 is amended to read as follows:

".4.3 through a recognized mobile satellite service by an additional ship earth station."

10 In paragraph 14.10.2, the existing sub-paragraph 3.2 is amended to read as follows:

".3.2 through a recognized mobile satellite service by a ship earth station; and".

14.12 Watches

11 In paragraph 14.12.1, the existing sub-paragraph .4 is amended to read as follows:

".4 for satellite shore-to-ship distress alerts, if the craft, in accordance with the requirements of 14.10.1.1, is fitted with a recognized mobile satellite service ship earth station."

14.13 Sources of energy

12 In paragraph 14.13.2, the word "Inmarsat" is deleted from the second sentence.

Annex

FORM OF HIGH-SPEED CRAFT SAFETY CERTIFICATE AND RECORD OF EQUIPMENT

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000

13 In section 4, the existing description of item 1.4 is amended to read as follows:

"Recognized mobile satellite service ship earth station".

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ANNEX 5

RESOLUTION MSC.440(99)
(adopted on 24 May 2018)

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE)

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.4(48), by which it adopted the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk ("the IBC Code"), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea (SOLAS), 1974 ("the Convention"),

NOTING ALSO article VIII(b) and regulation VII/8.1 of the Convention concerning the procedure for amending the IBC Code,

HAVING CONSIDERED, at its ninety-ninth session, amendments to the IBC 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 IBC 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 said amendments shall be deemed to have been accepted on 1 July 2019, 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 note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2020 upon its 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 CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE)

In the appendix, the existing paragraph 6 of the model form of International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk is replaced with the following:

"6 That the loading and stability information booklet required by paragraph 2.2.5 of the Code has been supplied to the ship in an approved form.

7 That the ship must be loaded:

.1* only in accordance with loading conditions verified compliant with intact and damage stability requirements using the approved stability instrument fitted in accordance with paragraph 2.2.6 of the Code;

.2* where a waiver permitted by paragraph 2.2.7 of the Code is granted and the approved stability instrument required by paragraph 2.2.6 of the Code is not fitted, loading shall be made in accordance with one or more of the following approved methods:

(i)* in accordance with the loading conditions provided in the approved loading and stability information booklet referred to in 6 above; or

(ii)* in accordance with loading conditions verified remotely using an approved means……; or

(iii)* in accordance with a loading condition which lies within an approved range of conditions defined in the approved loading and stability information booklet referred to in 6 above; or

(iv)* in accordance with a loading condition verified using approved critical KG/GM data defined in the approved loading and stability information booklet referred to in 6 above; and

.3* in accordance with the loading limitations appended to this Certificate.

Where it is required to load the ship other than in accordance with the above instruction, then the necessary calculations to justify the proposed loading conditions shall be communicated to the certifying Administration who may authorize in writing the adoption of the proposed loading condition.**

* Delete as appropriate.

** Instead of being incorporated in the Certificate, this text may be appended to the Certificate, if duly signed and stamped."

***

ANNEX 6

RESOLUTION MSC.441(99)
(adopted on 24 May 2018)

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

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.5(48), by which it adopted the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk ("the IGC Code"), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea (SOLAS), 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 ninety-ninth 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 said amendments shall be deemed to have been accepted on 1 July 2019, 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 note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2020 upon its acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purpose 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 CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

In appendix 2, the existing paragraph 6 of the model form of International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk is replaced with the following:

"6 That the loading and stability information booklet required by paragraph 2.2.5 of the Code has been supplied to the ship in an approved form.

7 That the ship shall be loaded:

.1* only in accordance with loading conditions verified compliant with intact and damage stability requirements using the approved stability instrument fitted in accordance with paragraph 2.2.6 of the Code;

.2* where a dispensation permitted by paragraph 2.2.7 of the Code is granted and the approved stability instrument required by paragraph 2.2.6 of the Code is not fitted, loading shall be made in accordance with one or more of the following approved methods:

.i* in accordance with the loading conditions provided in the approved loading and stability information booklet referred to in 6 above; or

.ii* in accordance with loading conditions verified remotely using an approved means……; or

.iii* in accordance with a loading condition which lies within an approved range of conditions defined in the approved loading and stability information booklet referred to in 6 above; or

.iv* in accordance with a loading condition verified using approved critical KG/GM data defined in the approved loading and stability information booklet referred to in 6 above; and

.3* in accordance with the loading limitations appended to this Certificate.

Where it is required to load the ship other than in accordance with the above instruction, then the necessary calculations to justify the proposed loading conditions shall be communicated to the certifying Administration who may authorize in writing the adoption of the proposed loading condition.**

* Delete as appropriate.

** Instead of being incorporated in the Certificate, this text may be appended to the Certificate, if duly signed and stamped."

***

ANNEX 7

RESOLUTION MSC.442(99)
(adopted on 24 May 2018)

AMENDMENTS TO THE INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE

THE MARITIME SAFETY COMMITTEE,

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

NOTING resolution MSC.122(75), by which it adopted the International Maritime Dangerous Goods Code (hereinafter referred to as "the IMDG Code"), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation VII/1.1 of the Convention concerning amendment procedure for amending the IMDG Code,

HAVING CONSIDERED, at its ninety-ninth session, amendments to the IMDG 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 IMDG Code, the text of which is set out in the annexes to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that said amendments shall be deemed to have been accepted on 1 July 2019, unless prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments, the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2020 upon their acceptance in accordance with paragraph 2 above;

4 AGREES that Contracting Governments to the Convention may apply the aforementioned amendments in whole or in part on a voluntary basis from 1 January 2019;

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

6 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 8

RESOLUTION MSC.443(99)
(adopted on 24 May 2018)

AMENDMENTS TO PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS 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.267(85), by which it adopted the International Code on Intact Stability, 2008 ("2008 IS Code"),

RECALLING FURTHER resolution MSC.413(97), by which it adopted amendments to the introduction and part A of the 2008 IS Code,

NOTING the provisions regarding the procedure for amendments to the introduction and part A of the 2008 IS Code, stipulated in regulation II-1/2.27.1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974 ("the Convention"), as amended by resolution MSC.269(85),

RECOGNIZING the need to include provisions regarding ships engaged in anchor handling, lifting and towing operations, including escort towing, in the 2008 IS Code,

HAVING CONSIDERED, at its ninety-ninth session, amendments to part A of the 2008 IS 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 part A of the 2008 IS Code, as amended by resolution MSC.413(97), the text of which is set out in the annex to the present resolution;

2 AGREES that the present resolution and resolution MSC.413(97) shall be read and interpreted together as one single instrument;

3 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that said amendments shall be deemed to have been accepted on 1 July 2019, 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 the Organization of their objections to the amendments;

4 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 2020 upon its acceptance in accordance with paragraph 2 above;

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

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

7 REQUESTS FURTHER the Secretary-General to prepare a consolidated text of the amendments adopted by the present resolution and resolution MSC.413(97).

ANNEX

AMENDMENTS TO PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE)

PART A
MANDATORY CRITERIA

The footnote to the existing title of chapter 2 is deleted.

***

ANNEX 9

RESOLUTION MSC.444(99)
(adopted on 24 May 2018)

AMENDMENTS TO PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS 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.267(85), by which it adopted the International Code on Intact Stability, 2008 ("2008 IS Code"),

RECALLING FURTHER resolution MSC.414(97), by which it adopted amendments to the introduction and part A of the 2008 IS Code,

NOTING the provisions regarding the procedure for amendments to the introduction and part A of the 2008 IS Code, stipulated in paragraph (16).1 of regulation I/3 of the Protocol of 1988 relating to the International Convention on Load Lines, 1966 ("1988 Load Lines Protocol"), as amended by resolution MSC.270(85),

RECOGNIZING the need to include provisions regarding ships engaged in anchor handling, lifting and towing operations, including escort towing, in the 2008 IS Code,

HAVING CONSIDERED, at its ninety-ninth session, amendments to part A of the 2008 IS Code, proposed and circulated in accordance with paragraph 2(a) of article VI of the 1988 Load Lines Protocol,

1 ADOPTS, in accordance with paragraph 2(d) of article VI of the 1988 Load Lines Protocol, amendments to part A of the 2008 IS Code, as amended by resolution MSC.414(97), the text of which is set out in the annex to the present resolution;

2 AGREES that the present resolution and resolution MSC.414(97) shall be read and interpreted together as one single instrument;

3 DETERMINES, in accordance with paragraph 2(f)(ii)(bb) of article VI of the 1988 Load Lines Protocol, that said amendments shall be deemed to have been accepted on 1 July 2019, unless, prior to that date, more than one third of the Parties to the 1988 Load Lines Protocol or Parties, the combined merchant fleets of which constitute not less than 50% of all the merchant fleets of all Parties, have notified the Secretary-General of the Organization of their objections to the amendments;

4 INVITES Parties to the 1988 Load Lines Protocol to note that, in accordance with paragraph 2(g)(ii) of article VI of the 1988 Load Lines Protocol, the amendments shall enter into force on 1 January 2020 upon its acceptance in accordance with paragraph 2 above;

5 REQUESTS the Secretary-General of the Organization, for the purposes of paragraph 2(e) of article VI of the 1988 Load Lines Protocol, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to the 1988 Load Lines Protocol;

6 REQUESTS ALSO the Secretary-General of the Organization to transmit copies of this resolution and its annex to Members of the Organization which are not Parties to the 1988 Load Lines Protocol.

7 REQUESTS FURTHER the Secretary-General to prepare a consolidated text of the amendments adopted by the present resolution and resolution MSC.414(97).

ANNEX

AMENDMENTS TO PART A OF THE INTERNATIONAL CODE ON INTACT STABILITY, 2008 (2008 IS CODE)

PART A
MANDATORY CRITERIA

The footnote to the existing title of chapter 2 is deleted.

***

ANNEX 10

RESOLUTION MSC.445(99)
(adopted on 24 May 2018)

AMENDMENTS TO THE CODE OF SAFETY FOR SPECIAL PURPOSE SHIPS, 2008 (2008 SPS 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.266(84), by which it adopted the Code of Safety for Special Purpose Ships, 2008 (2008 SPS Code),

NOTING the need to amend respective provisions of the Code,

NOTING ALSO that, by resolution MSC.436(99), it adopted amendments to SOLAS chapter IV and the appendix (Certificates) regarding the use of the term "recognized mobile satellite service",

HAVING CONSIDERED, at its ninety-ninth session, the consequential amendments to the Record of Equipment for Compliance with the 2008 SPS Code, proposed for adoption in conjunction with the adoption of amendments to SOLAS chapter IV and the appendix (Certificates),

1 ADOPTS amendments to the 2008 SPS Code, the text of which is set out in the annex to the present resolution;

2 DETERMINES that said amendments should become effective on 1 January 2020.

ANNEX

AMENDMENTS TO THE CODE OF SAFETY FOR SPECIAL PURPOSE SHIPS, 2008 (2008 SPS CODE)

ANNEX

FORM OF SAFETY CERTIFICATE FOR SPECIAL PURPOSE SHIPS

APPENDIX

Record of Equipment for the Special Purpose Ship Safety Certificate (Form SPS)

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE CODE OF SAFETY FOR SPECIAL PURPOSE SHIPS

3 Details of radio facilities

In section 1, the existing description of item 1.4 is amended to read as follows:

"Recognized mobile satellite service ship earth station".

***

ANNEX 11

RESOLUTION MSC.446(99)
(adopted on 24 May 2018)

AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (BCH 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 A.212(VII) by which the Assembly, at its seventh session, adopted the *Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk* (BCH Code), which provides safety requirements for chemical tankers supplementary to the provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended,

RECALLING FURTHER resolution MEPC.20(22), by which the Marine Environment Protection Committee (MEPC) adopted the BCH Code to make it mandatory under MARPOL,

NOTING resolution MSC.29(61), by which, at its sixty-first session, it adopted the revised BCH Code,

NOTING ALSO resolutions MSC.440(99) and MEPC.302(72), respectively, by which it, and MEPC, adopted corresponding amendments to the Certificate of Fitness under the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code),

NOTING FURTHER resolution MEPC.303(72) by which MEPC, at its seventy-second session, adopted amendments to the Certificate of Fitness under the BCH Code,

CONSIDERING that it is highly desirable for the provisions of the BCH Code, which are mandatory under MARPOL and recommendatory from a safety standpoint, to remain identical when adopted by the Marine Environment Protection Committee and the Maritime Safety Committee,

HAVING CONSIDERED, at its ninety-ninth session, amendments to the Certificate of Fitness under the BCH Code prepared by the Secretariat and, subsequently, approved by the Committee at its ninety-eighth session,

RECOGNIZING the need to bring the approved amendments to the BCH Code into force on the date on which corresponding amendment to the IBC Code enter into force,

1 ADOPTS amendments to the Certificate of Fitness under the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code), as amended, the text of which is set out in the annex to the present resolution;

2 DETERMINES that said amendments shall become effective on 1 January 2020 upon acceptance and entry into force of the corresponding amendment to the Certificate of Fitness under the IBC Code, adopted by resolution MSC.440(99).

ANNEX

AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (BCH CODE)

In the appendix, the existing paragraph 6 of the model form of Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk is replaced with the following:

"6 That the loading and stability manuals required by paragraph 2.2.1.1 of the Code have been supplied to the ship in an approved form.

7 That the ship must be loaded:

.1* only in accordance with loading conditions verified compliant with intact and damage stability requirements using the approved stability instrument fitted in accordance with paragraph 2.2.1.2 of the Code;

.2* where a waiver permitted by paragraph 2.2.1.3 of the Code is granted and the approved stability instrument required by paragraph 2.2.1.2 of the Code is not fitted, loading should be made in accordance with one or more of the following approved methods:

(i)* in accordance with the loading conditions provided in the approved loading and stability manuals referred to in 6 above; or

(ii)* in accordance with loading conditions verified remotely using an approved means ……..……; or

(iii)* in accordance with a loading condition which lies within an approved range of conditions defined in the approved loading and stability manuals referred to in 6 above; or

(iv)* in accordance with a loading condition verified using approved critical KG/GM data defined in the approved loading and stability manuals referred to in 6 above;

.3* in accordance with the loading limitations appended to this Certificate.

Where it is required to load the ship other than in accordance with the above instruction, then the necessary calculations to justify the proposed loading conditions should be communicated to the certifying Administration who may authorize in writing the adoption of the proposed loading condition.**

---

* Delete as appropriate.

** Instead of being incorporated in the Certificate, this text may be appended to the Certificate, if duly signed and stamped."

***

ANNEX 12

RESOLUTION MSC.447(99)
(adopted on 24 May 2018)

AMENDMENTS TO THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (GC 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 A.328(IX) by which the Assembly, at its ninth session, adopted the *Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk* (GC Code),

NOTING resolution MSC.441(99), by which it adopted the corresponding amendments to the Certificate of Fitness under the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code),

HAVING CONSIDERED, at its ninety-ninth session, amendments to the Certificate of Fitness under the GC Code prepared by the Secretariat and, subsequently, approved by the Committee at its ninety-eighth session,

RECOGNIZING the need for the amendments to the GC Code to become effective on the date on which the corresponding amendments to the IGC Code enter into force,

1 ADOPTS amendments to the Certificate of Fitness under the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, as amended, the text of which is set out in the annex to the present resolution;

2 DETERMINES that the said amendments shall become effective on 1 January 2020 upon acceptance and entry into force of the corresponding amendments to the IGC Code adopted by resolution MSC.441(99).

ANNEX

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

1 In the appendix, the existing paragraph 6 of the model form of Certificate of Fitness for the Carriage of Liquefied Gases in Bulk is replaced with the following:

"6 That the loading and stability information booklet required by paragraph 2.2.3 of the Code has been supplied to the ships in an approved form.

7 That the ship must be loaded:

.1* only in accordance with loading conditions verified compliant with intact and damage stability requirements using the approved stability instrument fitted in accordance with paragraph 2.2.4 of the Code;

.2* where a waiver permitted by paragraph 2.2.5 of the Code is granted and the approved stability instrument required by paragraph 2.2.4 of the Code is not fitted, loading should be made in accordance with one or more of the following approved methods:

(i)* in accordance with the loading conditions provided in the approved loading and stability information booklet referred to in 6 above; or

(ii)* in accordance with loading conditions verified remotely using an approved means……; or

(iii)* in accordance with a loading condition which lies within an approved range of conditions defined in the approved loading and stability information booklet referred to in 6 above; or

(iv)* in accordance with a loading condition verified using approved critical KG/GM data defined in the approved loading and stability information booklet referred to in 6 above;

.3* in accordance with the loading limitations appended to this Certificate.

Where it is required to load the ship other than in accordance with the above instruction, then the necessary calculations to justify the proposed loading conditions should be communicated to the certifying Administration who may authorize in writing the adoption of the proposed loading condition.**

* Delete as appropriate.

** Instead of being incorporated in the Certificate, this text may be appended to the Certificate, if duly signed and stamped."

***

ANNEX 14

RESOLUTION MSC.448(99)
(adopted on 24 May 2018)

REVISED GUIDELINES ON THE PREVENTION OF ACCESS BY STOWAWAYS AND THE ALLOCATION OF RESPONSIBILITIES TO SEEK THE SUCCESSFUL RESOLUTION OF STOWAWAY CASES

THE MARITIME SAFETY COMMITTEE,

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

HAVING CONSIDERED the general purposes of the Convention on Facilitation of International Maritime Traffic, 1965, as amended (FAL Convention), and in particular article III thereof,

RECALLING the provisions of resolution A.1027(26) on *Application and revision of the Guidelines on the allocation of responsibilities to seek the successful resolution of stowaway cases* (resolution A.871(20)),

RECALLING ALSO that the International Convention Relating to Stowaways, which attempted to establish an internationally acceptable regime for dealing with stowaways, has not yet come into force,

RECALLING FURTHER that, in accordance with article VII(2)(a) of the FAL Convention, the Facilitation Committee, at its twenty-ninth session, adopted on 10 January 2002 resolution FAL.7(29) on *Amendments to the Convention on Facilitation of International Maritime Traffic, 1965, as amended*, which introduced a new section 4 on Stowaways in the annex to the FAL Convention, prescribing Standards and Recommended Practices on matters relating to stowaways (the FAL provisions on stowaways), which entered into force on 1 May 2003,

RECALLING IN ADDITION that, for the purpose of this resolution, a stowaway is defined as a person who is secreted on a ship or in cargo which is subsequently loaded on the ship, without the consent of the shipowner or the master or any other responsible person, and who is detected on board the ship after it has departed from a port, or in the cargo while unloading it in the port of arrival, and is reported as a stowaway by the master to the appropriate authorities,

NOTING with concern the number of incidents involving stowaways, the consequent potential for disruption of maritime traffic, the impact such incidents may have on the safe and secure operation of ships and the considerable risks faced by stowaways, including loss of life,

NOTING FURTHER that the Assembly, at its twentieth regular session, adopted, by resolution A.871(20), *Guidelines on the allocation of responsibilities to seek the successful resolution of stowaway cases* (the Guidelines),

RECALLING that resolution A.1027(26) expressed conviction of the need to align, to the extent possible and desirable, the Guidelines with the FAL provisions on stowaways and to revise them in a manner that reflects developments in efforts undertaken to prevent stowaways, as well as to provide guidance and recommendations, taking into account the FAL provisions on stowaways, on measures which can be implemented by vessels to prevent cases involving stowaways,

RECOGNIZING that the revision of the Guidelines should be done in a manner that does not duplicate the existing provisions of the Special measures to enhance maritime security contained in chapter XI-2 of the International Convention for the Safety of Life at Sea, 1974, as amended, and in the International Ship and Port Facility Security (ISPS) Code, but augments and supplements them in the context of preventing cases involving stowaways,

RECALLING that one of the functional requirements of the ISPS Code is to prevent unauthorized access of any kind to ships, port facilities and their restricted areas, and that ship security assessments and port facility security assessments should consider all possible threats, including the presence of stowaways,

TAKING INTO ACCOUNT that some stowaways may be asylum seekers and refugees, which should entitle them to such relevant procedures as those provided by international instruments and national legislation,

BEING AWARE that considerable difficulties continue to be encountered by masters and shipping companies, shipowners and ship operators when stowaways are to be disembarked from ships into the care of the appropriate authorities,

AGREEING that the existence of the present guidance should in no way be regarded as condoning or encouraging the practice of stowing away and other illegal migration, and should not undermine efforts to combat the separate problems of alien smuggling or human trafficking,

NOTING that several Member States which are also Contracting Governments to the FAL Convention:

(a) have notified the Secretary-General, in accordance with article VIII(1) of the FAL Convention (in relation to the Standards specified in section 4 of the annex to the FAL Convention) either that they find it impracticable to comply with the above-mentioned Standards or of differences between their own practices and those Standards; or

(b) have not yet notified the Secretary-General, in accordance with article VIII(3) of the FAL Convention, that they have brought their formalities, documentary requirements and procedures into accord in so far as practicable with the Recommended Practices specified in section 4 of the annex to the FAL Convention,

NOTING ALSO that the parallel existence of the Guidelines and the FAL provisions on stowaways has raised questions in relation to the procedures to be followed for dealing with stowaways by Member States which are also Contracting Governments to the FAL Convention, in particular those referred to above,

BELIEVING that, at present, stowaway cases can best be resolved through close cooperation among all authorities and persons concerned,

BELIEVING FURTHER that, in normal circumstances, through such cooperation, stowaways should, as soon as practicable, be removed from the ship concerned and returned to the country of nationality/citizenship or to the port of embarkation, or to any other country which would accept them,

RECOGNIZING that stowaway incidents should be dealt with humanely by all Parties involved, giving due consideration to the operational safety of the ship and its crew,

WHILST URGING national authorities, port authorities, shipowners and masters to take all reasonable precautions to prevent stowaways gaining access to vessels,

RECALLING ALSO resolution A.1027(26), adopted by the Assembly at its twenty-sixth regular session, by which the Assembly, inter alia, authorized the Facilitation Committee and the Maritime Safety Committee to adopt jointly the necessary amendments to the Guidelines and to promulgate them by appropriate means,

NOTING that the Maritime Safety Committee, at its eighty-eighth session, adopted the *Revised guidelines on the prevention of access by stowaways and the allocation of responsibilities to seek the successful resolution of stowaway cases (*resolution MSC.312(88)),

RECALLING that the Facilitation Committee, at its fortieth session, adopted the amendments to the annex to the FAL Convention (resolution FAL.12(40)), which included amendments to section 4 (Stowaways,

AGREEING that these amendments should be reflected in the revised guidelines as adopted by resolution MSC.312(88),

NOTING that the Facilitation Committee, at its forty-second session, is expected to adopt a resolution on *Revised guidelines on the prevention of access by stowaways and the allocation of responsibilities to seek the successful resolution of stowaway cases*, with identical amendments to the Guidelines,

1 ADOPTS the *Revised guidelines on the prevention of access by stowaways and the allocation of responsibilities to seek the successful resolution of stowaway cases*, set out in the annex to the present resolution;

2 AGREES that the provisions of this resolution should, in accordance with resolution A.1027(26), be considered as being of relevance only with respect to:

(a) Member States which are not Contracting Governments to the FAL Convention; and

(b) Member States which are Contracting Governments to the FAL Convention and which:

(i) have notified the Secretary-General, in accordance with article VIII(1) of the FAL Convention (in relation to the Standards specified in section 4 of the annex to the FAL Convention) either that they find it impracticable to comply with the aforementioned Standards or of differences between their own practices and those Standards; or

(ii) have not yet notified the Secretary-General, in accordance with article VIII(3) of the FAL Convention, that they have brought their formalities, documentary requirements and procedures into accord in so far as practicable with the Recommended Practices specified in section 4 of the annex to the FAL Convention;

3 URGES Governments to implement in their national policies and practices the amended procedures recommended in the annexed Guidelines as from 1 July 2018;

4 URGES ALSO Governments to deal with stowaway cases in a spirit of cooperation with other parties concerned, on the basis of the allocation of responsibilities set out in the annexed Guidelines;

5 INVITES shipping companies, shipowners, ship operators and other stakeholders to take on the relevant responsibilities set out in the annexed Guidelines and to guide their masters and crews as to their respective responsibilities in stowaway cases;

6 INVITES Governments to develop, in cooperation with the industry, comprehensive strategies to improve access control and prevent intending stowaways from gaining access to ships;

7 AGREES that the Maritime Safety Committee should continue to monitor the effectiveness of the annexed Guidelines on the basis of information provided by Governments and the industry, to keep them under review and to take further action;

8 SUPERSEDES resolution MSC.312(88) *on Revised guidelines on the prevention of access by stowaways and the allocation of responsibilities to seek the successful resolution of stowaway cases*;

9 REQUESTS the Assembly to endorse the action taken by the Maritime Safety Committee and the Facilitation Committee.

ANNEX

REVISED GUIDELINES ON THE PREVENTION OF ACCESS BY STOWAWAYS AND THE ALLOCATION OF RESPONSIBILITIES TO SEEK THE SUCCESSFUL RESOLUTION OF STOWAWAY CASES

1 Introduction

1.1 Masters, shipowners, public authorities, port authorities and other stakeholders, including those providing security services ashore, have a responsibility to cooperate to the fullest extent possible in order:

.1 to prevent stowaway incidents; and

.2 to resolve stowaway cases expeditiously and secure that an early return or repatriation of the stowaway will take place. All appropriate measures should be taken in order to avoid situations where stowaways must stay on board ships for an unreasonable amount of time.

1.2 However, no matter how effective port and ship security measures are, it is recognized that there will still be occasions when stowaways gain access to vessels, either secreted in the cargo or by surreptitious boarding.

1.3 The resolution of stowaway cases is difficult because of different national legislation in each of the several potentially involved States: the State of embarkation, the State of disembarkation, the flag State of the ship, the State of apparent, claimed or actual nationality/ citizenship or right of residence of the stowaway, and States of transit during repatriation.

2 Definitions

For the purpose of these Guidelines the following meanings shall be attributed to the terms listed:

.1 *Attempted stowaway*. A person who is secreted on a ship, or in cargo which is subsequently loaded on the ship, without the consent of the shipowner or the master or any other responsible person, and who is detected on board the ship before it has departed from the port.

.2 *Port*. Any port, terminal, offshore terminal, ship and repair yard or roadstead which is normally used for the loading, unloading, repair and anchoring of ships, or any other place at which a ship can call.

.3 *Public authorities*. The agencies or officials in a State responsible for the application and enforcement of the laws and regulations of that State which relate to any aspect of the present Guidelines.

.4 *Security measures*. Measures developed and implemented in accordance with international agreements to improve security on board ships, in port areas, facilities and of goods moving in the international supply chain to detect and prevent unlawful acts.[8]

.5 *Shipowner.* One who owns or operates a ship, whether a person, a corporation or other legal entity, and any person acting on behalf of the owner or operator.

.6 *Stowaway.* A person who is secreted on a ship, or in cargo which is subsequently loaded on the ship, without the consent of the shipowner or the master or any other responsible person and who is detected on board the ship after it has departed from a port, or in the cargo while unloading it in the port of arrival, and is reported as a stowaway by the master to the appropriate authorities.

3 Basic principles

On the basis of the experience thus far, the application of the following basic principles have been useful in preventing stowaway incidents and have been helpful in the speedy resolution of stowaway cases:

.1 Stowaway incidents should be dealt with in a manner consistent with humanitarian principles. Due consideration must always be given to the operational safety and security of the ship and to the safety and well-being of the stowaway.

.2 Public authorities, port authorities, shipowners and masters should cooperate to the fullest extent possible in order to prevent stowaway incidents.

.3 Shipowners, masters, port authorities and public authorities should have adequate security arrangements in place which, as far as practicable, will prevent intending stowaways from getting aboard a ship or, if this fails, will detect them before the ship leaves port or, at the latest, before it arrives at the next port of call.

.4 Adequate, frequent and well-timed searches minimize the risk of having to deal with a stowaway case and may also save the life of a stowaway who may, for example, be hiding in a place which is subsequently sealed and/or chemically treated.

.5 Public authorities, port authorities, shipowners and masters should cooperate to the fullest extent possible in order to resolve stowaway cases expeditiously and secure that an early return or repatriation of the stowaway will take place. All appropriate measures should be taken in order to avoid situations where stowaways must stay on board ships for an unreasonable amount of time.

[8] Reference is made to chapter XI-2 of the International Convention for the Safety of Life at Sea, 1974, as amended (1974 SOLAS Convention) and the International Ship and Port Facility Security Code, as amended (the ISPS Code); and to the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, 1988 (1988 SUA Convention) and its 2005 Protocol (2005 SUA Protocol).

.6 Stowaways arriving at or entering a State without the required documents are, in general, illegal entrants. Decisions on dealing with such situations are the prerogative of the States where such arrival or entry occurs.

.7 Stowaway asylum-seekers should be treated in accordance with international protection principles as set out in international instruments, such as the provisions of the United Nations Convention relating to the Status of Refugees of 28 July 1951 and of the United Nations Protocol relating to the Status of Refugees of 31 January 1967 and relevant national legislation.[9]

.8 Every effort should be made to avoid situations where a stowaway has to be detained on board a ship indefinitely. In this regard States should cooperate with the shipowner in arranging the disembarkation of a stowaway to an appropriate State.

.9 States should accept the return of stowaways who have full nationality/ citizenship status in that State, or have a right of residence in that State.

.10 Where the nationality or citizenship or right of residence cannot be established, the State of the original port of embarkation of a stowaway should accept the return of such a stowaway for examination pending final case disposition.

4 Preventive measures

4.1 Port/terminal authorities

4.1.1 States and port and terminal owners, operators and authorities should ensure that the necessary infrastructure, and operational and security arrangements for the purpose of preventing persons attempting to stowaway on board ships from gaining access to port installations and to ships, are established in all their ports, taking into consideration when developing these arrangements the size of the port, and what type of cargo is shipped from the port. This should be done in close cooperation with relevant public authorities, shipowners and shore-side entities, with the aim of preventing stowaway occurrences in the individual port.

4.1.2 Operational arrangements and/or port facility security plans should at least be equivalent to those contained in the relevant text of section B/16 of the ISPS Code.[10]

4.2 Shipowner/Master

4.2.1 Shipowners and masters should ensure that adequate security arrangements are in place which, as far as practicable, will prevent intending stowaways from getting aboard the ship and, if this fails, as far as practicable, will detect them before the ship leaves port or, at the latest, before it arrives at the next port of call.

4.2.2 When calling at ports and during stay in ports, where there is risk of stowaway embarkation, operational arrangements and/or ship security plans should at least be equivalent to those contained in the relevant text of paragraph B/9 of the ISPS Code.[11]

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9 In addition, public authorities may wish to consider the non-binding conclusion of the UNHCR Executive Committee on Stowaway Asylum-Seekers (1988, No. 53 (XXXIX)).

10 Recommended Practice 4.3.1.2 of the FAL Convention.

11 Recommended Practice 4.3.2.2 of the FAL Convention.

4.2.3 When departing from a port, where there is risk of stowaway embarkation, a ship should undergo a thorough search in accordance with a specific plan or schedule, and with priorities given to places where stowaways might hide taking into account the specific ship type and its operations. Search methods which are likely to harm secreted stowaways should not be used.

4.2.4 Fumigation or sealing should not be carried out until a thorough search of the areas to be fumigated or sealed has taken place in order to ensure that no stowaways are present in those areas.

5 Responsibilities in relation to the resolution of stowaway cases

5.1 Questioning and notification by the master

It is the responsibility of the master of the ship which finds any stowaways on board:

.1 to make every effort to determine immediately the port of embarkation of the stowaway;

.2 to take practical steps to establish the identity, including the nationality/ citizenship and the right of residence of the stowaway;

.3 to prepare a statement containing all available information relevant to the stowaway for presentation to the appropriate authorities (for example, the public authorities at the port of embarkation, the flag State and, if necessary, subsequent ports of call) and the shipowner. In this respect the reporting form provided in the appendix should be used and completed as far as practicable;

.4 to notify the existence of a stowaway and any relevant details to the shipowner and appropriate authorities at the port of embarkation, the next port of call and the flag State, with the understanding that when a stowaway declares himself/herself to be a refugee, this information should be treated as confidential to the extent necessary for the security of the stowaway;

.5 not to depart from the planned voyage to seek the disembarkation of a stowaway discovered on board the ship after it has left the territorial waters of the State where the stowaway embarked unless permission to disembark the stowaway has been granted by the public authorities of the State to whose port the ship deviates, or repatriation has been arranged elsewhere with sufficient documentation and permission given for disembarkation, or unless there are extenuating safety, security, health or compassionate reasons, or attempts to disembark in other ports on the planned voyage have failed and deviation is necessary in order to avoid that the stowaway remain on board for a significant period of time;

.6 to ensure that the stowaway is presented to the appropriate authorities at the next port of call in accordance with their requirements;

.7 to take appropriate measures to ensure the security, general health, welfare and safety of the stowaway until disembarkation, including providing him/her with adequate provisioning, accommodation, proper medical attention and sanitary facilities;

.8 to ensure that stowaways are not permitted to work on board the ship, except in emergency situations or in relation to the stowaways' accommodation and provisioning on board; and

.9 to ensure that stowaways are treated humanely, consistent with the basic principles.

5.2 The shipowner

It is the responsibility of the shipowner of the ship on which stowaways are found:

.1 to ensure that the existence of, and any relevant information on, the stowaway has been notified to the appropriate authorities at the port of embarkation, the next port of call and the flag State;

.2 to comply with any removal directions made by the competent national authorities at the port of disembarkation; and

.3 to cover any applicable costs relating to the removal, detention, care and disembarkation of the stowaway in accordance with the legislation of the States which may be involved.

5.3 The State of the first port of call according to the voyage plan

It is the responsibility of the State of first port of call according to the voyage plan after the discovery of the stowaway:

.1 to accept the stowaway for examination in accordance with the national laws of that State and, where the competent national authority considers that it would facilitate matters, to allow the shipowner and the competent or appointed P&I Club correspondent to have access to the stowaway;

.2 to favourably consider allowing disembarkation and provide, as necessary and in accordance with national law, secure accommodation which may be at the expense of the shipowner, where:

.1 a case is unresolved at the time of sailing of the ship; or

.2 the stowaway is in possession of valid documents for return and the public authorities are satisfied that timely arrangements have been or will be made for repatriation and all the requisites for transit fulfilled; or

.3 other factors make it impractical for the stowaway to remain on the ship; such factors may include but are not limited to cases where a stowaway's presence on board would endanger the safe and secure operation of the ship, the health of the crew or the stowaway;

.3 to make every effort to cooperate in the identification of the stowaway and the establishment of his/her nationality/citizenship or right of residence;

.4 to make every effort to cooperate in establishing the validity and authenticity of a stowaway's documents and, when a stowaway has inadequate documents, to whenever practicable and to an extent compatible with national legislation and security requirements, issue a covering letter with a

photograph of the stowaway and any other important information, or alternatively, a suitable travel document accepted by the public authorities involved. The covering letter, authorizing the return of the stowaway either to his/her State of origin or to the point where the stowaway commenced his/her journey, as appropriate, by any means of transportation and specifying any other conditions imposed by the authorities, should be handed over to the operator effecting the removal of the stowaway. This letter will include information required by the authorities at transit points and/or the point of disembarkation;

.5 to give directions for the removal of the stowaway to the port of embarkation, State of nationality/citizenship or right of residence or to some other State to which lawful directions may be made, in cooperation with the shipowner;

.6 to inform the shipowner on whose ship the stowaway was found, as far as practicable, of the level of cost of detention and return and any additional costs for the documentation of the stowaway, if the shipowner is to cover these costs. In addition, public authorities should cooperate with the shipowner to keep such costs to a minimum, as far as practicable, and according to national legislation, if they are to be covered by the shipowner, as well as keeping to a minimum the period during which shipowners are held liable to defray costs of maintenance of a stowaway by public authorities;

.7 to consider mitigation of charges that might otherwise be applicable when shipowners have cooperated with the control authorities to the satisfaction of those authorities in measures designed to prevent the transportation of stowaways; or where the master has properly declared the existence of a stowaway to the appropriate authorities in the port of arrival, and has shown that all reasonable preventive measures had been taken to prevent stowaways gaining access to the ship;

.8 to issue, if necessary, in the event that the stowaway has no identification and/or travel documents, a document attesting to the circumstances of embarkation and arrival to facilitate the return of the stowaway either to his/her State of origin, to the State of the port of embarkation, or to any other State to which lawful directions can be made, by any means of transport;

.9 to provide the document to the transport operator effecting the removal of the stowaway;

.10 to take proper account of the interests of, and implications for, the shipowner when directing detention and setting removal directions, so far as is consistent with the maintenance of control, their duties or obligations to the stowaway under the law, and the cost to public funds;

.11 to report incidents of stowaways of which they become aware to the Organization;[12]

.12 to cooperate with the flag State of the ship in identifying the stowaway and their nationality/citizenship and right of residence, to assist in removal of the

[12] Refer to FAL.2/Circ.50/Rev.3 on Reports on Stowaway Incidents, as may be amended.

stowaway from the ship and to make arrangements for removal or repatriation; and

.13 if disembarkation is refused, to notify the flag State of the ship the reasons for refusing disembarkation.

5.4 Subsequent ports of call

When the disembarkation of a stowaway has not been possible at the first port of call, it is the responsibility of the State of the subsequent port of call to follow the guidance provided in paragraph 5.3.

5.5 State of embarkation

It is the responsibility of the State of the original port of embarkation of the stowaway (i.e. the State where the stowaway first boarded the ship):

.1 to accept any returned stowaway having nationality/citizenship or right of residence;

.2 to accept a stowaway back for examination where the port of embarkation is identified to the satisfaction of the public authorities of the receiving State; the public authorities of the State of embarkation should not return such stowaways to the State where they were earlier found to be inadmissible;

.3 to apprehend and detain the attempted stowaway, where permitted by national legislation, if the attempted stowaway is discovered before sailing either on the ship or in cargo due to be loaded; to refer the attempted stowaway to local authorities for prosecution, and/or, where applicable, to the immigration authorities for examination and possible removal: no charge is to be imposed on the shipowner in respect of detention or removal costs, and no penalty is to be imposed;

.4 to apprehend and detain the stowaway, where permitted by national legislation, if the stowaway is discovered while the ship is still in the territorial waters of the State of the port of his/her embarkation, or in another port in the same State (not having called at a port in another State in the meantime): no charge is to be imposed on the shipowner in respect of detention or removal costs, and no penalty is to be imposed;

.5 to report incidents of stowaways or attempted stowaways of which they become aware to the Organization;[13] and

.6 to reassess the preventative arrangements and measures in place and to verify the implementation and effectiveness of any corrective actions.

5.6 State of nationality or right of residence

It is the responsibility of the apparent or claimed State of nationality/citizenship of the stowaway and/or of the apparent or claimed State of residence of the stowaway:

.1 to make every effort to assist in determining the identity and nationality/citizenship or the rights of residence of the stowaway and to

[13] Refer to FAL.2/Circ.50/Rev.3 on Reports on Stowaway Incidents, as may be amended.

document the stowaway, accordingly once satisfied that he or she holds the nationality/citizenship or the right of residence claimed. Where possible, the local embassy, consulate or other diplomatic representation of the country of the stowaway's nationality will be required to assist in verifying the stowaway's nationality and providing emergency travel documentation;

.2 to accept the stowaway where nationality/citizenship or right of residence is established; and

.3 to report incidents of stowaways of which they become aware to the Organization.[14]

5.7 The flag State

It is the responsibility of the flag State of the ship:

.1 to be willing, if practicable, to assist the master/shipowner or the appropriate authority at the port of disembarkation in identifying the stowaway and determining his/her nationality/citizenship or right of residence;

.2 to be prepared to make representations to the relevant authority to assist in the removal of the stowaway from the ship at the first available opportunity;

.3 to be prepared to assist the master/shipowner or the authority at the port of disembarkation in making arrangements for the removal or repatriation of the stowaway; and

.4 to report incidents of stowaways of which they become aware to the Organization.[14]

5.8 States of transit during repatriation

It is the responsibility of any States of transit during repatriation to allow, subject to normal visa requirements and national security concerns, the transit through their ports and airports of stowaways travelling under the removal instructions or directions of the State of the port of disembarkation.

[14] Refer to FAL.2/Circ.50/Rev.3 on Reports on Stowaway Incidents, as may be amended.

APPENDIX

FORM OF STOWAWAY DETAILS REFERRED TO IN RECOMMENDED PRACTICE 4.6.2 OF THE CONVENTION ON FACILITATION OF INTERNATIONAL MARITIME TRAFFIC, 1965, AS AMENDED

SHIP DETAILS	*Date of birth:*
Name of ship:	*Place of birth:*
IMO number:	*Claimed nationality:*
Flag:	*Home address:*
Company:	*Country of domicile:*
Company address:	*ID-document type, e.g. Passport No.:*
	ID Card No. or Seaman's Book No.:
Agent in next port:	*If yes,*
Agent address:	*When issued:*
IRCS:	*Where issued:*
INMARSAT number:	*Date of expiry:*
Port of registry:	*Issued by:*
Name of Master:	*Photograph of the stowaway:*
STOWAWAY DETAILS	Photograph if available
Date/time found on board:	
Place of boarding:[15]	
Country of boarding:	
Date/time of boarding:	
Intended final destination:	
Stated reasons for boarding the ship:[16]	*General physical description of the stowaway:*
Surname:	
Given name:	
Name by which known:	
Gender:	
First language:	*Other languages:*
Spoken:	*Spoken:*
Read:	*Read:*
Written:	*Written:*

15 See FAL.7/Circ.1/Rev.1, related to the unified interpretation of appendix 3 to the FAL Convention.

16 If the stowaway declares himself to be a refugee or an asylum seeker, this information shall be treated as confidential to the extent necessary to the security of the stowaway.

Other details:

1) Method of boarding, including other persons involved (e.g. crew, port workers, etc.), and whether the stowaway was secreted in cargo/container or hidden in the ship:

2) Inventory of the stowaway's possessions:

3) Statement made by the stowaway:

4) Statement made by the master (including any observations on the credibility of the information provided by the stowaway):

Date(s) of interview(s):

Stowaway's signature: *Master's signature:*

Date: *Date:*

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ANNEX 17

RESOLUTION MSC.449(99)
(adopted on 24 May 2018)

PERFORMANCE STANDARDS FOR SHIPBORNE INDIAN REGIONAL NAVIGATION SATELLITE SYSTEM (IRNSS) 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 IMO policy for the recognition and acceptance of suitable radionavigation systems intended for international use, the "Revised Report on the Study of a Worldwide Radionavigation System", the Indian Regional Navigation Satellite System (IRNSS) may be recognized as a possible component of the world-wide 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 IRNSS 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 ninety-ninth session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue, at its fifth session,

1 ADOPTS the performance standards for shipborne IRNSS receiver equipment, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that IRNSS receiver equipment installed on or after 1 July 2020 conforms to performance standards not inferior to those specified in the annex to the present resolution.

ANNEX

PERFORMANCE STANDARDS FOR SHIPBORNE INDIAN REGIONAL NAVIGATION SATELLITE SYSTEM (IRNSS) RECEIVER EQUIPMENT

1 Introduction

1.1 IRNSS is a regional navigation satellite system compatible with other navigation satellite systems worldwide. IRNSS is an independent regional system developed and operated by India which comprises of three major components: space segment, ground control segment and user terminals. The space segment is a constellation of seven satellites, of which four are geosynchronous earth orbit (GSO) satellites inclined at 29° to equatorial plane with longitude crossing as 55°E and 111.75°E (two satellites in each slot) and three are geostationary satellite orbit (GEO) satellites positioned at 32.5°E, 83°E, 129.5°E orbital slots. This geometry ensures that a minimum of five satellites are visible to users within the service area with a position dilution of precision (PDOP) $\leqslant$ 6. Each satellite transmits standard positioning service signals on "L5" and "S" bands with carrier frequencies as 1176.45 MHz and 2492.028 MHz respectively. Standard positioning signals include ranging codes which could provide the open service. A navigation data message is superimposed on these codes. IRNSS satellites are identified by pseudo ranging noise (PRN) codes.

1.2 The IRNSS Standard Positioning Service (SPS) provides positioning, navigation and timing services, free of direct user charges. The IRNSS receiver equipment should be capable of receiving and processing the standard service signal.

1.3 IRNSS receiver equipment intended for navigation purposes on ships with a speed not exceeding 70 knots, in addition to the general requirements specified in the *General requirements for shipbore radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids* (resolution A.694(17)),[19] should comply with the following minimum performance requirements.

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 cover the requirements for other systems that may take input from the IRNSS receiver.

1.5 It should be noted that this is the regional navigation satellite system being recognized as a future component of the World-Wide Radio Navigation System (WWRNS) and the service is limited to the following coverage area.

Coverage area:

Area closed by 55°E Longitude, 50°N Latitude and 110°E Longitude, 5°S Latitude.

[19] Refer to publication IEC 60945. If IRNSS forms part of an approved Integrated Navigation System (INS), requirements of 2.1.3, 2.1.4 and 2.1.5 may be provided within the INS.

2 IRNSS receiver equipment

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

.1 antenna capable of receiving IRNSS signals;

.2 IRNSS 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 IRNSS receiver equipment

The IRNSS receiver equipment should:

.1 be capable of receiving and processing the IRNSS positioning and velocity, and timing signals, and should use the ionospheric model broadcast to the receiver by the constellation to generate ionospheric corrections;

.2 provide position information based upon WGS-84 coordinates and should be in accordance with international standards;[20]

.3 provide time referenced to universal time coordinated UTC;

.4 be provided with at least two outputs 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 3.16 and 3.18;

.5 have static accuracy such that the position of the antenna is determined to be within 25 m horizontally (95%) and 30 m vertically (95%);

.6 have dynamic accuracy equivalent to the static accuracy specified in 3.5 above under the normal sea states and motion experienced in ships;[21]

.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 have timing accuracy such that time is determined within 100 ns of UTC;

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[20] Publication IEC 61162.

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

.9 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;

.10 be capable of acquiring satellite signals with input signals having carrier levels in the range of -137dBm to -127dBm. Once the satellite signals have been acquired, the equipment should continue to operate satisfactorily with satellite signals having carrier levels down to -140dBm;

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

.12 be capable of acquiring position, velocity and time to the required accuracy within 3 min where there is no valid almanac data;

.13 be capable of acquiring position, velocity and time to the required accuracy within 2 min where there is valid almanac data;

.14 be capable of reacquiring position, velocity and time to the required accuracy within 1 min when there has been a service interruption of 60 s or less;

.15 generate and output to a display and digital interface[22] a new position solution at least once every 1 s for conventional craft and at least once every 0.5 s for high-speed craft;

.16 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[23] and speed and distance measuring equipment (SDME)[24] and the accuracy should be obtained under the various dynamic conditions that could be experienced on board ships;

.17 provide at least one normally closed contact, which should indicate failure of the IRNSS receiver equipment;

.18 have a bidirectional interface to facilitate communication so that alarms can be transferred to external systems and so that audible alarms from the IRNSS receiver can be acknowledged from external systems; the interface should comply with the relevant international standards;[25] and

.19 have the facilities to process differential IRNSS (D-IRNSS) data fed to it in accordance with the standards of ITU-R[26] and the appropriate RTCM standard and provide indication of the reception of D-IRNSS signals and whether they are being applied to the ship's position. When an IRNSS receiver is equipped with a differential receiver, performance standards for static and dynamic accuracies (paragraphs 3.5 and 3.6 above) should be 10 m (95%).

22 Conforming to the IEC 61162 series.

23 Resolution A.424(XI) for conventional craft and resolution A.821(19) for high-speed craft.

24 Resolution A.824(19) as amended by resolutions MSC.96(72) and MSC.334(90).

25 Publication IEC 61162.

26 ITU-R Recommendations M.823.

4 Integrity checking, failure warnings and status indications

4.1 The IRNSS receiver equipment should also indicate whether the performance of IRNSS is outside the bounds of requirements for general navigation in the ocean, coastal, port approach and restricted waters, and inland waterway phases of the voyage as specified in either the *Worldwide radionavigation system* (resolution A.1046(27)) or appendix 2 to the *Revised maritime policy and requirements for a future global navigation satellite system (GNSS)* (resolution A.915(22)) and any subsequent amendments, as appropriate.

4.2 The IRNSS 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 by the IRNSS constellation has not been calculated for more than 1 s for conventional craft and 0.5 s for high-speed craft. 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;

.2 use receiver autonomous integrity monitoring (RAIM) to provide integrity performance appropriate to the operation being undertaken; and

.3 provide a self-test function.

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 IRNSS receiver equipment inputs or outputs for a duration of 5 min.

***

ANNEX 18

RESOLUTION MSC.450(99)
(adopted on 24 May 2018)

STATEMENT OF RECOGNITION OF MARITIME MOBILE SATELLITE SERVICES PROVIDED BY INMARSAT GLOBAL LTD.

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 IV/4-1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, concerning Global Maritime Distress and Safety System (GMDSS) satellite providers, which requires that the Committee shall determine the criteria, procedures and arrangements for the evaluation, recognition, review and oversight of the provisions of mobile satellite communication services in the GMDSS pursuant to the provisions of SOLAS chapter IV,

RECALLING IN PARTICULAR the *Criteria for the provision of mobile satellite communication systems in the global maritime distress and safety system (GMDSS) (*resolution A.1001(25)) by which the Assembly adopted the criteria and requirements for mobile satellite communication services being designed for use in the GMDSS,

RECALLING FURTHER the *Guidance to prospective GMDSS satellite service providers* (MSC.1/Circ.1414) with respect to the provisions of resolution A.1001(25),

NOTING that:

(a) the Inmarsat Fleet Safety service conforms with all the criteria specified in the annex to resolution A.1001(25),

(b) the charging policies and provisions of the *Charges for distress, urgency and safety messages through the Inmarsat system* (resolution A.707(17)), *as amended,* are complied with,

(c) there is a well-founded confidence that Inmarsat Global Ltd. will remain viable for the foreseeable future and will remain in a position to deliver the required services over an extended period, in keeping with the expectations of the Organization and the maritime industry as to the continuity, durability and reliability of the service,

NOTING ALSO:

(a) its decision, at the eighty-second session, that the oversight of future satellite service providers in the GMDSS should be undertaken by the International Mobile Satellite Organization (IMSO),

(b) that Inmarsat Global Ltd. is ready to submit its Fleet Safety service to oversight by IMSO and sign the required Public Services Agreement (PSA) with that organization,

NOTING FURTHER that Inmarsat Global Ltd. is currently providing maritime mobile satellite services in the GMDSS (Inmarsat C, International SafetyNET Service and Inmarsat Fleet 77),

RECOGNIZING that the requested recognition is currently limited to the coverage area under the Inmarsat-4 Middle East and Asia (MEAS) region satellite, as this is within the satellite coverage of which Inmarsat has I-4 satellite contingency,

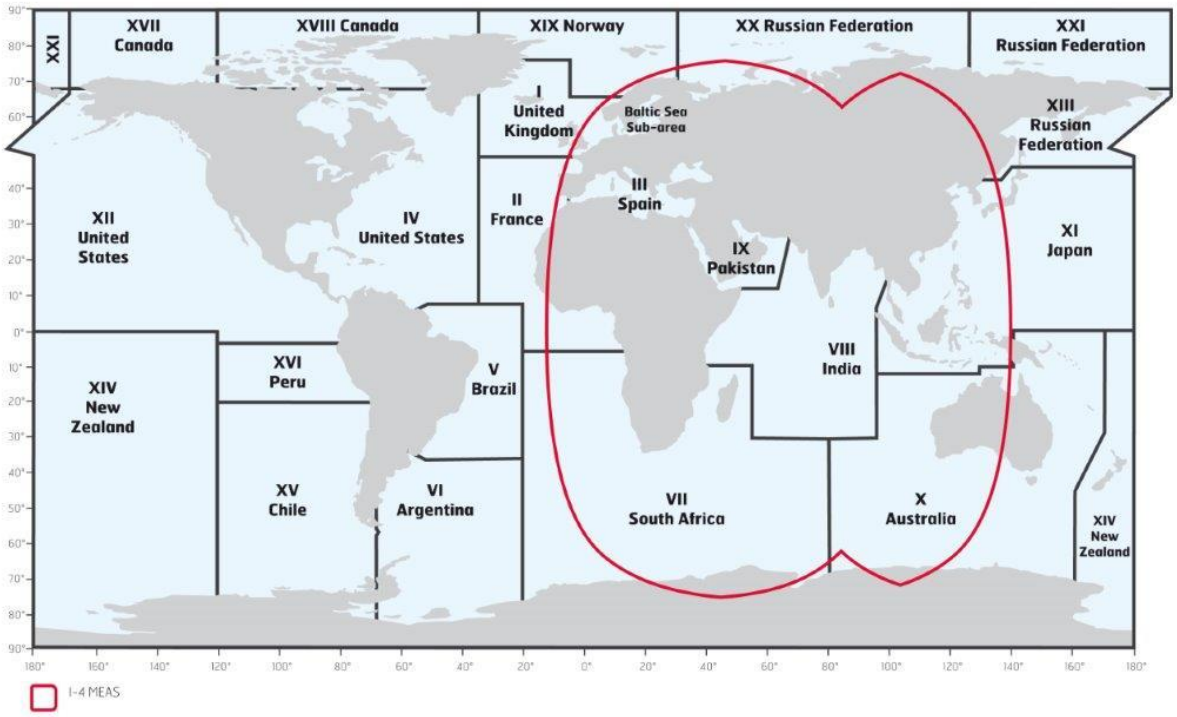
HAVING CONSIDERED, at its ninety-ninth session, the recommendation of the Sub-Committee on Navigation, Communications and Search and Rescue, at its fifth session,

1 RECOGNIZES the maritime mobile satellite services provided by the Inmarsat Fleet Safety service, in the coverage area under the Inmarsat-4 Middle East and Asia (MEAS) region satellite as set out in the annex, for use in the GMDSS;

2 REQUESTS the Secretary-General to provide a copy of this resolution to IMSO.

ANNEX

**COVERAGE AREA UNDER THE INMARSAT-4
MIDDLE EAST AND ASIA (MEAS) REGION SATELLITE**



The current coverage area for the Inmarsat Fleet Safety service as recognized for use in the GMDSS is the area of the I – 4 MEAS satellite that is overlapped by either the Alphasat satellite or I – 4 Asia – Pacific satellite.

The service coverage is Sea Area A3 in accordance with SOLAS regulation IV/2.14 within the limits as illustrated in the drawing, and in accordance with the guidance in resolution A.801(19).

***

ANNEX 19

RESOLUTION MSC.451(99)
(adopted on 24 May 2018)

STATEMENT OF RECOGNITION OF MARITIME MOBILE SATELLITE SERVICES PROVIDED BY IRIDIUM SATELLITE LLC.

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 IV/4-1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, concerning Global Maritime Distress and Safety System (GMDSS) satellite providers, which requires that the Committee shall determine the criteria, procedures and arrangements for the evaluation, recognition, review and oversight of the provisions of mobile satellite communication services in the GMDSS pursuant to the provisions of SOLAS chapter IV,

RECALLING IN PARTICULAR the Criteria for the provision of mobile satellite communication systems in the global maritime distress and safety system (GMDSS) (resolution A.1001(25)) by which the Assembly adopted the criteria and requirements for mobile satellite communication services being designed for use in the GMDSS,

RECALLING FURTHER the Guidance to prospective GMDSS satellite service providers (MSC.1/Circ.1414) with respect to the provisions of resolution A.1001(25),

NOTING that:

(a) the Iridium Safety Voice, Short-Burst data and enhanced group calling services conform with all the criteria specified in the annex to resolution A.1001(25),

(b) the charging policies and provisions of resolution A.707(17), as amended, on *Charges for distress, urgency and safety messages through the Inmarsat system*, are complied with,

(c) there is a well-founded confidence that Iridium Satellite LLC will remain viable for the foreseeable future and will remain in a position to deliver the required services over an extended period, in keeping with the expectations of the Organization and the maritime industry as to the continuity, durability and reliability of the service,

NOTING ALSO:

(a) its decision, at the eighty-second session, that the oversight of future satellite service providers in the GMDSS should be undertaken by the International Mobile Satellite Organization (IMSO),

(b) that Iridium Satellite LLC is ready to submit its Safety Voice, Short-Burst data and enhanced group calling services to oversight by IMSO and sign the required Public Services Agreement (PSA) with that organization,

HAVING CONSIDERED, at its ninety-ninth session, the report of the Sub-Committee on Navigation, Communications and Search and Rescue, at its fifth session,

1 RECOGNIZES the maritime mobile satellite services provided by the Iridium Safety Voice, Short-Burst data and enhanced group calling services, for use in the GMDSS;

2 REQUESTS the Secretary-General to provide a copy of this resolution to IMSO.

***

ANNEX 20

RESOLUTION MSC.452(99)
(adopted on 24 May 2018)

AMENDMENTS TO THE REVISED PERFORMANCE STANDARDS FOR INTEGRATED NAVIGATION SYSTEMS (INS) (RESOLUTION MSC.252(83))

THE MARITIME SAFETY COMMITTEE,

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

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

HAVING CONSIDERED, at its ninety-ninth session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue, at its fifth session,

1 ADOPTS amendments to the *Revised Performance standards for integrated navigation systems (INS)* (resolution MSC.252(83)), set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that INS equipment installed on or after 1 July 2020 conforms to performance standards not inferior to those set out in the annex to resolution MSC.252(83), as amended by the annex to the present resolution.

ANNEX

AMENDMENTS TO REVISED PERFORMANCE STANDARDS FOR INTEGRATED NAVIGATION SYSTEMS (INS) (RESOLUTION MSC.252(83))

3 Application of these performance standards

1 In paragraph 3.5, insert the following at the end of table 2:

"

Allow for accepting the INS in compliance with as	INS in compliance with	
	Tasks and functions (Para of this standard)	Applicable modules of specific equipment standards as specified in the appendices of the document
…	…	…
NAVTEX or other IMO-recognized equipment accommodating other providers of GMDSS terrestrially-based services	Meteorological warnings (7.2.3) Navigation and SAR warnings (7.3.2) Ice warnings (7.3.2)	MSC.148(77)
Recognized mobile satellite service enhanced group calling system	Meteorological warnings (7.2.3) Navigation and SAR warnings (7.3.2) Ice warnings (7.3.2)	A.807(19), as amended by MSC.68(68), annex 4 and MSC.306(87)

"

7 Task and functional requirements for an INS

2 In paragraph 7.3.2, insert the following after the bullet point " • AIS reports of AtoNs,":

"

- Coastal and NAVAREA navigational warnings,
- search and rescue (SAR) warnings,
- Coastal and METAREA meteorological warnings,
- ice warnings,
- Maritime Safety Information overlay functions,"

3 In paragraph 7.3.3, replace bullet points with the following:

"

- tracked radar targets and AIS targets
- AIS binary and safety-related messages
- initiation and monitoring of man-overboard and SAR manoeuvres (search and rescue and man-overboard modes)
- tidal and current data
- weather data
- ice data, and
- the operator may appropriately filter the display of Maritime Safety Information messages."

4 In paragraph 7.5.2.1, replace the last bullet point with the following:

"

- safety related messages: e.g. AIS safety-related and binary messages, Maritime Safety Information messages."

5 In paragraph 7.7.1, replace the fourth bullet point with the following:

"

- presentation of received safety related messages, such as AIS safety-related and binary messages, Application Specific Messages (ASM), Maritime Safety Information messages"

Appendix 1

DEFINITIONS

6 Replace the definition of "External safety related messages" with the following:

External safety related messages	Data received from outside of the ship concerning the safety of navigation, through equipment listed in SOLAS chapter V and/or Maritime Safety Information messages.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1527
6 June 2016

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-2

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), with a view to providing more specific guidance on the conditions under which materials other than steel may be permitted for components mounted on engines, turbines and gearboxes; arrangements for fixed hydrocarbon gas detection systems in double-hull and double-bottom spaces of oil tankers; and non-combustible material as "steel or equivalent" for ventilation ducts, approved unified interpretations of SOLAS chapter II-2, prepared by the Sub-Committee on Ship Systems and Equipment, at its second session (23 to 27 March 2015), as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying SOLAS regulations II-2/4 and II-2/9 and to bring the unified interpretations to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-2

SOLAS REGULATION II-2/4

Application of materials other than steel on engine, turbine and gearbox installations

Materials other than steel may be assessed in relation to the risk of fire associated with the component and its installation. The use of materials other than steel is considered acceptable for the following applications:

.1 internal pipes which cannot cause any release of flammable fluid onto the machinery or into the machinery space in case of failure; or

.2 components that are only subject to liquid spray on the inside when the machinery is running, such as machinery covers, rocker box covers, camshaft end covers, inspection plates and sump tanks. It is a condition that the pressure inside these components and all the elements contained therein is less than 0.18 N/mm^2 and that wet sumps have a volume not exceeding 100 litres; or

.3 components attached to machinery which satisfy fire test criteria according to standard ISO 19921:2005/19922:2005 or other standards acceptable to the Administration, and which retain mechanical properties adequate for the intended installation.

SOLAS REGULATION II-2/4.5.7.3.1

Arrangements for fixed hydrocarbon gas detection systems in double-hull and double-bottom spaces of oil tankers

1 The term "cargo tanks" in the phrase "spaces adjacent to the cargo tanks" includes slop tanks except those arranged for the storage of oily water only.

2 The term "spaces" in the phrase "spaces under the bulkhead deck adjacent to cargo tanks" includes dry compartments such as ballast pump-rooms and bow thruster rooms and any tanks such as freshwater tanks, but excludes fuel oil tanks.

3 The term "adjacent" in the phrase "adjacent to the cargo tanks" includes ballast tanks, void spaces, other tanks or compartments located below the bulkhead deck located adjacent to cargo tanks and includes any spaces or tanks located below the bulkhead deck which form a cruciform (corner to corner) contact with the cargo tanks.

SOLAS REGULATION II-2/9.7.1.1

Non-combustible material as "steel or equivalent" for ventilation ducts

With respect to SOLAS regulation II-2/9.7.1.1, a ventilation duct made of material other than steel may be considered equivalent to a ventilation duct made of steel, provided the material is non-combustible and has passed a standard fire test in accordance with annex 1 to part 3 of the 2010 FTP Code as a non-load bearing structure for 30 minutes, following the requirements for testing "B" class divisions.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1528
6 June 2016

UNIFIED INTERPRETATIONS OF CHAPTERS 5, 6 AND 9 OF THE FSS CODE

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), with a view to providing more specific guidance on fixed gas fire-extinguishing systems and fixed fire detection and fire alarm systems; foam-generating capacity of fixed foam fire-extinguishing systems; and an additional indicating unit in the cargo control rooms, approved unified interpretations of chapters 5, 6 and 9 of the FSS Code, prepared by the Sub-Committee on Ship Systems and Equipment, at its second session (23 to 27 March 2015), as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying paragraph 2.2.1.7 of chapter 5 of the FSS Code, paragraphs 3.2.1.2 and 3.3.1.2 of chapter 6 of the FSS Code, as amended by resolution MSC.327(90), and paragraph 2.5.1.3 of chapter 9, of the FSS Code, as amended by resolution MSC.339(91), to the systems and units to be installed on board ships constructed on or after 13 May 2016 and to bring the unified interpretations to the attention of all parties concerned.

***

ANNEX

UNIFIED INTERPRETATIONS OF CHAPTERS 5, 6 AND 9 OF THE FSS CODE

CHAPTER 5 – FIXED GAS FIRE-EXTINGUISHING SYSTEMS

Fixed gas fire-extinguishing systems (paragraph 2.2.1.7)

1 The "quantity of gas" means that quantity required for the largest cargo space in accordance with the provisions of paragraph 2.1.1.1 of chapter 5:

> "2.1.1.1 Where the quantity of the fire-extinguishing medium is required to protect more than one space, the quantity of medium available need not be more than the largest quantity required for any one space so protected. ... Adjacent spaces with independent ventilation systems not separated by at least A-0 class divisions should be considered as the same space."

2 In such cases, the system controls should be capable of allowing one third, two thirds or the entire quantity of gas as required by paragraph 2.1.1.1 of chapter 5 to be discharged to comply with the last sentence of paragraph 2.2.1.7 (i.e. the number of setting points of control is three).

CHAPTER 6 – FIXED FOAM FIRE-EXTINGUISHING SYSTEMS

Foam-generating capacity of fixed foam fire-extinguishing systems (paragraphs 3.2.1.2 and 3.3.1.2, as amended by resolution MSC.327(90))

1 This interpretation of the term "largest protected space" applies to a machinery space of category A protected by a fixed high-expansion foam fire-extinguishing system complying with the provisions of the FSS Code.

2 Where such a machinery space includes a casing (e.g. an engine casing in a machinery space of category A containing internal combustion machinery, and/or a boiler), the volume of such a casing, above the level up to which foam should be filled to protect the highest position of the fire risk objects within the machinery space, need not be included in the volume of the protected space (see figure 1).

3 The level up to which foam should be filled to protect the highest positioned fire risk objects within the machinery space should not be less than:

- 1 m above the highest point of any such object; or
- the lowest part of the casing,

whichever is higher (see figure 1).

4 Where such a machinery space does not include a casing, the volume of the largest protected space should be that of the space in its entirety, irrespective of the location of any fire risk object therein (see figure 2).

5 Fire risk objects include, but may not be limited to, those listed in SOLAS regulation II-2/3.31 and those defined in regulation II-2/3.34. Although not referred to in those regulations, they may also include items having a similar fire risk such as exhaust gas boilers or oil fuel tanks.

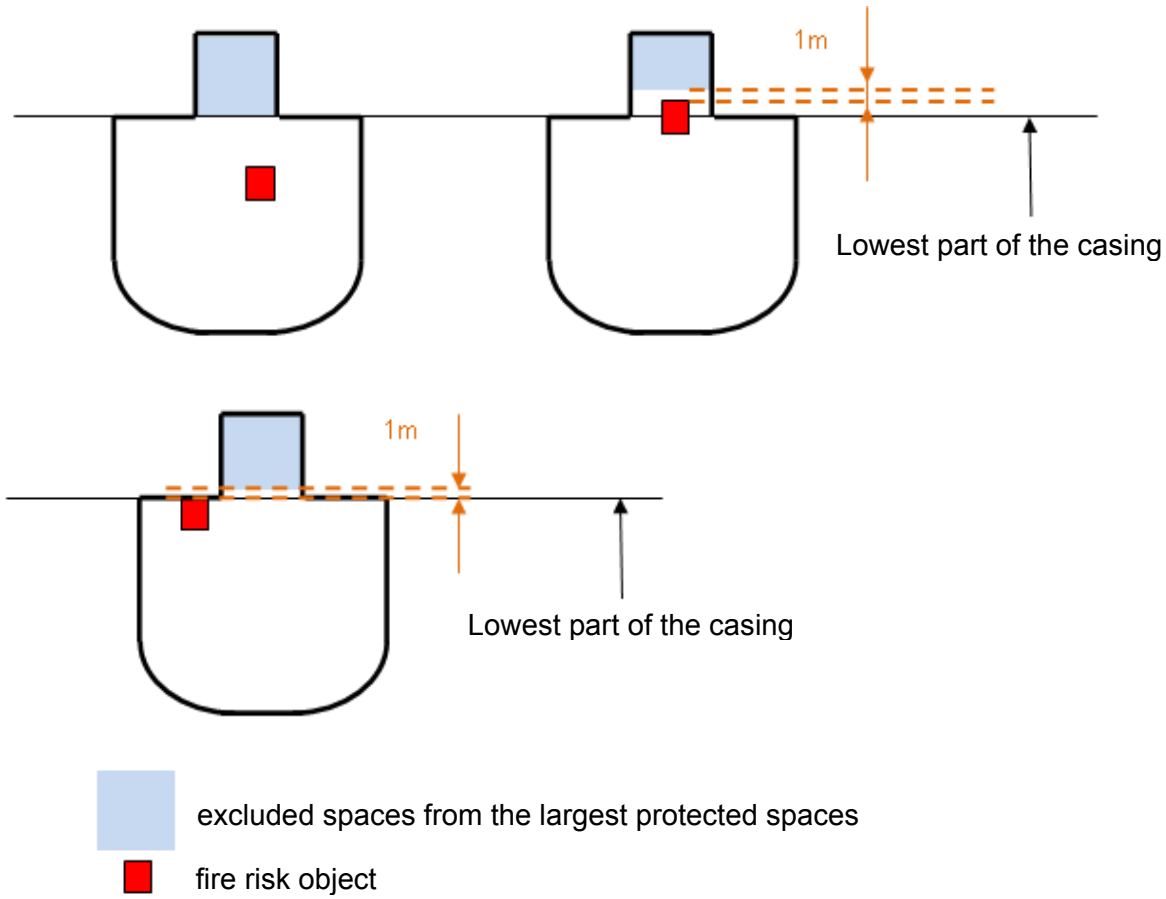

Figure 1: Machinery space including a casing

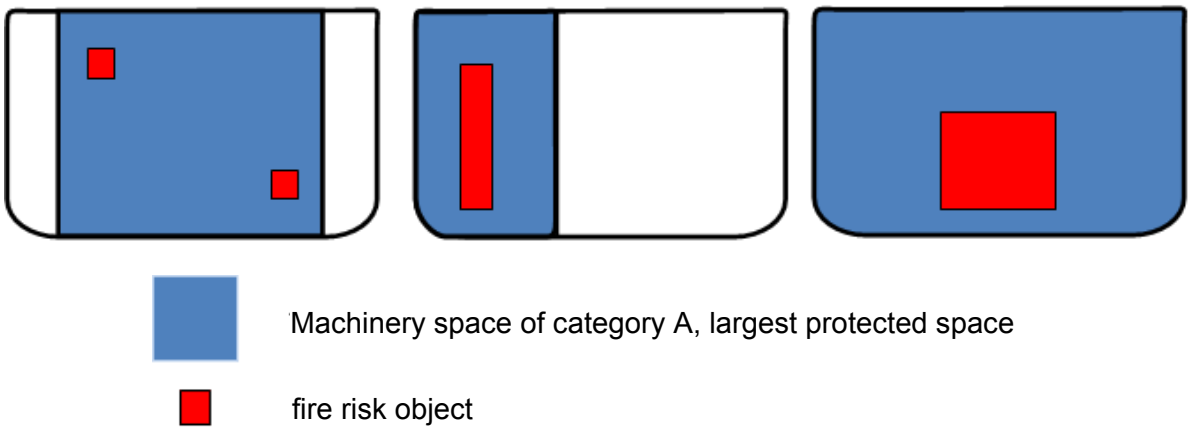

Figure 2: Machinery space not including a casing

CHAPTER 9 – FIXED FIRE DETECTION AND FIRE ALARM SYSTEM

Additional indicating unit in the cargo control room (paragraph 2.5.1.3, as amended by resolution MSC.339(91))

A space in which a cargo control console is installed, but does not serve as a dedicated cargo control room (e.g. ship's office, machinery control room), should be regarded as a cargo control room for the purposes of paragraph 2.5.1.3 of chapter 9 of the FSS Code, as amended by resolution MSC.339(91), and therefore be provided with an additional indicating unit.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1529
6 June 2016

UNIFIED INTERPRETATIONS OF PARAGRAPH 4.4.7.6 OF THE LSA CODE, AS AMENDED BY RESOLUTION MSC.320(89)

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), with a view to providing more specific guidance on lifeboat release and retrieval systems, approved unified interpretations of paragraph 4.4.7.6 of the LSA Code, as amended by resolution MSC.320(89), prepared by the Sub-Committee on Ship Systems and Equipment, at its second session (23 to 27 March 2015), as set out in the annex.

2 Member States are invited to use the annexed unified interpretation as guidance when applying paragraphs 4.4.7.6.6, 4.4.7.6.7.2, 4.4.7.6.9 and 4.4.7.6.14 of the LSA Code, as amended by resolution MSC.320(89), to the systems to be installed on board ships constructed on or after 13 May 2016 and to bring the unified interpretations to the attention of all parties concerned.

***

ANNEX

UNIFIED INTERPRETATIONS OF PARAGRAPH 4.4.7.6 OF THE LSA CODE, AS AMENDED BY RESOLUTION MSC.320(89)

IMPLEMENTATION OF THE REQUIREMENTS RELATING TO LIFEBOAT RELEASE AND RETRIEVAL SYSTEMS

Paragraphs 4.4.7.6.6 and 4.4.7.6.7.2

1 The reset function as required by paragraph 4.4.7.6.6 should also apply to the "other means" or "similar device" referred to in paragraph 4.4.7.6.7.2.

2 Where a safety pin is fitted to facilitate compliance with SOLAS regulation III/1.5 then, in line with paragraph 4 of the annex to MSC.1/Circ.1327, the safety pin arrangement should be acceptable to the hook manufacturer, as defined in paragraph 9.9 of the annex to MSC.1/Circ.1392.

Paragraph 4.4.7.6.9

1 All interlocks ("mechanical protection" of on-load release), which include hydrostatic components in the operating mechanism, should also be of material corrosion resistant in the marine environment.

2 Where stainless steel having a Pitting Resistance Equivalent Number (PREN)[1] of 22 or more is chosen, such stainless steel does not need to be subjected to standard ISO 9227:2012 or other equivalent recognized national standard.

3 Where stainless steel having a PREN < 22, or another corrosion resistant material/alloy is chosen, the material should be qualified by corrosion test according to standard ISO 9227:2012 or other equivalent recognized national standard. When the test is carried out in accordance with standard ISO 9227:2012, neutral salt spray (NSS) should be used, with 1,000 hours test duration for components outside the lifeboat, and 160 hours for those inside the lifeboat. The salt spray tests may be conducted by using round specimens (diameter is 14 mm) according to IACS UR W2.4.2.

4 After the salt spray test, the release mechanism should be subjected to load and release test as described in resolution MSC.81(70), as amended by resolution MSC.321(89), part 1, paragraph 6.9.4.1, to demonstrate satisfactory operation. The load and release should be repeated 10 times. Where specimens are used for the salt spray tests, tensile tests should be conducted in lieu of the load and release test. The results from the tests should be in order to verify that the reduction in the ultimate tensile strength and reduction in cross sectional area ratio is less than 5% between corrosion tested and non-corrosion tested specimens.

5 Where austenitic stainless steels (e.g. 316L or 316) are used for welded structures, the risk of sensitization to intergranular corrosion should be addressed by the component manufacturer's quality control system.

[1] PREN = 1 • %Cr + 3.3 (%Mo + 0.5 • %W) + 16 • %N

6 Austenitic stainless steels 201, 304, 321, 347 are susceptible to pitting and crevice corrosion and, therefore, unsuitable for these applications. For operating cables covered with sheath and installed inside the lifeboat, inner cables made of austenitic stainless steels 304 are acceptable without the corrosion test above.

Paragraph 4.4.7.6.14

The hanging-off arrangement, including the connections to the lifeboat release and retrieval system and davit, should be designed with a calculated factor of safety of 6 based on the ultimate strength of the materials used, and mass of the lifeboat when loaded with its full complement of fuel and equipment plus 1,000 kg equally distributed between the falls.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1530
6 June 2016

UNIFIED INTERPRETATIONS OF SOLAS REGULATIONS III/6.4 AND III/6.5 AND SECTION 7.2 OF THE LSA CODE

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), with a view to providing more specific guidance on general emergency alarms and public address systems in ro-ro spaces, approved unified interpretations of SOLAS regulations III/6.4 and III/6.5 and section 7.2 of the LSA Code, prepared by the Sub-Committee on Ship Systems and Equipment, at its second session (23 to 27 March 2015), as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying SOLAS regulations III/6.4 and III/6.5 and section 7.2 of the LSA Code and to bring the unified interpretations to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS REGULATIONS III/6.4 AND III/6.5 AND SECTION 7.2 OF THE LSA CODE

General

1 The term "accommodation" defined in SOLAS regulation II-2/3.1 applies also to SOLAS regulation III/6.4.3.

2 The term "similar spaces" used in SOLAS regulation II-2/3.1, when applied to public address and general alarm systems required in SOLAS regulations II-2/12.3, III/6.4 and III/6.5, includes, but is not limited to, the following spaces: stairways, lifts, recreation rooms and pantries.

3 The word "audibility" or the term "audible" used in SOLAS regulations III/6.4.2, III/6.4.3 and III/6.5, and when referred to in these unified interpretations, means the sound pressure level requirements as defined in section 7.2 of the LSA Code.

General emergency alarm

4 Regarding the audibility (sound pressure) requirements in SOLAS regulations III/6.4.2 and III/6.4.3 and section 7.2 of the LSA Code, the audibility (sound pressure) requirements as defined in section 7.2 of the LSA Code, should include special category spaces, ro-ro spaces and vehicle spaces as defined in SOLAS regulations II-2/3.46, II-2/3.41 and II-2/3.49 on all types of ship that carry vehicles (for example PCC/PCTC/RO PAX vessel).

5 For cargo ships, it is not necessary to provide a public address system in cargo spaces used for the carriage of vehicles (i.e. only a general emergency alarm is required in spaces used for the carriage of vehicles on cargo ships).

6 Regarding SOLAS regulation III/6.4.3, the term "normal crew working spaces" includes spaces where routine maintenance tasks or local control of machinery operated at sea are undertaken.

Public address system

7 Regarding the audibility (sound pressure) requirements in SOLAS regulation III/6.5.2 for passenger ships, the audibility (sound pressure) requirements should include special category spaces, ro-ro spaces and vehicle spaces as defined in SOLAS regulations II-2/3.41, II-2/3.46 and II-2/3.49 on board passenger ships, if accessible by the general public at sea.

8 For cargo ships, it is not necessary to provide a public address system in cargo spaces used for the carriage of vehicles (i.e. only a general emergency alarm is required in spaces used for the carriage of vehicles on cargo ships).

9 Regarding SOLAS regulation III/6.5.2 and the requirements of paragraph 7.2.2.1 of the LSA Code, the term "spaces where crew members or passengers or both are normally present" includes all accommodation spaces. With respect to spaces where a public address system may not be required in accordance with paragraph 7.2.2.1 of the LSA Code, these may be spaces such as under deck passageways, including passageways in the car hold between an accommodation space and an engine-room, bosun's lockers and pump-rooms.

10 With respect to cabin/state rooms, the sound pressure levels as stated in paragraph 7.2.2.2.1 of the LSA Code should be attained as required inside the cabin/state room, during sea trials.

11 Where an individual loudspeaker has a device for local silencing, an override arrangement from the control station(s), including the navigating bridge, should be in place.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1534
6 June 2016

UNIFIED INTERPRETATIONS RELATING TO THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of the requirements of the 1966 Load Lines Convention, approved unified interpretations relating to the International Convention on Load Lines, 1966, prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex.

2 Member States are invited to apply the annexed unified interpretations and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS RELATING TO THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

Regulation 13 – Position of hatchways, doorways and ventilators

1 For the purpose of these regulations, two positions of hatchways, doorways and ventilators are defined as follows:

Position 1 – Upon freeboard decks and raised quarterdecks, or other exposed decks* lower than one standard height of superstructure above the freeboard deck, and upon exposed decks* situated forward of a point located a quarter of the ship's length from the forward perpendicular that are located lower than two standard heights of superstructure above the freeboard deck.

Position 2 – Upon exposed decks* situated abaft a quarter of the ship's length from the forward perpendicular and located at least one standard height of superstructure above the freeboard deck and lower than two standard heights of superstructure above the freeboard deck.

Upon exposed decks* situated forward of a point located a quarter of the ship's length from the forward perpendicular and located at least two standard heights of superstructure above the freeboard deck and lower than three standard heights of superstructure above the freeboard deck.

Regulation 20 – Air pipes

2 Where air pipes to ballast and other tanks extend above:

.1 the freeboard deck; or

.2 other exposed decks* lower than two standard heights of superstructure above the freeboard deck,

the exposed parts of the pipes should be of substantial construction, and the height from the deck to the point where water may have access below should be at least:

.1 760 mm on the freeboard deck or other exposed decks* lower than one standard height of superstructure above the freeboard deck; and

.2 450 mm on other exposed decks* lower than two standard heights of superstructure above freeboard deck.

Note: Flush bolted access covers, which are of substantial construction and are secured by gaskets and closely spaced bolts to maintain water tightness, are not subject to the minimum sill height requirements.

* "Exposed decks" include top decks of superstructures, deckhouses, companionways and other similar deck structures.

Regulation 27 – Types of ships

Regulation 27(13)(e)

3 Unprotected openings include ventilators (complying with regulation 19(4)of the International Convention on Load Lines, 1966) that for operational reasons have to remain open to supply air to the engine room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship.

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INTERNATIONAL MARITIME ORGANIZATION

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

E

MSC.1/Circ.1534/Corr.1
2 December 2016

UNIFIED INTERPRETATIONS RELATING TO THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

Corrigendum

Paragraph 3 of the annex, including the title "**Regulation 27 – Types of ships**" and the subtitle "***Regulation 27(13)(e)***", is deleted.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1535
6 June 2016

UNIFIED INTERPRETATIONS RELATING TO THE PROTOCOL OF 1988 RELATING TO THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of requirements concerning sill and coaming heights for openings on top of deckhouses and companionways of the 1988 Load Lines Protocol, approved unified interpretations relating to the Protocol of 1988 relating to the International Convention on Load Lines, 1966, prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex.

2 Member States are invited to apply the annexed unified interpretations and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS RELATING TO THE PROTOCOL OF 1988 RELATING TO THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

Regulation 13 – Position of hatchways, doorways and ventilators

1 For the purpose of these regulations, two positions of hatchways, doorways and ventilators are defined as follows:

Position 1 – Upon freeboard decks and raised quarterdecks, or other exposed decks* lower than one standard height of superstructure above the freeboard deck, and upon exposed decks* situated forward of a point located a quarter of the ship's length from the forward perpendicular that are located lower than two standard heights of superstructure above the freeboard deck.

Position 2 – Upon exposed decks* situated abaft a quarter of the ship's length from the forward perpendicular and located at least one standard height of superstructure above the freeboard deck and lower than two standard heights of superstructure above the freeboard deck.

Upon exposed decks* situated forward of a point located a quarter of the ship's length from the forward perpendicular and located at least two standard heights of superstructure above the freeboard deck and lower than three standard heights of superstructure above the freeboard deck.

Regulation 20 – Air pipes

2 Where air pipes to ballast and other tanks extend above:

.1 the freeboard deck; or

.2 other exposed decks* lower than two standard heights of superstructure above the freeboard deck,

the exposed parts of the pipes should be of substantial construction, and the height from the deck to the point where water may have access below should be at least:

.1 760 mm on the freeboard deck or other exposed decks* lower than one standard height of superstructure above the freeboard deck; and

.2 450 mm on other exposed decks* lower than two standard heights of superstructure above freeboard deck.

Note: Flush bolted access covers, which are of substantial construction and are secured by gaskets and closely spaced bolts to maintain water tightness, are not subject to the minimum sill height requirements.

* "Exposed decks" include top decks of superstructures, deckhouses, companionways and other similar deck structures.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1535/Corr.1
2 December 2016

UNIFIED INTERPRETATIONS RELATING TO THE PROTOCOL OF 1988 RELATING TO THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

Corrigendum

The following text is added to the end of the annex:

"**Regulation 27 – Types of ships**

Regulation 27(13)(e)

3 Unprotected openings include ventilators (complying with regulation 19(4) of the International Convention on Load Lines, 1966) that for operational reasons have to remain open to supply air to the engine room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship."

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1536
6 June 2016

UNIFIED INTERPRETATIONS OF SOLAS REGULATIONS II-1/29.3 AND II-1/29.4

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), with a view to providing more specific guidance on the application of the provisions of SOLAS regulations II-1/29.3 and 29.4 concerning the steering gear test, approved the unified interpretations of SOLAS regulations II-1/29.3 and II-1/29.4, prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex.

2 Member States are invited to apply the annexed unified interpretations from 13 May 2016 when applying the relevant provisions of SOLAS regulations II-1/29.3 and II-1/29.4 and to bring them to the attention of all parties concerned.

3 This circular supersedes MSC.1/Circ.1425.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS REGULATIONS II-1/29.3 AND II-1/29.4

Regulation II-1/29 – Steering gear

1 In order for ships to comply with the performance requirements stated in regulations II-1/29.3.2 and 29.4.2, they are to have steering gear capable of meeting these performance requirements when at their deepest seagoing draught.

2 In order to demonstrate this ability, the trials may be conducted in accordance with section 6.1.5.1 of the standard ISO 19019:2005 (Sea-going vessels and marine technology – Instructions for planning, carrying out and reporting sea trials).

3 On all occasions when trials are conducted with the vessel not at the deepest seagoing draught, the loading condition can be accepted on the conditions that either:

.1 The rudder is fully submerged (at zero speed waterline) and the vessel is in an acceptable trim condition.

.2 The rudder torque at the trial loading condition has been reliably predicted (based on the system pressure measurement) and extrapolated to the maximum seagoing draught condition using the following method to predict the equivalent torque and actuator pressure at the deepest seagoing draught:

$$Q_F = Q_T \alpha$$

$$\alpha = 1.25(\frac{A_F}{A_T})(\frac{V_F}{V_T})^2$$

where:

α is the Extrapolation factor.

Q_F is the rudder stock moment (torque in the rudder stock) for the deepest service draught and maximum service speed condition.

Q_T is the rudder stock moment (torque in the rudder stock) for the trial condition.

A_F is the total immersed projected area of the movable part of the rudder in the deepest seagoing condition.

A_T is the total immersed projected area of the movable part of the rudder in the trial condition.

V_F is the contractual design speed of the vessel corresponding to the maximum continuous revolutions of the main engine at the deepest seagoing draught.

V_T is the measured speed of the vessel (considering current) in the trial condition.

Where the rudder actuator system pressure is shown to have a linear relationship to the rudder stock torque the above equation can be taken as:

$$P_F = P_T \alpha$$

where:

P_F is the estimated steering actuator hydraulic pressure in the deepest seagoing draught condition.

P_T is the maximum measured actuator hydraulic pressure in the trial condition.

Where constant volume fixed displacement pumps are utilized then the regulations can be deemed satisfied if the estimated steering actuator hydraulic pressure at the deepest draught is less than the specified maximum working pressure of the rudder actuator. Where a variable delivery pump is utilized pump data should be supplied and interpreted to estimate the delivered flow rate corresponds to the deepest seagoing draught in order to calculate the steering time and allow it to be compared to the required time.

Where A_T is greater than $0.95A_F$ there is no need for extrapolation methods to be applied.

.3 Alternatively, the designer or builder may use computational fluid dynamic (CFD) studies or experimental investigations to predict the rudder stock moment at the full seagoing draught condition and service speed. These calculations or experimental investigations should be to the satisfaction of the Administration.

4 In any case for the main steering gear trial, the speed of the ship corresponding to the number of maximum continuous revolution of main engine and maximum design pitch applies.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1537
6 June 2016

UNIFIED INTERPRETATIONS OF THE 2008 IS CODE

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of requirements of the 2008 IS Code, approved unified interpretations of the 2008 IS Code, prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex.

2 Member States are invited to apply the annexed unified interpretations and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF THE 2008 IS CODE

Introduction

2.23 Definition of the term "lightship"

1 The weight of mediums on board for the fixed firefighting systems (e.g. freshwater, CO_2, dry chemical powder, foam concentrate, etc.) should be included in the lightweight and lightship condition.

Part A – Mandatory criteria

2.3 Severe wind and rolling criterion (weather criterion)

2 In applying Φ_f, openings which cannot be or are incapable of being closed weathertight include ventilators (complying with regulation 19(4) of the *International Convention on Load Lines, 1966*) that for operational reasons have to remain open to supply air to the engine room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship.

Part B – Recommendations for certain types of ships and additional guidelines

3.4.2 Assumptions for calculating loading conditions

3 For tankers assigned with a tropical load line, the ship should be assumed to be loaded to its tropical load line.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1538
6 June 2016

UNIFIED INTERPRETATION RELATING TO THE INTERNATIONAL GRAIN CODE

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of requirements concerning the angle of down-flooding of the International Code for the Safe Carriage of Grain in Bulk (International Grain Code), approved unified interpretation relating to the International Grain Code, prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex.

2 Member States are invited to apply the annexed unified interpretation and to bring it to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION RELATING TO THE INTERNATIONAL GRAIN CODE

Part A – Specific requirements

In applying Φ_1, openings which cannot be or are incapable of being closed weathertight, include ventilators (complying with regulation 19(4) of the *International Convention on Load Lines, 1966*) that for operational reasons have to remain open to supply air to the engine room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1539
6 June 2016

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-1

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of the requirements of SOLAS chapter II-1, approved unified interpretations of SOLAS chapter II-1, prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex.

2 Member States are invited to apply the annexed unified interpretations and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-1

Regulation 2.21 – Definition of the term "Lightweight"

1 The weight of mediums on board for the fixed firefighting systems (e.g. freshwater, CO_2, dry chemical powder, foam concentrate, etc.) should be included in the lightweight and lightship condition.

Regulation 3-2 – Protective coatings of dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers

2 The following tanks should not be considered to be dedicated seawater ballast tanks and should, therefore, be exempted from the application and requirements of the *Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers* (resolution MSC.215(82)), provided the coatings applied in the tanks described in subparagraphs .2 and .3 below are confirmed by the coating manufacturer to be resistant to the media stored in these tanks and provided such coatings are applied and maintained according to the coating manufacturer's procedures.

.1 ballast tanks identified as "Spaces included in Net Tonnage" in the International Tonnage Certificate (1969);

.2 seawater ballast tanks in passenger ships also designated for the carriage of grey water or black water; and

.3 seawater ballast tanks in livestock carriers also designated for the carriage of livestock dung.

Regulation 7-2 – Calculation of the factor s_i

3 In applying θ_v, openings which cannot be or are incapable of being closed weathertight include ventilators (complying with regulation 19(4) of the *International Convention on Load Lines, 1966)* that for operational reasons have to remain open to supply air to the engine room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1540
6 June 2016

UNIFIED INTERPRETATION OF THE 2009 MODU CODE

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of the requirements of the 2009 MODU Code, approved a unified interpretation for chapter 1 of the 2009 MODU Code, as set out in the annex.

2 Member States are invited to apply the annexed unified interpretation and to bring it to the attention of all parties concerned.

***

ANNEX

UNIFIED INTERPRETATION OF THE 2009 MODU CODE

Chapter 1, paragraph 1.3.30 – Definition of the term "Lightweight"

The weight of mediums on board for the fixed firefighting systems (e.g. freshwater, CO_2, dry chemical powder, foam concentrate, etc.) should be included in the lightweight and lightship condition.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1541
6 June 2016

UNIFIED INTERPRETATION OF THE 1994 HSC CODE

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of the requirements of the 1994 HSC Code, approved a unified interpretation for chapter 1 of the 1994 HSC Code, as set out in the annex.

2 Member States are invited to apply the annexed unified interpretation and to bring it to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION OF THE 1994 HSC CODE

Chapter 1, paragraph 1.4.27 – Definition of the term "Lightweight"

The weight of mediums on board for the fixed firefighting systems (e.g. freshwater, CO_2, dry chemical powder, foam concentrate, etc.) should be included in the lightweight and lightship condition.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1542
6 June 2016

UNIFIED INTERPRETATION OF THE 2000 HSC CODE

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of the requirements of the 2000 HSC Code, approved a unified interpretation for chapter 1 of the 2000 HSC Code, as set out in the annex.

2 Member States are invited to apply the annexed unified interpretation and to bring it to the attention of all parties concerned.

***

ANNEX

UNIFIED INTERPRETATION OF THE 2000 HSC CODE

Chapter 1, paragraph 1.4.34 – Definition of the term "Lightweight"

The weight of mediums on board for the fixed firefighting systems (e.g. freshwater, CO_2, dry chemical powder, foam concentrate, etc.) should be included in the lightweight and lightship condition.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1543
6 June 2016

UNIFIED INTERPRETATION RELATING TO THE IGC CODE

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), in order to facilitate global and consistent implementation of flooding assumptions requirements of the IGC Code, approved unified interpretation relating to the IGC Code, prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex.

2 Member States are invited to apply the annexed unified interpretation and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION RELATING TO THE IGC CODE

2.7 Survival requirements

Other openings capable of being closed weathertight do not include ventilators (complying with regulation 19(4) of the International Convention on Load Lines, 1966) that for operational reasons have to remain open to supply air to the engine room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1544
6 June 2016

UNIFIED INTERPRETATIONS FOR THE APPLICATION OF CHAPTER 2 OF THE 2009 MODU CODE AND THE REVISED TECHNICAL PROVISIONS FOR MEANS OF ACCESS FOR INSPECTIONS (RESOLUTION MSC.158(78))

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), approved the unified interpretations for the application of chapter 2 of the 2009 MODU Code, and the *Revised technical provisions for means of access for inspections* (resolution MSC.158(78)), prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex, with a view to ensuring a uniform approach towards the application of the provisions of the 2009 MODU Code.

2 Member States are invited to apply the annexed unified interpretations and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS FOR THE APPLICATION OF CHAPTER 2 OF THE 2009 MODU CODE AND THE REVISED TECHNICAL PROVISIONS FOR MEANS OF ACCESS FOR INSPECTIONS (RESOLUTION MSC.158(78))

2009 MODU Code

2.2.1 Means of access

Paragraph 2.2.1.2

1 Some possible alternative means of access are listed under paragraph 3.9 of the MODU Technical Provisions for means of access for inspection (MODU TP). Always subject to acceptance as equivalent by the Administration, alternative means such as an unmanned robot arm, ROVs with necessary equipment of the permanent means of access for overall and close-up inspections and thickness measurements of the deck head structure, such as deck transverses and deck longitudinals of ballast tanks and other tanks, holds and other spaces where gas hazardous atmosphere may be present, should be capable of:

.1 safe operation in ullage space in gas-free environment; and

.2 introduction into the place directly from a deck access.

2 When considering use of alternative means of access as addressed by paragraph 3.9 of the MODU TP, refer to IACS Recommendation No.91 "Guidelines for Approval/Acceptance of Alternative Means of Access".

Paragraph 2.2.1.3

3 This interpretation is to be contained in a section of the Means of Access (MA) Manual, as specified in the *Revised technical provisions for means of access for inspections* (resolution MSC.158(78)).

2.2.2 Safe access to holds, tanks, ballast tanks and other spaces

4 This regulation is only applicable to integral tanks. Independent tanks can be excluded. Additionally, spud cans and jack cases of self-elevating units can be excluded.

5 The wording "not intended for the carriage of oil or hazardous materials" applies only to "similar compartments", i.e. safe access can be through a pump-room, deep cofferdam, pipe tunnel, cargo hold or double hull space.

Paragraph 2.2.2.2

6 A tank of less than 35 m in length without a swash bulkhead requires only one access hatch.

7 Where rafting is indicated in the access manual as the means to gain ready access to the under deck structure, the term "*similar obstructions*" referred to in the regulation includes internal structures (e.g. webs > 1.5 m deep) which restrict the ability to raft (at the maximum water level needed for rafting of under deck structure) directly to the nearest access ladder and hatchway to deck. When rafts or boats alone, as an alternative means of access, are allowed, permanent means of access should be provided to allow safe entry and exit. This means:

.1 access direct from the deck via a vertical ladder and small platform fitted approximately 2 m below the deck in each bay; or

.2 access to deck from a longitudinal permanent platform having ladders to deck in each end of the tank. The platform should, for the full length of the tank, be arranged in level with, or above, the maximum water level needed for rafting of under deck structure. For this purpose, the ullage corresponding to the maximum water level should be assumed not more than 3 m from the deck plate measured at the midspan of deck transverses and in the middle length of the tank. A permanent means of access from the longitudinal permanent platform to the water level indicated above should be fitted in each bay (e.g. permanent rungs on one of the deck webs inboard of the longitudinal permanent platform).

2.2.3 Access manual

8 The access manual* is to address spaces listed in section 2.2.2 of the Code. As a minimum, the English version should be provided.

9 The access manual should contain at least the following two parts:

Part 1: Plans, instructions and inventory required by paragraphs .1.1 to .1.7 of section 2.2.3.1. This part is to be approved by the Administration or the organization recognized by the Administration.

Part 2: Form of record of inspections and maintenance, and change of inventory of portable equipment due to additions or replacement after construction. This part is to be approved for its form only at new building.

10 The following matters should be addressed in the access manual:

.1 the access manual should clearly cover scope as specified in the regulations for use by crews, surveyors and port State control officers;

.2 approval / re-approval procedure for the manual, i.e. any changes of the permanent, portable, movable or alternative means of access within the scope of the regulation and the Technical provisions are subject to review and approval by the Administration or by the organization recognized by the Administration;

.3 verification of MA should be part of safety construction survey for continued effectiveness of the MA in that space which is subject to the statutory survey;

.4 inspection of MA by the crew and/or a competent inspector of the company as a part of regular inspection and maintenance (see interpretation for paragraph 2.2.1.3);

.5 actions to be taken if MA is found unsafe to use; and

.6 in case of use of portable equipment, plans showing the means of access within each space indicating from where and how each area in the space can be inspected.

* Refer to IACS Recommendation No.90 "Ship Structural Access Manual".

Paragraph 2.2.3.2

11 Critical structural areas should be identified by advanced calculation techniques for structural strength and fatigue performance, if available, and feedback from the service history and design development of similar or sister units.

2.2.4 General technical specifications

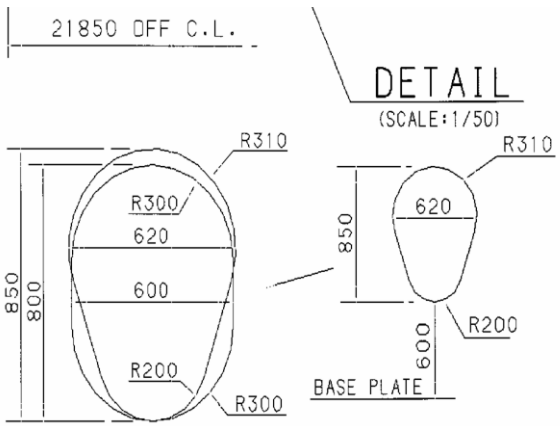
Paragraph 2.2.4.1

12 The minimum clear opening of 600 mm x 600 mm may have corner radii up to 100 mm maximum. The clear opening is specified in the *Guidelines on the means of access to structures for inspection and maintenance of oil tankers and bulk carriers* (MSC/Circ.686) to keep the opening fit for passage of personnel wearing breathing apparatus. In such a case, where as a consequence of structural analysis of a given design the stress should be reduced around the opening, it is considered appropriate to take measures to reduce the stress such as making the opening larger with increased radii, e.g. 600 mm x 800 mm with 300 mm radii, in which a clear opening of 600 mm x 600 mm with corner radii up to 100mm maximum fits.

Paragraph 2.2.4.2

13 The minimum clear opening of not less than 600 mm x 800 mm may also include an opening with corner radii of 300 mm. An opening of 600 mm in height x 800 mm in width may be accepted as access openings in vertical structures where it is not desirable to make large opening in the structural strength aspects, i.e. girders and floors in double bottom tanks.

14 Subject to verification of easy evacuation of injured person on a stretcher the vertical opening 850 mm x 620 mm with wider upper half than 600 mm, while the lower half may be less than 600 mm with the overall height not less than 850 mm is considered an acceptable alternative to the traditional opening of 600 mm x 800 mm with corner radii of 300 mm.



15 If a vertical opening is at a height of more than 600 mm, steps and handgrips are to be provided. In such arrangements it is to be demonstrated that an injured person can be easily evacuated.

Revised technical provisions for means of access for inspections (resolution MSC.158(78))

1 Preamble

16 In the context of the above requirement, the deviation should be applied only to distances between integrated PMA that are the subject of paragraph 2.1.2 of table 1.

17 Deviations should not be applied to the distances governing the installation of underdeck longitudinal walkways and dimensions that determine whether permanent access are required or not, such as height of the spaces and height to elements of the structure (e.g. cross-ties).

3 Technical provisions

Paragraph 3.1

18 The permanent means of access to a space can be credited for the permanent means of access for inspection.

Paragraphs 3.2 and 3.3

19 Sloping structures are structures that are sloped by 5 or more degrees from horizontal plane when a unit is in upright position at even-keel.

20 Guard rails should be fitted on the open side. For stand-alone passageways guard rails should be fitted on both sides of these structures.

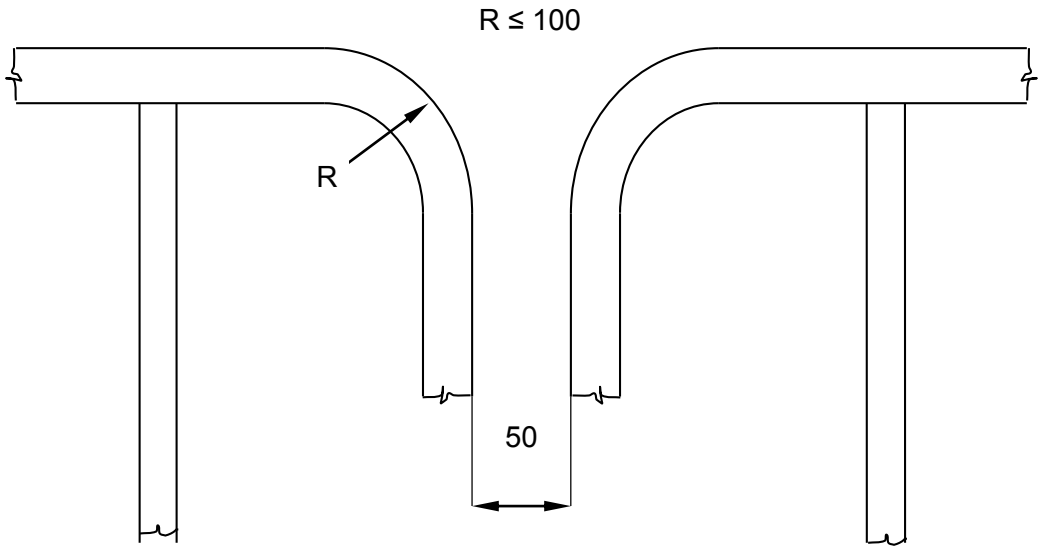
21 Discontinuous top handrails are allowed, provided the gap does not exceed 50 mm.

22 The same maximum gap is to be considered between the top handrail and other structural members (i.e. bulkhead, web frame, etc.).

23 The maximum distance between the adjacent stanchions across the handrail gaps should be 350 mm where the top and mid handrails are not connected together and 550 mm when they are connected together.

24 The maximum distance between the stanchion and other structural members should not exceed 200 mm where the top and mid handrails are not connected together and 300 mm when they are connected together.

25 When the top and mid handrails are connected by a bent rail, the outside radius of the bent part should not exceed 100 mm (see figure below).



26 Non-skid construction is such that the surface on which personnel walks provides sufficient friction to the sole of boots even if the surface is wet and covered with thin sediment.

27 "Substantial construction" is taken to refer to the designed strength as well as the residual strength during the service life of the unit. Durability of passageways together with guard rails should be ensured by the initial corrosion protection and inspection and maintenance during services.

28 For guard rails, use of alternative materials such as GRP should be subject to compatibility with the liquid carried in the tank. Non-fire resistant materials should not be used for means of access to a space with a view to securing an escape route at a high temperature.

29 Requirements for resting platforms placed between ladders are equivalent to those applicable to elevated passageways.

Paragraph 3.4

30 Where the vertical manhole is at a height of more than 600 mm above the walking level, it should be demonstrated that an injured person can be easily evacuated.

Paragraph 3.6

31 Vertical height of handrails should not be less than 890 mm from the centre of the step and two course handrails are to be provided.

32 The requirement of two square bars for treads specified in MODU TP, paragraph 3.6, is based upon the specification of construction of ladders in paragraph 3(e) of annex 1 to resolution A.272(VIII), which addresses inclined ladders. MODU TP, paragraph 3.4, allows for single rungs fitted to vertical surfaces, which is considered for a safe grip. For vertical ladders, when steel is used, the rungs are to be formed of single square bars of not less than 22 mm by 22 mm for the sake of safe grip.

33 The width of inclined ladders for access to a hold should be at least 450 mm to comply with the Australian AMSA Marine Orders Part 32, Appendix 17.

34 The width of inclined ladders other than an access to a hold should not be less than 400 mm.

35 The minimum width of vertical ladders should be 350 mm and the vertical distance between the rungs is to be equal and should be between 250 mm and 350 mm.

36 A minimum climbing clearance in width should be 600 mm other than the ladders placed between the hold frames.

37 The vertical ladders should be secured at intervals not exceeding 2.5 m apart to prevent vibration.

Paragraphs 3.7 to 3.9

38 A mechanical device such as hooks for securing at the upper end of a ladder should be considered as an appropriate securing device if a movement fore/aft and sideways can be prevented at the upper end of the ladder.

Paragraphs 3.10 and 3.11

39 See interpretation for paragraphs 2.2.4.1 and 2.2.4.2 of 2009 MODU Code (paragraphs 12 to 15 above).

Paragraphs 3.12 and 3.13

40 Either a vertical or an inclined ladder or a combination of them may be used for access to a large hold where the vertical distance is 6 m or less from the deck to the bottom of the hold.

41 Adjacent sections of vertical ladder need to be installed so that the following provisions are complied with (refer to figures A and B):

- The minimum "lateral offset" between two adjacent sections of vertical ladder, is the distance between the sections, upper and lower, so that the adjacent stringers are spaced of at least 200 mm, measured from half thickness of each stringer.

- Adjacent sections of vertical ladder should be installed so that the upper end of the lower section is vertically overlapped, in respect to the lower end of the upper section, to a height of 1500 mm in order to permit a safe transfer between ladders.

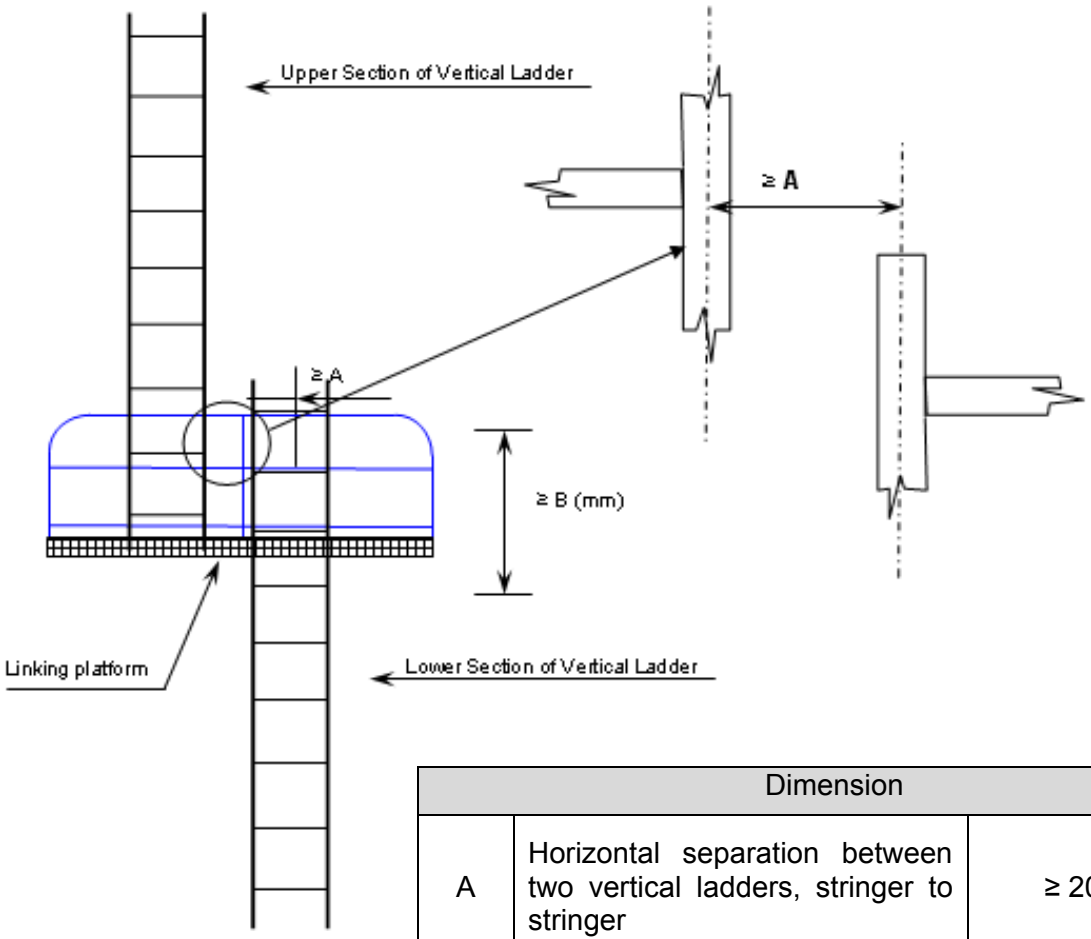
- No section of the access ladder should be terminated directly or partly above an access opening.

Paragraph 3.14

42 Deck is defined as "weather deck".

Figure "A"

Vertical Ladder – Ladder through the linking platform



Dimension		
A	Horizontal separation between two vertical ladders, stringer to stringer	≥ 200 mm
B	Stringer height above landing or intermediate platform	≥ 1500* mm
C	Horizontal separation between ladder and platform	100 mm ≤C< 300 mm
*	Note: the minimum height of the handrail of resting platform is 1000 mm (Technical Provision, resolution MSC.158(78), paragraph 3.3)	

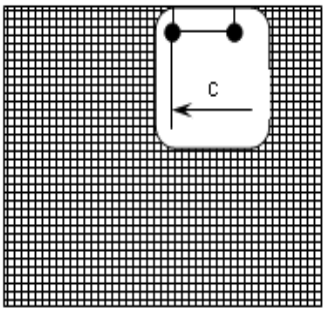
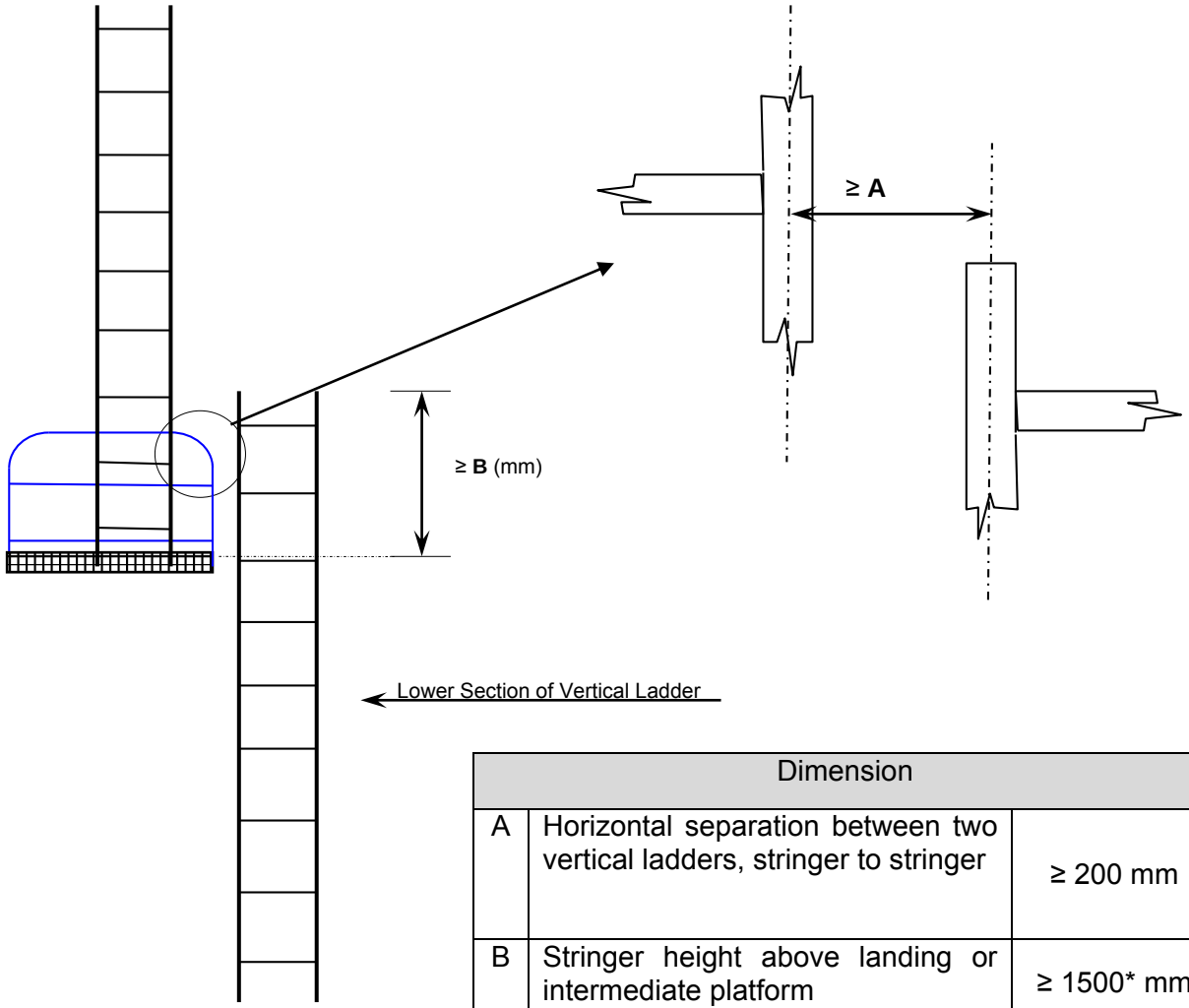


Figure "B"

Vertical Ladder – Side mount



Dimension		
A	Horizontal separation between two vertical ladders, stringer to stringer	≥ 200 mm
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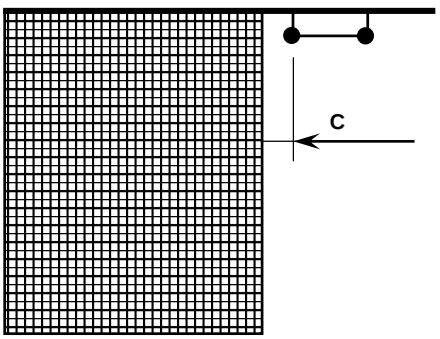

Table 1 – Means of access, paragraph 1.1

43 For tanks containing oil products other than crude oil (e.g. fuel oil, diesel oil, base oil) where lower corrosion is expected, section 1.1 of table 1 should not be applied. For tanks containing products considered corrosive (e.g. brine, drilling mud), section 1.1 should be applied.

44 Sub-paragraphs .1 to .3 define access to underdeck structure, access to the uppermost sections of transverse webs and connection between these structures.

45 Sub-paragraphs .4 to .6 define access to vertical structures only and are linked to the presence of transverse webs on longitudinal bulkheads.

46 If there are no underdeck structures (deck longitudinals and deck transverses) but there are vertical structures in the tank supporting transverse and longitudinal bulkheads, access in accordance with sub-paragraphs .1 to .6 should be provided for inspection of the upper parts of vertical structure on transverse and longitudinal bulkheads.

47 If there is no structure in the tank, section 1.1 of table 1 should not be applied.

48 The vertical distance below the overhead structure should be measured from the underside of the main deck plating to the top of the platform of the means of access at a given location.

49 The height of the tank should be measured at each tank. For a tank the height of which varies at different bays, item 1.1 should be applied to such bays of a tank that have height 6 m and over.

Table 1 – Means of access, paragraph 1.1.2

50 There is need to provide continuous longitudinal permanent means of access when the deck longitudinals and deck transverses are fitted on deck but supporting brackets are fitted under the deck.

Table 1 – Means of access, paragraph 1.1.3

51 Means of access to tanks may be used for access to the permanent means of access for inspection.

Table 1 – Means of access, paragraph 1.1.4

52 The permanent fittings required to serve alternative means of access, such as wire lift platform, that are to be used by crew and surveyors for inspection should provide at least an equal level of safety as the permanent means of access stated by the same paragraph. These means of access should be carried on board the unit and be readily available for use without the filling of water in the tank.

53 Therefore, rafting should not be acceptable under this provision.

54 Alternative means of access should be part of the Access Manual which is to be approved on behalf of the flag State.

Table 1 – Means of access paragraph 2.1

55 Paragraph 2.1.1 represents requirements for access to underdeck structures, while paragraph 2.1.2 is a requirement for access for survey and inspection of vertical structures on longitudinal bulkheads (transverse webs).

Table 1 – Means of access, paragraph 2.1.1

56 For a tank, the vertical distance between horizontal upper stringer and deck head of which varies at different sections, item 2.1.1 should be applied to such sections that fall under the criteria.

57 The continuous permanent means of access may be a wide longitudinal, which provides access to critical details on the opposite side by means of platforms as necessary on web frames. In case the vertical opening of the web frame is located in way of the open part between the wide longitudinal and the longitudinal on the opposite side, platforms should be provided on both sides of the web frames to allow safe passage through the web frame.

58 Where two access hatches are required by the 2009 MODU Code, paragraph 2.2.2.2, access ladders at each end of the tank should lead to the deck.

Table 1 – Means of access, paragraph 2.1.2

59 The continuous permanent means of access may be a wide longitudinal, which provides access to critical details on the opposite side by means of platforms as necessary on web frames. In case the vertical opening of the web is located in way of the open part between the wide longitudinal and the longitudinal on the opposite side, platforms should be provided on both sides of the web to allow safe passage through the web.

60 A "reasonable deviation", as noted in MODU TP, paragraph 1.4, of not more than 10% may be applied where the permanent means of access is integral with the structure itself.

Table 1 – Means of access, paragraph 2.2

61 Permanent means of access between the longitudinal continuous permanent means of access and the bottom of the space should be provided.

62 The height of a bilge hopper tank located outside of the parallel part of the unit should be taken as the maximum of the clear vertical distance measured from the bottom plating to the hopper plating of the tank.

63 The foremost and aftmost bilge hopper ballast tanks with raised bottom, of which the height is 6 m and over, a combination of transverse and vertical MA for access to the upper knuckle point for each transverse web should be accepted in place of the longitudinal permanent means of access.

Table 1 – Means of access, paragraph 3.1

64 Means of access should be provided to the crossdeck structures of the foremost and aftermost part of the each hold.

65 Interconnected means of access under the cross deck for access to three locations at both sides and in the vicinity of the centreline should be acceptable as the three means of access.

66 Permanent means of access fitted at three separate locations accessible independently, one at each side and one in the vicinity of the centreline, should be acceptable.

67 Special attention should be paid to the structural strength where any access opening is provided in the main deck or cross deck.

Table 1 – Means of access, paragraph 3.3

68 Particular attention should be paid to preserve the structural strength in way of access opening provided in the main deck or cross deck.

Table 1 – Means of access, paragraph 3.4

69 The movable means of access to the underdeck structure of cross deck need not necessarily be carried on board the unit. It is sufficient if it is made available when needed.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1545
6 June 2016

UNIFIED INTERPRETATIONS RELATING TO THE APPLICATION OF SOLAS REGULATION II-1/3-6, AS AMENDED, AND THE REVISED TECHNICAL PROVISIONS FOR MEANS OF ACCESS FOR INSPECTIONS (RESOLUTION MSC.158(78))

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), approved the Unified interpretations relating to the application of SOLAS regulation II-1/3-6, as amended, and the *Revised technical provisions for means of access for inspections* (resolution MSC.158(78)), prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex, with a view to ensuring a uniform approach towards the application of the provisions of SOLAS regulation II-1/3-6.

2 Member States are invited to use the annexed unified interpretations when applying the relevant provisions of SOLAS regulation II-1/3-6, as amended, and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS RELATING TO THE APPLICATION OF SOLAS REGULATION II-1/3-6, AS AMENDED, AND THE REVISED TECHNICAL PROVISIONS FOR MEANS OF ACCESS FOR INSPECTIONS (RESOLUTION MSC.158(78))

Revised technical provisions for means of access for inspections (resolution MSC.158(78)), paragraphs 3.13.2 and 3.13.6

Adjacent sections of vertical ladder need to be installed so that the following provisions are complied with:

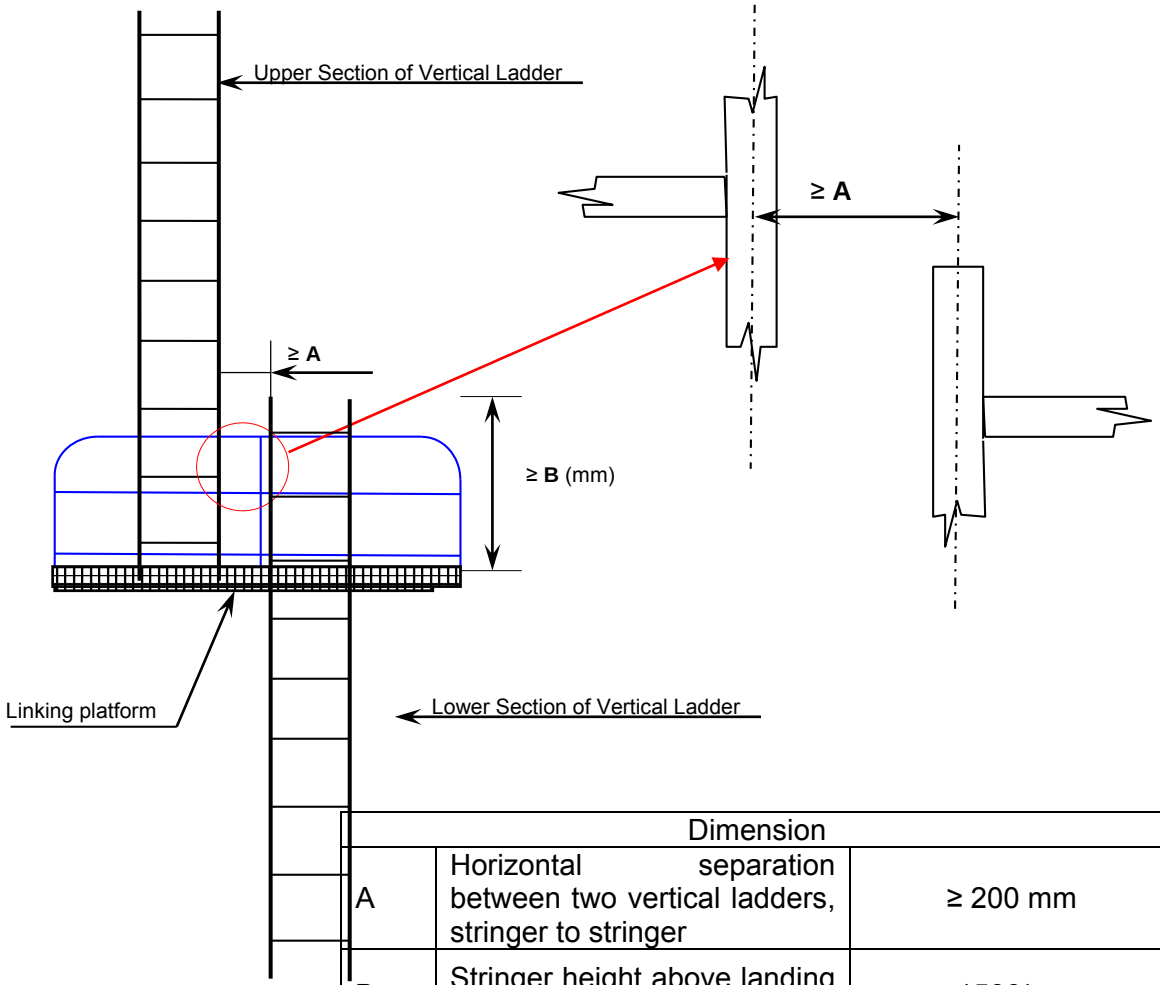
- the minimum "lateral offset" between two adjacent sections of vertical ladder, is the distance between the sections, upper and lower, so that the adjacent stringers are spaced of at least 200 mm, measured from half thickness of each stringer.

- adjacent sections of vertical ladder should be installed so that the upper end of the lower section is vertically overlapped, in respect to the lower end of the upper section, to a height of 1500 mm in order to permit a safe transfer between ladders.

- no section of the access ladder should be terminated directly or partly above an access opening.

Figure "A"

Vertical Ladder – Ladder through the linking platform



	Dimension	
A	Horizontal separation between two vertical ladders, stringer to stringer	≥ 200 mm
B	Stringer height above landing or intermediate platform	≥ 1500* mm
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*	The minimum height of the handrail of resting platform is 1000 mm (Technical Provision, resolution MSC.158(78), paragraph 3.3)	

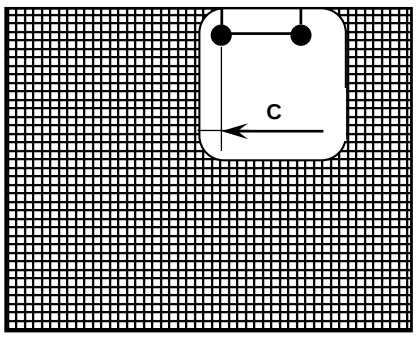
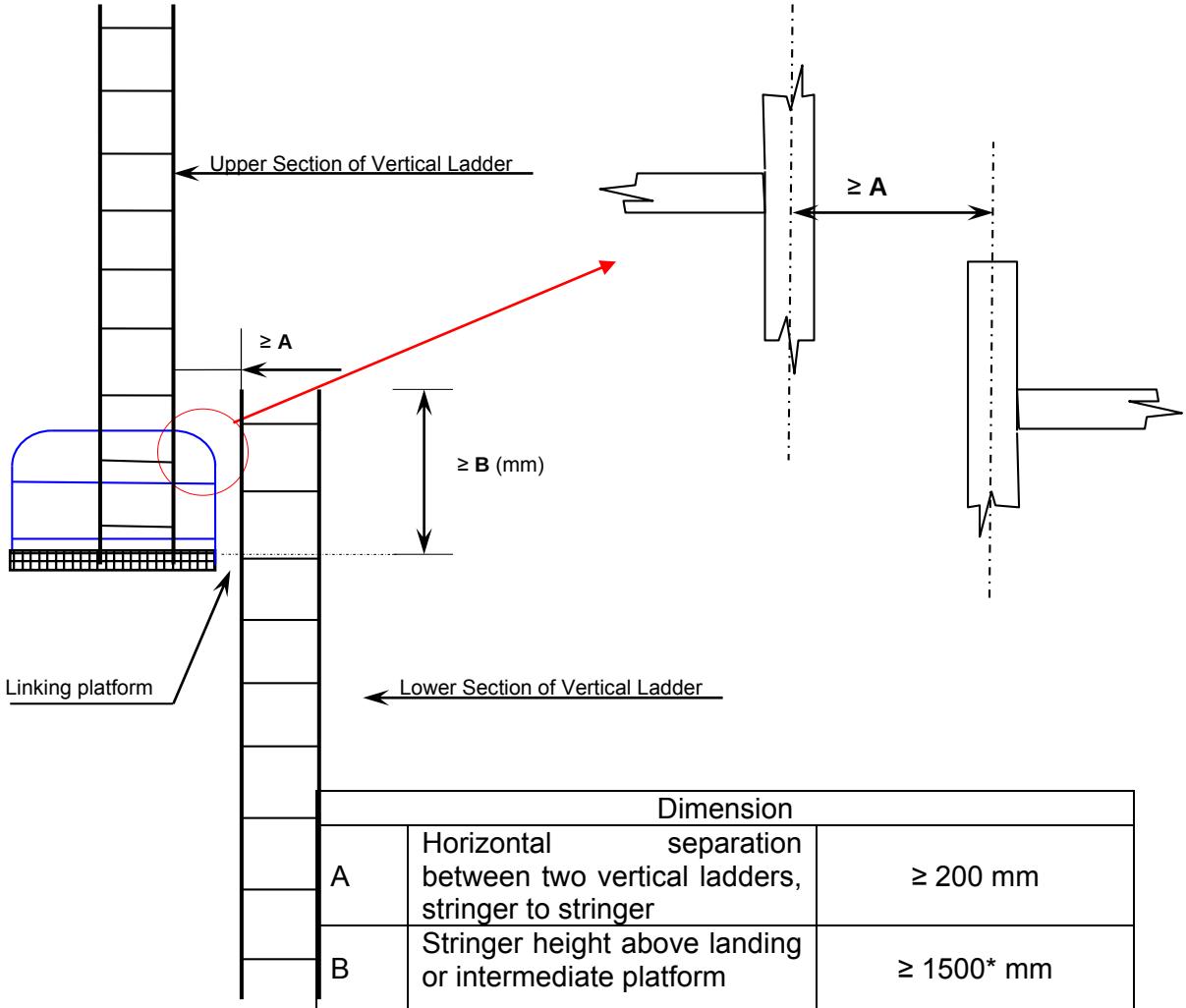


Figure "B"

Vertical Ladder – Side mount



Dimension		
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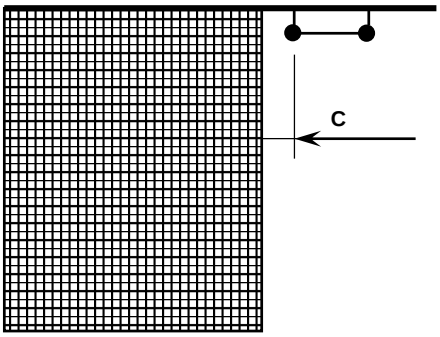

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1546
6 June 2016

UNIFIED INTERPRETATION OF THE 1969 TM CONVENTION

1 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), approved the Unified interpretation of the 1969 TM Convention, relating to heat exchangers (coolers) fitted on the hull, prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex, with a view to ensuring a uniform approach towards the application of the relevant provisions of the 1969 TM Convention.

2 Member States are invited to use the annexed unified interpretation when applying the relevant provisions of the 1969 TM Convention and to bring it to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION OF THE 1969 TM CONVENTION

Regulation 2(4) – Enclosed spaces
Regulation 6(2) – Calculation of volumes

Heat exchangers (coolers) fitted in hull recesses or outside of the hull should be treated as machinery under interpretation R.2(4)-9 set out in the annex to the *Unified interpretations relating to the International Convention on Tonnage Measurement of Ships, 1969* (TM.5/Circ.6) and not as appendages.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1550
25 November 2016

UNIFIED INTERPRETATIONS RELATING TO THE APPLICATION OF SOLAS REGULATIONS II-2/10.2.1.3, II-2/10.2.2.4.1.2, II-2/10.7.3.2.3 AND II-2/19.3.1, AS AMENDED, AND PARAGRAPH 2.2.1.1 OF CHAPTER 12 OF THE FSS CODE

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), approved the Unified interpretations relating to the application of SOLAS regulations II-2/10.2.1.3, II-2/10.2.2.4.1.2, II-2/10.7.3.2.3 and II-2/19.3.1, as amended, and paragraph 2.2.1.1 of chapter 12 of the FSS Code, as set out in the annex, in order to facilitate global and consistent implementation of the requirements related to fire pumps in ships designed to carry five or more tiers of containers on or above the weather deck.

2 Member States are invited to use the annexed Unified interpretations when applying the relevant provisions of SOLAS regulations II-2/10.2.1.3, II-2/10.2.2.4.1.2, II-2/10.7.3.2.3 and II-2/19.3.1, as amended, and paragraph 2.2.1.1 of chapter 12 of the FSS Code, and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS RELATING TO THE APPLICATION OF SOLAS REGULATIONS II-2/10.2.1.3, II-2/10.2.2.4.1.2, II-2/10.7.3.2.3 AND II-2/19.3.1, AS AMENDED, AND PARAGRAPH 2.2.1.1 OF CHAPTER 12 OF THE FSS CODE

SOLAS regulation II-2/10 – Fire fighting
SOLAS regulation II-2/19 – Carriage of dangerous goods
FSS Code, chapter 12 – Fixed emergency fire pumps

1 On board cargo ships designed to carry five or more tiers of containers on or above the weather deck:

.1 in cases where the mobile water monitors are supplied by separate pumps and piping system, the total capacity of the main fire pumps need not exceed 180 m^3/h and the diameter of the fire main and water service pipes (hereinafter referred to "the pipework diameter") need only be sufficient for the discharge of 140 m^3/h;

.2 in cases where the mobile water monitors are supplied by the main fire pumps; the total capacity of required main fire pumps and the pipework diameter should be sufficient for simultaneously supplying both the required number of fire hoses and mobile water monitors. However, the total capacity should not be less than the following subparagraphs .1 or .2, whichever is smaller:

.1 four thirds of the quantity required under regulation II-1/35-1 to be dealt with by each of the independent bilge pumps in a passenger ship of the same dimension when employed in bilge pumping; or

.2 180 m^3/h.

.3 in cases where the mobile water monitors and the "water spray system" (fixed arrangement of spraying nozzles or flooding the cargo space with water) required by SOLAS regulation II-2/19.3.1.3 are supplied by the main fire pumps, the total capacity of the main fire pumps and the pipework diameter need only be sufficient to supply whichever of the following is the greater:

.1 the mobile water monitors and the four nozzles required by SOLAS regulation II-2/19.3.1.2; or

.2 the four nozzles required by SOLAS regulation II-2/19.3.1.2 and the water spray system required by SOLAS regulation II-2/19.3.1.3.

The total capacity, however, should not be less than the capacity required in paragraph 1.2.1 or 1.2.2, whichever is smaller.

2 On board cargo ships designed to carry five or more tiers of containers on or above the weather deck, the total capacity of the emergency fire pump need not exceed 72 m^3/h.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1554
25 November 2016

UNIFIED INTERPRETATION OF CHAPTER 9 OF THE FSS CODE

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), with a view to providing more specific guidance on sizing the emergency power source for the fire detection and alarm system, approved a unified interpretation of chapter 9 of the FSS Code, prepared by the Sub-Committee on Ship Systems and Equipment at its third session (14 to 18 March 2016), as set out in the annex.

2 Member States are invited to use the annexed unified interpretation as guidance when applying paragraph 2.2.4 of chapter 9 of the FSS Code and to bring the unified interpretation to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION OF CHAPTER 9 OF THE FSS CODE

CHAPTER 9 OF THE FSS CODE

Fixed fire detection and fire alarm systems

The "30 minutes" in paragraph 2.2.4 of chapter 9 of the FSS Code means the last 30 minutes of the periods required under SOLAS regulations II-1/42 and II-1/43 (18 hours for cargo ships and 36 hours for passenger ships).

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1555
25 November 2016

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-2

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), with a view to providing more specific guidance on the definition of vehicle carrier; suitable connections for the supply of inert gas to double-hull spaces; ventilation provided by fan coil units and internal circulation fans; the fire integrity of the bulkheads between the wheelhouse and a toilet inside the wheelhouse; the suitable number of spare air cylinders to be provided in connection with drills; and sources of ignition on board ships carrying dangerous goods, approved unified interpretations of SOLAS chapter II-2, prepared by the Sub-Committee on Ship Systems and Equipment at its third session (14 to 18 March 2016), as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying SOLAS regulations II-2/3 to II-2/5, II-2/7, II-2/9, II-2/15, II-2/19 and II-2/20-1, and to bring the unified interpretations to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-2

SOLAS REGULATIONS II-2/3.56 AND II-2/20-1, AS AMENDED BY RESOLUTION MSC.365(93)

Definition of vehicle carrier

The definition of vehicle carrier in SOLAS regulation II-2/3.56 is intended for pure car and truck carriers, and should exclude other types of ro-ro cargo ships or container/ro-ro ships, even when carrying empty cars and trucks as cargo.

SOLAS REGULATION II-2/4.5.5.1, AS AMENDED BY RESOLUTION MSC.365(93)

Inert gas supply to double-hull spaces

Double-hull spaces required to be fitted with suitable connections for the supply of inert gas as per SOLAS regulation II-2/4.5.5.1.4.1 are all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks, except cargo pump-rooms and ballast pump-rooms.

SOLAS REGULATIONS II-2/5.2.1.2, II-2/5.2.1.3 AND II-2/7.9.3

Ventilation by fan coil units and internal circulation fans

The fan in a heat, ventilation and air conditioning (HVAC) temperature control unit, or a circulation fan inside a cabinet/switchboard, is not considered to be a ventilation fan as addressed in SOLAS regulations II-2/5.2.1.2, II-2/5.2.1.3 and II-2/7.9.3, if it is not capable of supplying outside air to the space when the power ventilation is shut down (e.g. small units intended for recirculation of air within a cabin). Therefore, such fans need not be capable of being stopped from an easily accessible position (or a safe position) outside the space being served when applying SOLAS regulations II-2/5.2.1.2 or II-2/5.2.1.3, and need not be capable of being controlled from a continuously manned central control station for passenger ships carrying more than 36 passengers when applying SOLAS regulation II-2/7.9.3.

SOLAS REGULATION II-2/9

Bulkhead between the wheelhouse and toilet inside the wheelhouse

A bulkhead separating the wheelhouse and the toilet, installed completely within the wheelhouse, requires no fire rating.

SOLAS REGULATION II-2/15.2.2.6, AS INTRODUCED BY RESOLUTION MSC.338(91)

Suitable number of spare air cylinders to be provided in connection with drills

1 "A suitable number of spare cylinders" to be carried on board to replace those used for fire drills should be at least one "set of cylinders" for each mandatory breathing apparatus, unless additional spare cylinders are required by the shipboard safety management system (SMS).

2 "Set of cylinders" means the number of cylinders which are required to operate the breathing apparatus.

3 No additional cylinders are required for fire drills for breathing apparatus sets required by SOLAS regulation II-2/19, IMSBC Code, the IBC Code or IGC Code.

SOLAS REGULATION II-2/19.3.2

Certified safe type electrical equipment for ships carrying dangerous goods

1 Reference should be made to IEC 60092-506:2003 standard, Electrical installations in ships – Part 506: Special features – Ships carrying specific dangerous goods and materials hazardous only in bulk.

2 For pipes having open ends (e.g. ventilation and bilge pipes) in a hazardous area, the pipe itself should be classified as a hazardous area (see IEC 60092-506:2003 table B1, item B).

3 When carrying flammable liquids having flashpoints less than 23°C as Class 3, Class 6.1 or Class 8 in cargo spaces, the bilge pipes with flanges, valves, pumps, etc. constitute a source of release and the enclosing spaces (e.g. pipe tunnels, bilge pump-rooms) should be classified as an extended hazardous area (comparable with zone 2) unless these spaces are continuously mechanically ventilated with a capacity for at least six air changes per hour. Except where the space is protected with redundant mechanical ventilation capable of starting automatically, equipment not certified for zone 2 should be automatically disconnected following loss of ventilation while essential systems such as bilge and ballast systems should be certified for zone 2. Where redundant mechanical ventilation is employed, equipment and essential systems not certified for zone 2 should be interlocked so as to prevent inadvertent operation if the ventilation is not operational. Audible and visible alarms should be provided at a manned station if failure occurs.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1556
25 November 2016

UNIFIED INTERPRETATION OF CHAPTER 8 OF THE FSS CODE AND THE REVISED GUIDELINES FOR APPROVAL OF SPRINKLER SYSTEMS EQUIVALENT TO THAT REFERRED TO IN SOLAS REGULATION II-2/12 (RESOLUTION A.800(19)), AS AMENDED BY RESOLUTION MSC.265(84)

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), with a view to providing more specific guidance on sizing of pumps and pressure tank for automatic sprinkler systems, approved a unified interpretation of chapter 8 of the FSS Code and the *Revised guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12* (resolution A.800(19)), as amended by resolution MSC.265(84), prepared by the Sub-Committee on Ship Systems and Equipment at its third session (14 to 18 March 2016), as set out in the annex.

2 Member States are invited to use the annexed unified interpretation as guidance when applying paragraphs 2.3.2.1, 2.3.3.2 and 2.5.2.3 of chapter 8 of the FSS Code and paragraphs 3.3 and 3.22 in the aforementioned Revised guidelines, as amended by resolution MSC.265(84), in sizing of pumps and pressure tank for automatic sprinkler systems, and to bring the unified interpretation to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION OF CHAPTER 8 OF THE FSS CODE AND THE REVISED GUIDELINES FOR APPROVAL OF SPRINKLER SYSTEMS EQUIVALENT TO THAT REFERRED TO IN SOLAS REGULATION II-2/12 (RESOLUTION A.800(19)), AS AMENDED BY RESOLUTION MSC.265(84)

CHAPTER 8 OF THE FSS CODE

Automatic sprinkler, fire detection and fire alarm systems

For sizing the sprinkler pumps and pressure tank, the calculation method should be as follows:

.1 for sprinkler systems in accordance with chapter 8 of the FSS Code, the pump capacity and pressure tank volume should be calculated by multiplying the 5 l/m^2/min application rate times the area of 280 m^2;

.2 for equivalent sprinkler systems, the pump capacity and pressure tank volume, or other means meeting the functional requirements stipulated in paragraph 2.3.2.1 of chapter 8 of the FSS Code should be calculated by multiplying the highest application rate of the most hydraulically demanding area at the minimum design pressure, as determined by full scale fire testing according to the *Revised guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12* (resolution A.800(19)), as amended by resolution MSC.265(84), times the area of 280 m^2. In cases where multiple types of spaces are located within the hydraulically most demanding 280 m^2 area, the application rate of each respective area should be applied;

.3 for application to a ship with the largest area separated from adjacent spaces by A-class divisions of less than 280 m^2, the area required when sizing pumps and alternate supply components is the largest given area; and

.4 for application to a ship with a total protected area of less than 280 m^2 the Administration may specify the appropriate area for sizing of pumps and alternate supply components.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1558
28 November 2016

UNIFIED INTERPRETATIONS OF THE IGF CODE

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), with a view to providing more specific guidance for the application of the relevant requirements of the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code), approved unified interpretations of the IGF Code prepared by the Sub-Committee on Carriage of Cargoes and Containers, at its third session, as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying relevant provisions of the IGF Code and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF THE IGF CODE

1 Tank connection space for tanks on open deck and tank connection space equipment (paragraph 2.2.15.3)

1.1 A tank connection space may be required also for tanks on open deck. This may apply for ships where restriction of hazardous areas is safety critical. A tank connection space may also be necessary in order to provide environmental protection for essential safety equipment related to the gas fuel system like tank valves, safety valves and instrumentation.

1.2 A tank connection space may also contain equipment such as vaporizers or heat exchangers. Such equipment is considered to only contain potential sources of release, but not sources of ignition.

2 Fuel preparation room (paragraph 2.2.17)

A tank connection space which has equipment such as vaporizers or heat exchangers installed inside is not regarded as a fuel preparation room. Such equipment is considered to only contain potential sources of release, but not sources of ignition.

3 Appropriate location of premixed engines using fuel gas mixed with air before the turbocharger (paragraph 5.4.1)

Premixed engines using fuel gas mixed with air before the turbocharger should be located in ESD-protected machinery spaces.

4 Protection against cryogenic leakage and control of hazardous zones in fuel preparation rooms on open deck (paragraphs 5.8 and 6.2.1.1)

4.1 Fuel preparation rooms, regardless of location, should be arranged to safely contain cryogenic leakages.

4.2 The material of the boundaries of the fuel preparation room should have a design temperature corresponding with the lowest temperature it can be subjected to in a probable maximum leakage scenario unless the boundaries of the space, i.e. bulkheads and decks, are provided with suitable thermal protection.

4.3 The fuel preparation room should be arranged to prevent surrounding hull structure from being exposed to unacceptable cooling, in case of leakage of cryogenic liquids.

4.4 The fuel preparation room should be designed to withstand the maximum pressure build up during such a leakage. Alternatively, pressure relief venting to a safe location (mast) can be provided.

5 External surface area of the tank for determining sizing of pressure relief valve (paragraph 6.7.3.1.1.2 and figure 6.7.1)

For prismatic tanks

5.1 L_{min}, for non-tapered tanks, is the smaller of the horizontal dimensions of the flat bottom of the tank. For tapered tanks, as would be used for the forward tank, L_{min} is the smaller of the length and the average width.

5.2 For prismatic tanks whose distance between the flat bottom of the tank and bottom of the hold space is equal to or less than $L_{min}/10$:

A = external surface area minus flat bottom surface area.

5.3 For prismatic tanks whose distance between the flat bottom of the tank and bottom of the hold space is greater than $L_{min}/10$:

A = external surface area.

6 Control and maintenance of pressure and temperature of liquefied gas fuel tanks after the activation of the safety system (paragraphs 6.9.1.1 and 6.9.1.2)

Liquefied gas fuel tanks' pressure and temperature should be controlled and maintained within the design range at all times including after activation of the safety system required in 15.2.2 for a period of minimum 15 days. The activation of the safety system alone is not deemed as an emergency situation.

7 Special consideration within the risk assessment of closed or semi-enclosed bunkering stations (paragraph 8.3.1.1)

The special consideration should as a minimum include, but not be restricted to, the following design features:

- segregation towards other areas on the ship
- hazardous area plans for the ship
- requirements for forced ventilation
- requirements for leakage detection (e.g. gas detection and low temperature detection)
- safety actions related to leakage detection (e.g. gas detection and low temperature detection)
- access to bunkering station from non-hazardous areas through airlocks
- monitoring of bunkering station by direct line of sight or by CCTV.

8 Ventilation of machinery spaces (paragraph 13.5.1)

Spaces enclosed in the boundaries of machinery spaces (such as purifier's room, engine-room workshops and stores) are considered an integral part of machinery spaces containing gas-fuelled consumers and, therefore, their ventilation system does not need to be independent of the one of machinery spaces.

9 Ventilation of double piping and gas valve unit spaces in gas safe engine-rooms (paragraph 13.8.2)

Double piping and gas valve unit spaces in gas safe engine-rooms are considered an integral part of the fuel supply systems and, therefore, their ventilation system does not need to be independent of other fuel supply ventilation systems provided such fuel supply systems contain only gaseous fuel.

10 Ventilation inlet for double wall piping or duct (paragraph 13.8.3)

The ventilation inlet for the double wall piping or duct should always be located in a non-hazardous area in open air away from ignition sources.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1559
28 November 2016

UNIFIED INTERPRETATIONS OF THE IGC CODE (AS AMENDED BY RESOLUTION MSC.370(93))

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), with a view to providing more specific guidance for the application of the relevant requirements of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), approved unified interpretations of the IGC Code (as amended by resolution MSC.370(93)) prepared by the Sub-Committee on Carriage of Cargoes and Containers, at its third session, as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying relevant provisions of the IGC Code (as amended by resolution MSC.370(93)) and to bring them to the attention of all parties concerned.

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ANNEX

**UNIFIED INTERPRETATIONS OF THE IGC CODE
(AS AMENDED BY RESOLUTION MSC.370(93))**

1 Closing devices for air intakes (paragraph 3.2.6)

1.1 The closing devices that need not be operable from within the single spaces may be located in centralized positions.

1.2 Engine-room casings, cargo machinery spaces, electric motor rooms and steering gear compartments are generally considered as spaces not covered by paragraph 3.2.6 and, therefore, the requirement for closing devices need not be applied to these spaces.

1.3 The closing devices should give a reasonable degree of gas tightness. Ordinary steel fire-flaps without gaskets/seals should not be considered satisfactory.

1.4 Regardless of this interpretation, the closing devices shall be operable from outside of the protected space (SOLAS regulation II-2/5.2.1.1).

2 Application of fire safety requirements in SOLAS chapter II-2 to cargo machinery spaces and turret compartments (paragraphs 3.3.1 and 11.1.1.1)

The sentence "for the purpose of prevention of potential explosion according to SOLAS regulation ll-2/4.5.10" in paragraph 3.3.1 does not require application of the aforementioned SOLAS regulation. SOLAS regulation II-2/4.5.10 does not apply in accordance with paragraph 11.1.1.1.

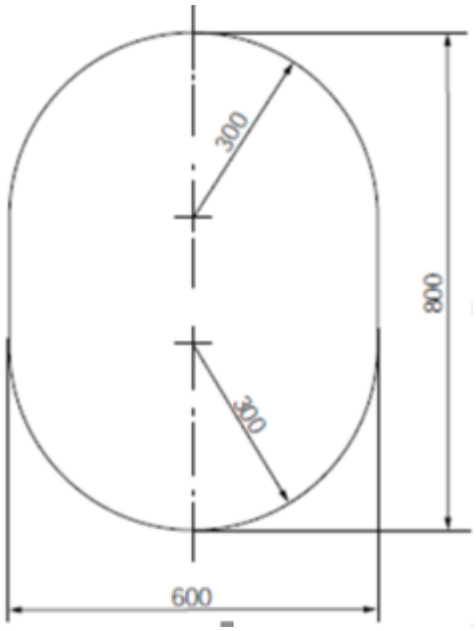
3 Cargo tank clearances (paragraphs 3.5.3.1.2 and 3.5.3.1.3)

Access through horizontal openings, hatches or manholes

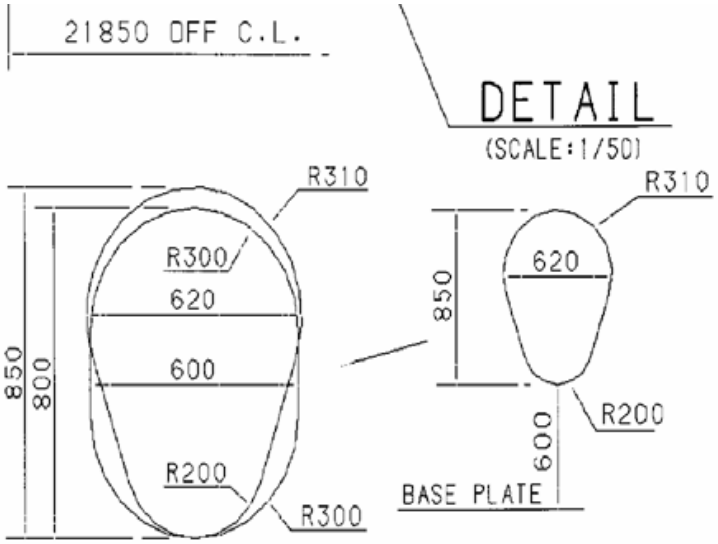
3.1 The minimum clear opening of 600 mm x 600 mm may have corner radii up to 100 mm maximum. In such a case where as a consequence of structural analysis of a given design the stress is to be reduced around the opening, it is considered appropriate to take measures to reduce the stress such as making the opening larger with increased radii, e.g. 600 mm x 800 mm with 300 mm radii, in which a clear opening of 600 mm x 600 mm with corner radii up to 100 mm maximum fits.

Access through vertical openings or manholes providing passage through the length and breadth of the space

3.2 The minimum clear opening of not less than 600 mm x 800 mm may also include an opening with corner radii of 300 mm. An opening of 600 mm in height x 800 mm in width may be accepted as access openings in vertical structures where it is not desirable to make large openings in the structural strength aspects, i.e. girders and floors in double bottom tanks.



3.3 Subject to verification of easy evacuation of an injured person on a stretcher the vertical opening 850 mm x 620 mm with upper half wider than 600 mm, while the lower half may be less than 600 mm with the overall height not less than 850 mm is considered an acceptable alternative to the traditional opening of 600 mm x 800 mm with corner radii of 300 mm.



3.4 If a vertical opening is at a height of more than 600 mm steps and handgrips should be provided. In such arrangements it should be demonstrated that an injured person can be easily evacuated.

4 Pump Vents in Machinery Spaces (paragraph 3.7.5)*

The requirement of "Pump vents shall not be open to machinery spaces" applies only to pumps in the machinery spaces serving dry duct keels through which ballast piping passes.

5 Safe means of emergency isolation of pressure relief valves (paragraph 8.2.9)

The "safe means of emergency isolation", as required by paragraph 8.2.9, should be provided so that a PRV can be isolated on a temporary basis to reseat or repair the valve before putting the PRV back into service. Such means of emergency isolation should be installed in a manner that does not allow their inadvertent operation.

6 External surface area of the tank for determining sizing of pressure relief valve (paragraph 8.4.1.2 and figure 8.1)

For prismatic tanks

6.1 L_{min}, for non-tapered tanks, is the smaller of the horizontal dimensions of the flat bottom of the tank. For tapered tanks, as would be used for the forward tank, L_{min} is the smaller of the length and the average width.

6.2 For prismatic tanks whose distance between the flat bottom of the tank and bottom of the hold space is equal to or less than $L_{min}/10$:

A = external surface area minus flat bottom surface area.

6.3 For prismatic tanks whose distance between the flat bottom of the tank and bottom of the hold space is greater than $L_{min}/10$:

A = external surface area.

7 Back-flushing of the water-spray system (paragraph 11.3.6)

The last sentence of paragraph 11.3.6, i.e. "In addition, means shall be provided to back-flush the system with fresh water", should be understood to mean that arrangements should be provided so that the water-spray system as a whole (i.e. piping, nozzles and in-line filters) can be flushed or back-flushed, as appropriate, with fresh water to prevent the blockage of pipes, nozzles and filters.

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* The interpretation also applies to the requirement of "Pump vents should not be open to machinery spaces" in paragraph 3.7.4 of the IGC Code, as amended by resolution MSC.103(73).

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1561
28 November 2016

UNIFIED INTERPRETATION OF SOLAS REGULATION XI-1/7

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), with a view to providing more specific guidance on the provision of suitable means for the calibration of portable atmosphere testing instruments, approved a unified interpretation of SOLAS regulation XI-1/7, as set out in the annex.

2 Member States are invited to use the annexed unified interpretation as guidance when applying SOLAS regulation XI-1/7 and to bring it to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION OF SOLAS REGULATION XI-1/7

Provision of suitable means for the calibration of portable atmosphere testing instruments

Compliance with the provision "suitable means shall be provided for the calibration of all such instruments" in SOLAS regulation XI-1/7, as adopted by resolution MSC.380(94), may be achieved by portable atmosphere testing instruments being calibrated on board or ashore in accordance with the manufacturer's instructions.

For the avoidance of any doubt, the above clarification refers to the calibration of portable atmosphere testing instruments, as required by SOLAS regulation XI-1/7, and not to any pre-operational accuracy tests as recommended by the manufacturer.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1562
12 December 2016

UNIFIED INTERPRETATIONS OF SOLAS REGULATION XIV/2.2 AND PARAGRAPHS 1.3.2 AND 1.3.6, PART I-A OF THE POLAR CODE

1 The Maritime Safety Committee, at its ninety-seventh session (21 to 25 November 2016), with a view to providing more specific guidance on the initial and maintenance surveys as required in the provisions of SOLAS chapter XIV and the Polar Code, approved the Unified interpretations of SOLAS regulation XIV/2.2 and paragraphs 1.3.2 and 1.3.6, part I-A of the Polar Code, as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying SOLAS regulation XIV/2.2 and paragraphs 1.3.2 and 1.3.6, part I-A of the Polar Code and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS REGULATION XIV/2.2 AND PARAGRAPHS 1.3.2 AND 1.3.6, PART I-A OF THE POLAR CODE

The implementation of initial and maintenance surveys as required in SOLAS regulation XIV/2.2, as adopted by resolution MSC.386(94), and paragraphs 1.3.2 and 1.3.6, part I-A of the Polar Code, as adopted by resolution MSC.385(94), should be interpreted as indicated in the following table:

INITIAL AND MAINTENANCE SURVEYS PERTAINING TO SOLAS CHAPTER XIV AND THE POLAR CODE

1. Ships under Harmonized System of Survey and Certification (HSSC) Scheme			
Type of ship	**Initial Survey for issuance of the Polar Ship Certificate**	**Surveys for the maintenance of the Polar Ship Certificate**	**Surveys for renewal of the Polar Ship certificate**
Passenger Ship	First passenger ship's safety renewal survey after 1 January 2018.	Not applicable.	Every year.
Cargo ship	First Safety Construction intermediate survey or renewal survey, as required by SOLAS regulation I/10, whichever occurs first after 1 January 2018.	a) Aligned with maintenance survey (annual or intermediate) related to the Cargo Ship Safety Certificate. The Polar Ship Certificate should be endorsed upon satisfactory results of the maintenance survey related to the Polar Code and Cargo Ship Safety; or b) Aligned with maintenance survey (annual or intermediate) related to the Safety Construction Certificate. The Polar Ship Certificate should be endorsed upon satisfactory results of the maintenance survey (annual or intermediate) related to the Polar Code and Safety Construction, provided that valid Safety Equipment and Safety Radio Certificates are held by a ship.	a) Aligned with renewal survey related to the Cargo Ship Safety Certificate. The Polar Ship Certificate should be reissued upon satisfactory results of the renewal survey related to the Polar Code and Cargo Ship Safety; or b) Aligned with renewal Survey of Safety Construction. The Polar Ship Certificate should be reissued upon satisfactory results of the renewal survey related to the Polar Code and Safety Construction, provided that Safety Equipment and Safety Radio Certificates are held by a ship.

2. Ships not under HSSC Scheme			
Type of ship	**Initial Survey for issuance of the Polar Ship Certificate**	**Surveys for the maintenance of the Polar Ship Certificate**	**Surveys for renewal of the Polar Ship Certificate**
Passenger Ship	First passenger ship's safety renewal survey after 1 January 2018.	Not applicable.	Every year.
Cargo Ship	First Safety Construction renewal survey as required by SOLAS regulation I/10, which occurs after 1 January 2018 but, in any case, not later than 31 March 2021.	Aligned with maintenance survey (annual or intermediate) related to the Safety Construction Certificate. The Polar Ship Certificate should be endorsed upon satisfactory results of maintenance survey (annual or intermediate) related to the Polar Code and Safety Construction, provided that valid Safety Equipment and Safety Radio Certificates are held by a ship.	Aligned with renewal Survey of Safety Construction. The Polar Ship Certificate should be reissued upon satisfactory results of the renewal survey related to Polar Code and Safety Construction, provided that Safety Equipment and Safety Radio Certificates are held by a ship.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1571
9 June 2017

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-1

1 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), with a view to providing more specific guidance on special requirements for vehicle ferries, ro-ro ships and other ships of similar type, and on the drainage of enclosed spaces situated on the bulkhead deck, approved the unified interpretations of SOLAS chapter II-1, prepared by the Sub-Committee on Ship Design and Construction, at its fourth session (13 to 17 February 2017), as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying SOLAS regulations II-1/17-1, II-1/20-2 and II-1/35-1, and to bring the unified interpretations to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-1

Regulations II-1/17-1.1.1 and II-1/20-2

1 Stern, bow and side doors of large dimensions, when manual devices would not be readily accessible, should be normally secured by means of power systems.

2 Alternative means of securing should also be provided for emergency use in case of failure of the power systems.

3 In ro-ro passenger ships constructed before 1 July 1997, all access doors or hatchways to spaces below the ro-ro deck, which may be used at sea, should have sills or coamings not less than 380 mm in height above the ro-ro deck, and should be provided with doors or covers considered weathertight in relation to their position; refer to SOLAS regulation II-1/20-2.

4 For ro-ro passenger ships constructed on or after 1 July 1997 but before 1 January 2009, refer to SOLAS regulation II-1/20-2.

5 The ro-ro deck, referred to in paragraph 3 above, is the deck above which the stern, bow or side doors are fitted, or the first deck above the load waterline.

Regulation II-1/35-1.2.6.1

The drainage of enclosed spaces situated on the bulkhead deck to suitable spaces below the bulkhead deck is also permitted provided such drainage is arranged in accordance with the provisions of regulation 22(2) of the Protocol of 1988 relating to the International Convention on Load Lines, 1966.

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INTERNATIONAL MARITIME ORGANIZATION

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

E

MSC.1/Circ.1572
9 June 2017

UNIFIED INTERPRETATIONS OF SOLAS CHAPTERS II-1 AND XII, OF THE TECHNICAL PROVISIONS FOR MEANS OF ACCESS FOR INSPECTIONS (RESOLUTION MSC.158(78)) AND OF THE PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS (RESOLUTION MSC.188(79))

1 The Maritime Safety Committee, at its ninety-second session (12 to 21 June 2013), approved unified interpretations of the provisions of SOLAS chapters II-1 and XII, of the *Technical provisions for means of access for inspections* (resolution MSC.158(78)) and of the *Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers* (resolution MSC.188(79)), as set out in the annex to MSC.1/Circ.1464/Rev.1 and in Corr.1, following the recommendations made by the Sub-Committee on Ship Design and Equipment at its fifty-seventh session, with a view to ensuring a uniform approach towards the application of the provisions of SOLAS chapters II-1 and XII.

2 The Maritime Safety Committee, at its ninety-fifth session (3 to 12 June 2015), with a view to providing more specific guidance on the application of SOLAS regulation II-1/3-6.3.1, as amended, and the revised *Technical provisions for means of access for inspections* (resolution MSC.158(78)), approved amendments to the *Unified interpretations of the provisions of SOLAS chapters II-1 and XII, of the Technical provisions for means of access for inspections (resolution MSC.158(78)) and of the Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers (resolution MSC.188(79))* (MSC.1/Circ.1464/Rev.1), as prepared by the Sub-Committee on Ship Design and Construction, at its second session (16 to 20 February 2015), as set out in the annex to MSC.1/Circ.1507.

3 The Maritime Safety Committee, at its ninety-sixth session (11 to 20 May 2016), approved the Unified interpretations relating to the application of SOLAS regulation II-1/3-6, as amended, and the *Revised technical provisions for means of access for inspections* (resolution MSC.158(78)), prepared by the Sub-Committee on Ship Design and Construction, at its third session (18 to 22 January 2016), as set out in the annex to MSC.1/Circ.1545, with a view to ensuring a uniform approach towards the application of the provisions of SOLAS regulation II-1/3-6. Having approved MSC.1/Circ.1545 and considered the need to consequentially amend MSC.1/Circ.1464/Rev.1 and its Corr.1, as amended by MSC.1/Circ.1507, the Committee requested the Secretariat to prepare a consolidated MSC circular containing the provisions of MSC.1/Circ.1464/Rev.1 and Corr.1, as amended by MSC.1/Circ.1507, and MSC.1/Circ.1545.

4 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), approved the Unified interpretations of the provisions of SOLAS chapters II-1 and XII, of the *Revised technical provisions for means of access for inspections* (resolution MSC.158(78)) and of the *Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers* (resolution MSC.188(79)), containing the provisions of MSC.1/Circ.1464/Rev.1 and Corr.1, as amended by MSC.1/Circ.1507, and MSC.1/Circ.1545, as set out in the annex.

5 Member States are invited to use the annexed interpretations when applying relevant provisions of SOLAS chapters II-1 and XII to ships constructed on or after 9 June 2017, and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS CHAPTERS II-1 AND XII, OF THE TECHNICAL PROVISIONS FOR MEANS OF ACCESS FOR INSPECTIONS (RESOLUTION MSC.158(78)) AND OF THE PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS (RESOLUTION MSC.188(79))

Table of contents

1 SOLAS REGULATION II-1/3-6 – ACCESS TO AND WITHIN SPACES IN, AND FORWARD OF, THE CARGO AREA OF OIL TANKERS AND BULK CARRIERS

1.1 SOLAS REGULATION II-1/3-6, SECTION 1

Interpretation

Oil tankers

This regulation is only applicable to oil tankers having integral tanks for carriage of oil in bulk, which is contained in the definition of oil in Annex I of MARPOL. Independent oil tanks can be excluded. Regulation II-1/3-6 should not normally be applied to FPSO or FSU unless the Administration decides otherwise.

Technical background

Means of access specified in the Technical provisions contained in resolution MSC.158(78) are not specific with respect to the application to integral cargo oil tanks or also to independent cargo oil tanks. Enhanced survey programme (ESP) requirements of oil tankers have been established assuming the target cargo oil tanks are integral tanks. The means of access regulated under regulation II-1/3-6 is for overall and close-up inspections as defined in regulation IX/1. Therefore it is assumed that the target cargo oil tanks are those of ESP, i.e. integral cargo tanks. Regulation II-1/3-6 is applicable to new, purpose-built FPSO or FSU if they are subject to the scope of the 2011 ESP Code (resolution A.1049(27), as amended). Considering that the principles of the *Technical provisions for means of access for inspections* (resolution MSC.158(78)) recognize that permanent means of access should be considered and provided for at the design stage so that, to the maximum extent possible, they can be made an integral part of the designed structural arrangement, regulation II-1/3-6 is not considered applicable to an FPSO/FSU that is converted from an existing tanker.

Reference

SOLAS regulation IX/1 and the 2011 ESP Code, as amended.

1.2 SOLAS REGULATION II-1/3-6, PARAGRAPH 2.1

Interpretation

Each space for which close-up inspection is not required such as fuel oil tanks and void spaces forward of cargo area, may be provided with a means of access necessary for overall survey intended to report on the overall conditions of the hull structure.

1.3 SOLAS REGULATION II-1/3-6, PARAGRAPH 2.2

Interpretation

Some possible alternative means of access are listed under paragraph 3.9 of the Technical provisions for means of access for inspections. Always subject to acceptance as equivalent by the Administration, alternative means such as an unmanned robot arm, ROVs and dirigibles with necessary equipment of the permanent means of access for overall and close-up inspections and thickness measurements of the deck head structure such as deck transverses and deck longitudinals of cargo oil tanks and ballast tanks, should be capable of:

.1 safe operation in ullage space in gas-free environment; and

.2 introduction into the place directly from a deck access.

Technical background

Innovative approaches, in particular the development of robots in place of elevated passageways, are encouraged and it is considered worthwhile to provide the functional requirement for the innovative approach.

1.4 SOLAS REGULATION II-1/3-6, PARAGRAPH 2.3

Interpretation

Inspection

The means of access arrangements, including portable equipment and attachments, should be periodically inspected by the crew or competent inspectors as and when it is going to be used to confirm that the means of access remain in serviceable condition.

Procedures

1 Any Company authorized person using the means of access should assume the role of inspector and check for obvious damage prior to using the access arrangements. Whilst using the means of access, the inspector should verify the condition of the sections used by close-up examination of those sections and note any deterioration in the provisions. Should any damage or deterioration be found, the effect of such deterioration should be assessed as to whether the damage or deterioration affects the safety for continued use of the access. Deterioration found that is considered to affect safe use should be determined as "substantial damage" and measures should be put in place to ensure that the affected section(s) are not to be further used prior to effective repair.

2 Statutory survey of any space that contains means of access should include verification of the continued effectiveness of the means of access in that space. Survey of the means of access should not be expected to exceed the scope and extent of the survey being undertaken. If the means of access is found deficient the scope of survey should be extended if this is considered appropriate.

3 Records of all inspections should be established based on the requirements detailed in the ship's Safety Management System. The records should be readily available to persons using the means of access and a copy attached to the Ship Structure Access Manual. The latest record for the portion of the means of access inspected should include as a minimum the date of the inspection, the name and title of the inspector, a confirmation signature, the sections of means of access inspected, verification of continued serviceable condition or details of any deterioration or substantial damage found. A file of permits issued should be maintained for verification.

Technical background

It is recognized that means of access may be subject to deterioration in the long term due to corrosive environment and external forces from ship motions and sloshing of liquid contained in the tank. Means of access therefore should be inspected at every opportunity of tank/space entry. The above interpretation should be contained in a section of the Ship Structure Access Manual.

1.5 SOLAS REGULATION II-1/3-6, PARAGRAPH 3.1

Interpretation

1 Access to a double-side skin space of bulk carriers may be either from a topside tank or double-bottom tank or from both.

2 The wording "not intended for the carriage of oil or hazardous cargoes" applies only to "similar compartments", i.e. safe access can be through a pump-room, deep cofferdam, pipe tunnel, cargo hold or double-hull space.

Technical background

Unless used for other purposes, the double-side skin space should be designed as a part of a large U-shaped ballast tank and such space should be accessed through the adjacent part of the tank, i.e. topside tank or double-bottom/bilge hopper tank. Access to the double-side skin space from the adjacent part rather than direct from the open deck is justified. Any such arrangement should provide a directly routed, logical and safe access that facilitates easy evacuation of the space.

1.6 SOLAS REGULATION II-1/3-6, PARAGRAPH 3.2

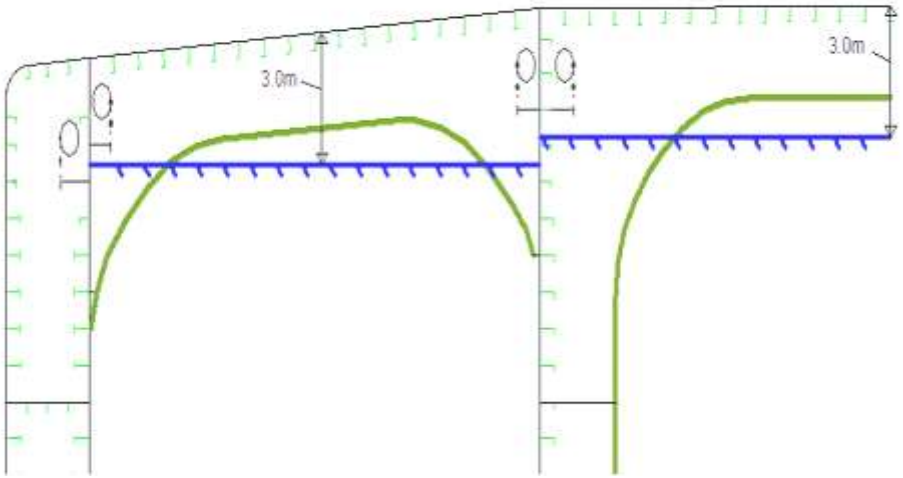
Interpretation

1 A cargo oil tank of less than 35 m length without a swash bulkhead requires only one access hatch.

2 Where rafting is indicated in the ship structures access manual as the means to gain ready access to the under-deck structure, the term "*similar obstructions*" referred to in the regulation includes internal structures (e.g. webs > 1.5 m deep) which restrict the ability to raft (at the maximum water level needed for rafting of under-deck structure) directly to the nearest access ladder and hatchway to deck. When rafts or boats alone, as an alternative means of access, are allowed under the conditions specified in the 2011 ESP Code, permanent means of access are to be provided to allow safe entry and exit. This means:

.1 access direct from the deck via a vertical ladder and small platform fitted approximately 2 m below the deck in each bay; or

.2 access to the deck from a longitudinal permanent platform having ladders to the deck in each end of the tank. The platform should, for the full length of the tank, be arranged in level with, or above, the maximum water level needed for rafting of the under-deck structure. For this purpose, the ullage corresponding to the maximum water level should not be assumed more than 3 m from the deck plate measured at the midspan of deck transverses and in the middle length of the tank (see figure below). A permanent means of access from the longitudinal permanent platform to the water level indicated above should be fitted in each bay (e.g. permanent rungs on one of the deck webs inboard of the longitudinal permanent platform).



1.7 SOLAS REGULATION II-1/3-6, PARAGRAPH 4.1

Interpretation

1 The access manual should address spaces listed in paragraph 3 of regulation II-1/3-6. As a minimum the English version should be provided. The ship structure access manual should contain at least the following two parts:

Part 1: Plans, instructions and inventory required by paragraphs 4.1.1 to 4.1.7 of regulation II-1/3-6. This part should be approved by the Administration or the organization recognized by the Administration.

Part 2: Form of record of inspections and maintenance, and change of inventory of portable equipment due to additions or replacement after construction. This part should be approved for its form only at new building.

2 The following matters should be addressed in the ship structure access manual:

.1 the access manual should clearly cover scope as specified in the regulations for use by crews, surveyors and port State control officers;

.2 approval/re-approval procedure for the manual, i.e. any changes of the permanent, portable, movable or alternative means of access within the scope of the regulation and the Technical provisions are subject to review and approval by the Administration or by the organization recognized by the Administration;

.3 verification of means of access should be part of the safety construction survey for continued effectiveness of the means of access in that space which is subject to the statutory survey;

.4 inspection of means of access by the crew and/or a competent inspector of the company as a part of regular inspection and maintenance (see interpretation of paragraph 2.3 of regulation II-1/3-6);

.5 actions to be taken if means of access is found unsafe to use; and

.6 in case of use of portable equipment plans showing the means of access within each space indicating from where and how each area in the space can be inspected.

1.8 SOLAS REGULATION II-1/3-6, PARAGRAPH 4.2

Interpretation

1 Critical structural areas should be identified by advanced calculation techniques for structural strength and fatigue performance, if available, and feedback from the service history and design development of similar or sister ships.

2 Reference should be made to the following publications for critical structural areas, where applicable:

.1 Oil tankers: Guidance Manual for Tanker Structures by TSCF;

.2 Bulk carriers: Bulk Carriers Guidelines for Surveys, Assessment and Repair of Hull Structure by IACS; and

.3 Oil tankers and bulk carriers: the 2011 ESP Code (resolution A.1049(27), as amended).

Technical background

These documents contain the relevant information for the present ship types. However, identification of critical areas for new double-hull tankers and double-side skin bulk carriers of improved structural design should be made by structural analysis at the design stage, this information should be taken into account to ensure appropriate access to all identified critical areas.

1.9 SOLAS REGULATION II-1/3-6, PARAGRAPH 5.1

Interpretation

The minimum clear opening of 600 mm x 600 mm may have corner radii up to 100 mm maximum. The clear opening is specified in MSC/Circ.686/Rev.1 to keep the opening fit for passage of personnel wearing a breathing apparatus. In such a case where as a consequence of structural analysis of a given design the stress should be reduced around the opening, it is considered appropriate to take measures to reduce the stress such as making the opening larger with increased radii, e.g. 600 x 800 with 300 mm radii, in which a clear opening of 600 x 600 mm with corner radii up to 100 mm maximum fits.

Technical background

The interpretation is based upon the established Guidelines in MSC/Circ.686/Rev.1.

Reference

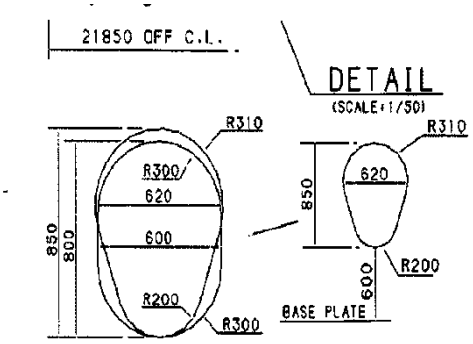
Paragraph 9 of the annex to MSC/Circ.686/Rev.1.

1.10 SOLAS REGULATION II-1/3-6, PARAGRAPH 5.2

Interpretation

1 The minimum clear opening of not less than 600 mm x 800 mm may also include an opening with corner radii of 300 mm. An opening of 600 mm in height x 800 mm in width may be accepted as access openings in vertical structures where it is not desirable to make large openings in the structural strength aspects, i.e. girders and floors in double-bottom tanks.

2 Subject to verification of easy evacuation of an injured person on a stretcher the vertical opening 850 mm x 620 mm with wider upper half than 600 mm, while the lower half may be less than 600 mm with the overall height not less than 850 mm is considered an acceptable alternative to the traditional opening of 600 mm x 800 mm with corner radii of 300 mm.



3 If a vertical opening is at a height of more than 600 mm steps then handgrips should be provided. In such arrangements it should be demonstrated that an injured person can be easily evacuated.

Technical background

The interpretation is based upon the established Guidelines in MSC/Circ.686/Rev.1 and an innovative design is considered for easy access by humans through the opening.

Reference

Paragraph 11 of the annex to MSC/Circ.686/Rev.1.

2 TECHNICAL PROVISIONS FOR MEANS OF ACCESS FOR INSPECTIONS (RESOLUTION MSC.158(78))

2.1 PARAGRAPH 1.3

Interpretation

A "combined chemical/oil tanker complying with the provisions of the IBC Code" is a tanker that holds both a valid IOPP certificate as a tanker and a valid certificate of fitness for the carriage of dangerous chemicals in bulk, i.e. a tanker that is certified to carry both oil cargoes under MARPOL Annex I and Chemical cargoes in chapter 17 of the IBC Code either as full or part cargoes. The Technical provisions should be applied to ballast tanks of combined chemical/oil tankers complying with the provisions of the IBC Code.

2.2 PARAGRAPH 1.4

Interpretation

1 In the context of the above requirement, the deviation should be applied only to distances between integrated permanent means of access that are the subject of paragraph 2.1.2 of table 1.

2 Deviations should not be applied to the distances governing the installation of under-deck longitudinal walkways and dimensions that determine whether permanent access is required or not, such as height of the spaces and height to elements of the structure (e.g. cross-ties).

2.3 PARAGRAPH 3.1

Interpretation

The permanent means of access to a space can be credited for the permanent means of access for inspection.

Technical background

The Technical provisions specify means of access to a space and to hull structure for carrying out overall and close-up surveys and inspections. Requirements of means of access to hull structure may not always be suitable for access to a space. However, if the means of access to a space can also be used for the intended surveys and inspections such means of access can be credited for the means of access for use for surveys and inspections.

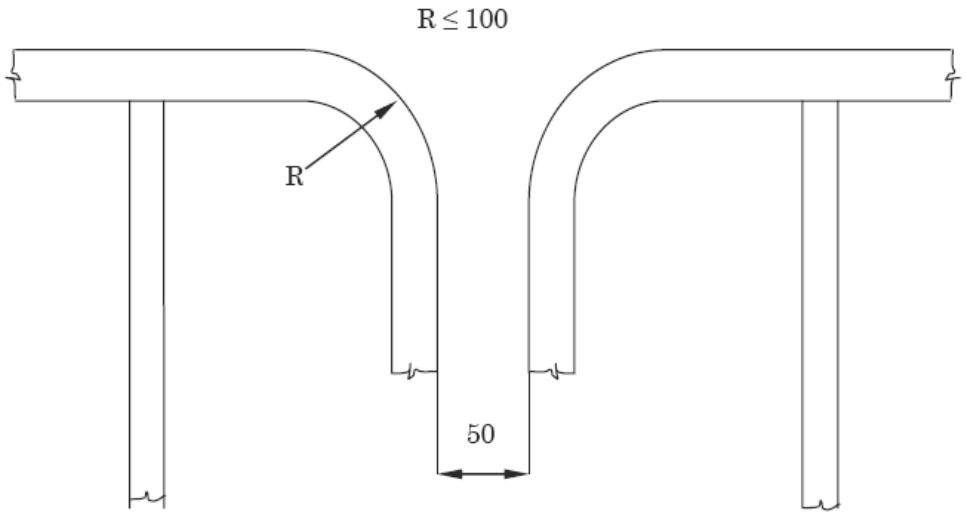
2.4 PARAGRAPH 3.3

Interpretation

1 Sloping structures are structures that are sloped by 5 or more degrees from horizontal plane when a ship is in an upright position at even-keel.

2 Guard rails should be fitted on the open side and should be at least 1,000 mm in height. For stand-alone passageways guard rails should be fitted on both sides of these structures. Guardrail stanchions are to be attached to the permanent means of access. The distance between the passageway and the intermediate bar and the distance between the intermediate bar and the top rail should not be more than 500 mm.

3 Discontinuous top handrails are allowed, provided the gap does not exceed 50 mm. The same maximum gap is to be considered between the top handrail and other structural members (i.e. bulkhead, web frame, etc.). The maximum distance between the adjacent stanchions across the handrail gaps is to be 350 mm where the top and mid handrails are not connected together and 550 mm when they are connected together. The maximum distance between the stanchion and other structural members is not to exceed 200 mm where the top and mid handrails are not connected together and 300 mm when they are connected together. When the top and mid handrails are connected by a bent rail, the outside radius of the bent part is not to exceed 100 mm (see figure below).



4 Non-skid construction is such that the surface on which personnel walks provides sufficient friction to the sole of boots even if the surface is wet and covered with thin sediment.

5 "Substantial construction" is taken to refer to the as-designed strength as well as the residual strength during the service life of the vessel. Durability of passageways together with guard rails should be ensured by the initial corrosion protection and inspection and maintenance during services.

6 For guard rails, use of alternative materials such as GRP should be subject to compatibility with the liquid carried in the tank. Non-fire resistant materials should not be used for means of access to a space with a view to securing an escape route at a high temperature.

7 Requirements for resting platforms placed between ladders should be equivalent to those applicable to elevated passageways.

Reference

Paragraph 10 of the annex to MSC/Circ.686/Rev.1.

2.5 PARAGRAPH 3.4

Interpretation

Where the vertical manhole is at a height of more than 600 mm above the walking level, it should be demonstrated that an injured person can be easily evacuated.

2.6 PARAGRAPH 3.5

Interpretation

Means of access to ballast tanks, cargo tanks and spaces other than fore peak tanks:

For oil tankers:

1 Tanks and subdivisions of tanks having a length of 35 m or more with two access hatchways:

First access hatchway: Inclined ladder or ladders should be used.

Second access hatchway:

.1 A vertical ladder may be used. In such a case where the vertical distance is more than 6 m, vertical ladders should comprise one or more ladder-linking platforms spaced not more than 6 m apart vertically and displaced to one side of the ladder.

The uppermost section of the vertical ladder, measured clear of the overhead obstructions in the way of the tank entrance, should not be less than 2.5 m but not exceed 3.0 m and should comprise a ladder-linking platform which should be displaced to one side of a vertical ladder. However, the vertical distance of the uppermost section of the vertical ladder may be reduced to 1.6 m, measured clear of the overhead obstructions in the way of the tank entrance, if the ladder lands on a longitudinal or athwartship permanent means of access fitted within that range. Adjacent sections of the ladder should be laterally offset from each other by at least the width of the ladder (see paragraph 20 of MSC/Circ.686/Rev.1 and refer to the interpretation of paragraphs 3.13.2 and 3.13.6 of the Technical provisions (resolution MSC.158(78))); or

.2 Where an inclined ladder or combination of ladders is used for access to the space, the uppermost section of the ladder, measured clear of the overhead obstructions in the way of the tank entrance, should be vertical for not less than 2.5 m but not exceed 3.0 m and should comprise a landing platform continuing with an inclined ladder. However, the vertical distance of the uppermost section of the vertical ladder may be reduced to 1.6 m, measured clear of the overhead obstructions in the way of the tank entrance, if the ladder lands on a longitudinal or athwartship permanent means of access fitted within that range. The flights of the inclined ladders are normally to be not more than 6 m in vertical height. The lowermost section of the ladders may be vertical for the vertical distance not exceeding 2.5 m.

2 Tanks less than 35 m in length and served by one access hatchway: an inclined ladder or combination of ladders should be used to the space as specified in 1.2 above.

3 In spaces of less than 2.5 m in width the access to the space may be by means of vertical ladders that comprise one or more ladder-linking platforms spaced not more than 6 m apart vertically and displaced to one side of the ladder. The uppermost section of the vertical ladder, measured clear of the overhead obstructions in the way of the tank entrance, should not be less than 2.5 m but not exceed 3.0 m and should comprise a ladder-linking platform which should be displaced to one side of a vertical ladder. However, the vertical distance of the uppermost section of the vertical ladder may be reduced to 1.6 m, measured clear of the overhead obstructions in the way of the tank entrance, if the ladder lands on a longitudinal or athwartship permanent means of access fitted within that range. Adjacent sections of the ladder should be laterally offset from each other by at least the width of the ladder (see paragraph 20 of MSC/Circ.686/Rev.1 and refer to the interpretation of paragraphs 3.13.2 and 3.13.6 of the Technical provisions (resolution MSC.158(78))).

4 Access from the deck to a double-bottom space may be by means of vertical ladders through a trunk. The vertical distance from deck to a resting platform, between resting platforms, or a resting platform and the tank bottom should not be more than 6 m, unless otherwise approved by the Administration.

Means of access for inspection of the vertical structure of oil tankers:

Vertical ladders provided for means of access to the space may be used for access for inspection of the vertical structure.

Unless stated otherwise in table 1 of the Technical provisions, vertical ladders that are fitted on vertical structures for inspection should comprise one or more ladder-linking platforms spaced not more than 6 m apart vertically and displaced to one side of the ladder. Adjacent sections of ladder should be laterally offset from each other by at least the width of the ladder (see paragraph 20 of MSC/Circ.686/Rev.1 and refer to the interpretation of paragraphs 3.13.2 and 3.13.6 of the Technical provisions (resolution MSC.158(78))).

Obstruction distances

The minimum distance between the inclined ladder face and obstructions, i.e. 750 mm and, in the way of openings, 600 mm specified in paragraph 3.5 of the Technical provisions, should be measured perpendicular to the face of the ladder.

Technical background

It is common practice to use a vertical ladder from the deck to the first landing to clear overhead obstructions before continuing to an inclined ladder or a vertical ladder displaced to one side of the first vertical ladder.

Reference

For vertical ladders: paragraph 20 of the annex to MSC/Circ.686/Rev.1.

2.7 PARAGRAPH 3.6

Interpretation

1 The vertical height of handrails should not be less than 890 mm from the centre of the step and two course handrails need only be provided where the gap between the stringer and the top handrail is greater than 500 mm.

2 The requirement of two square bars for treads specified in paragraph 3.6 of the Technical provisions is based upon the specification of the construction of ladders in paragraph 3(e) of annex 1 to resolution A.272(VIII), which addresses inclined ladders. Paragraph 3.4 of the Technical Provisions allows for single rungs fitted to vertical surfaces, which is considered a safe grip. For vertical ladders, when steel is used, the rungs should be formed of single square bars of not less than 22 mm by 22 mm for the sake of safe grip.

3 The width of inclined ladders for access to a cargo hold should be at least 450 mm to comply with the Australian AMSA Marine Orders part 32, appendix 17.

4 The width of inclined ladders other than an access to a cargo hold should be not less than 400 mm.

5 The minimum width of vertical ladders should be 350 mm and the vertical distance between the rungs should be equal and should be between 250 mm and 350 mm.

6 A minimum climbing clearance in width should be 600 mm other than the ladders placed between the hold frames.

7 The vertical ladders should be secured at intervals not exceeding 2.5 m apart to prevent vibration.

Technical background

1 Paragraph 3.6 of the Technical provisions is a continuation of paragraph 3.5 of the Technical Provisions, which addresses inclined ladders. Interpretations for vertical ladders are needed based upon the current standards of IMO, AMSA or the industry.

2 Interpretations 2 and 5 address vertical ladders based upon the current standards.

3 Double square bars for treads become too large for a grip for vertical ladders and single rungs facilitate a safe grip.

4 Interpretation 7 is introduced consistently with the requirement and the interpretation of paragraph 3.4 of the Technical provisions.

Reference

1 Annex 1 to resolution A.272(VIII).

2 Australian AMSA Marine Orders part 32, appendix 17.

3 ILO Code of Practice *Safety and health in dock work* – section 3.6, Access to ship's hold.

2.8 PARAGRAPH 3.9.6

Interpretation

A mechanical device such as hooks for securing at the upper end of a ladder should be considered as an appropriate securing device if a movement fore/aft and sideways can be prevented at the upper end of the ladder.

Technical background

Innovative design should be accepted if it fits the functional requirement with due consideration for safe use.

2.9 PARAGRAPHS 3.10 AND 3.11

Interpretation

See interpretation for paragraphs 5.1 and 5.2 of SOLAS regulation II-1/3-6.

2.10 PARAGRAPH 3.13.1

Interpretation

1 Either a vertical or an inclined ladder or a combination of them may be used for access to a cargo hold where the vertical distance is 6 m or less from the deck to the bottom of the cargo hold.

2 Deck is defined as "weather deck".

2.11 PARAGRAPHS 3.13.2 AND 3.13.6

Adjacent sections of vertical ladder should to be installed so that the following provisions are complied with:

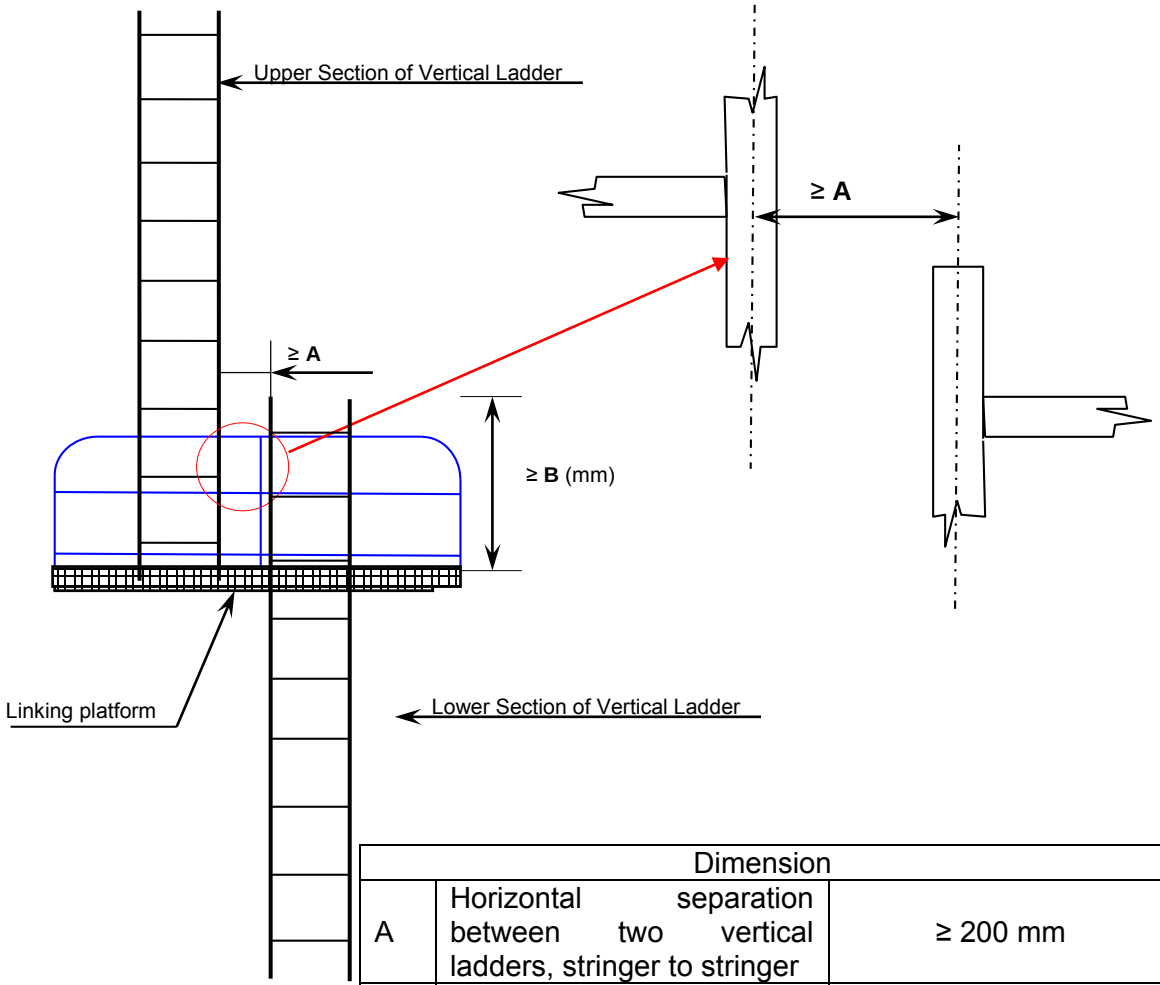
- the minimum "lateral offset" between two adjacent sections of vertical ladder, is the distance between the sections, upper and lower, so that the adjacent stringers are spaced of at least 200 mm, measured from half thickness of each stringer.

- adjacent sections of vertical ladder should be installed so that the upper end of the lower section is vertically overlapped, in respect to the lower end of the upper section, to a height of 1,500 mm in order to permit a safe transfer between ladders.

- no section of the access ladder should be terminated directly or partly above an access opening.

Figure "A"

Vertical Ladder – Ladder through the linking platform



Dimension		
A	Horizontal separation between two vertical ladders, stringer to stringer	≥ 200 mm
B	Stringer height above landing or intermediate platform	≥ 1,500* mm
C	Horizontal separation between ladder and platform	100 mm ≤ C < 300 mm
*	The minimum height of the handrail of resting platform is 1,000 mm (paragraph 3.3 of the Technical provisions (resolution MSC.158(78)))	

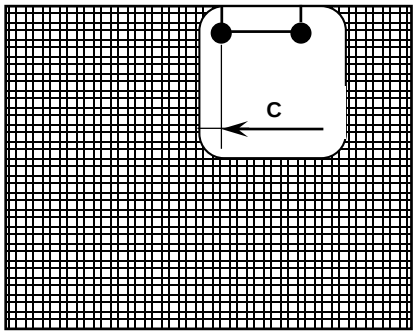
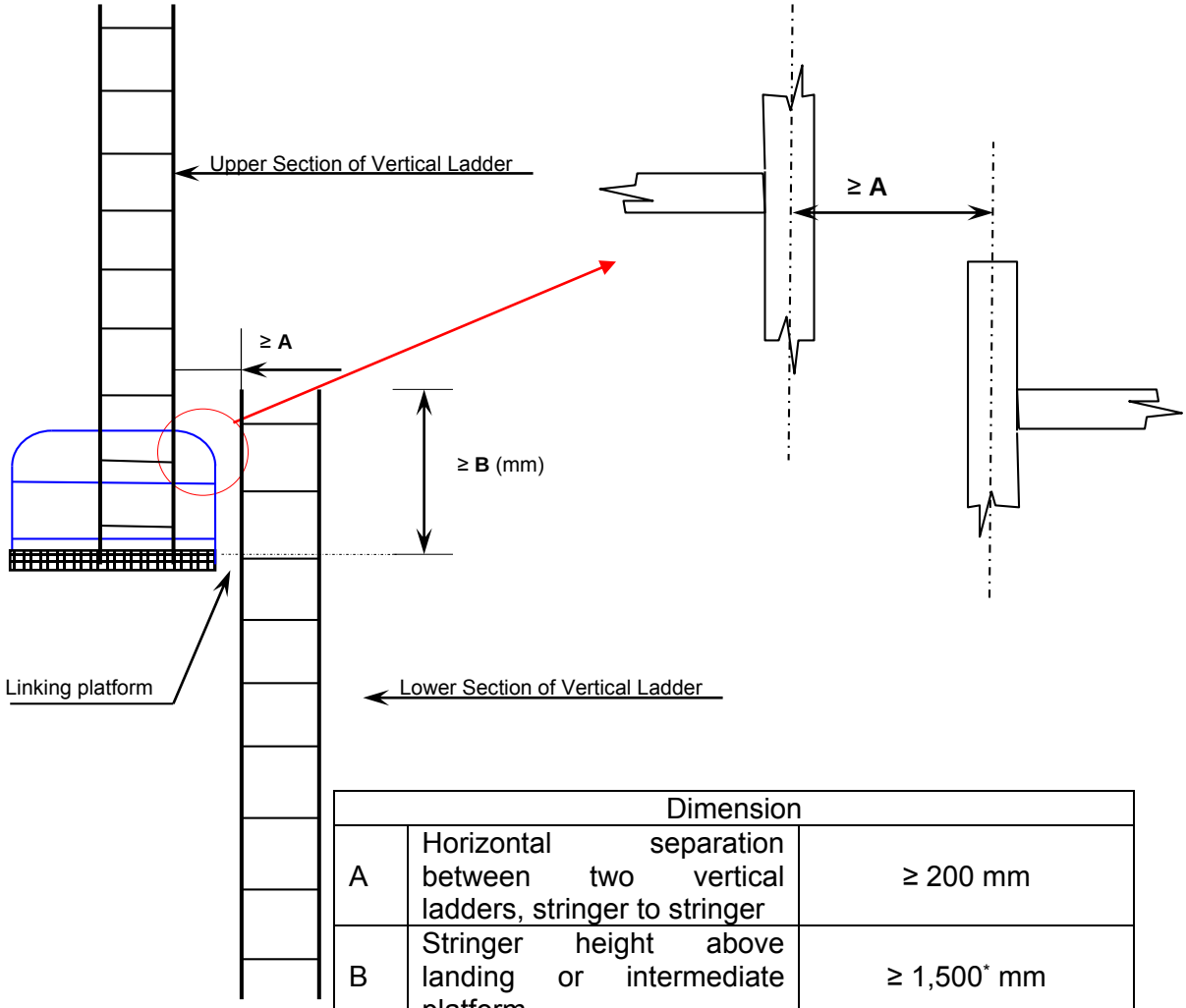
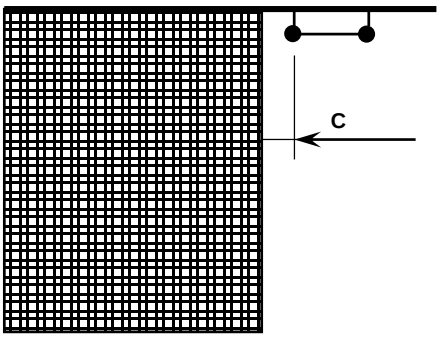


Figure "B"

Vertical Ladder – Side mount



Dimension		
A	Horizontal separation between two vertical ladders, stringer to stringer	≥ 200 mm
B	Stringer height above landing or intermediate platform	≥ 1,500* mm
C	Horizontal separation between ladder and platform	100 mm ≤ C < 300 mm
*	The minimum height of the handrail of resting platform is 1,000 mm (paragraph 3.3 of the Technical provisions, (resolution MSC.158(78)))	



2.12 TABLE 1 – MEANS OF ACCESS FOR BALLAST AND CARGO TANKS OF OIL TANKERS, PARAGRAPH 1.1

Interpretation

1 Subparagraphs .1 to .3 define access to under-deck structures, access to the uppermost sections of transverse webs and connection between these structures.

2 Subparagraphs .4 to .6 define access to vertical structures only and are linked to the presence of transverse webs on longitudinal bulkheads.

3 If there are no under-deck structures (deck longitudinals and deck transverses) but there are vertical structures in the cargo tank supporting transverse and longitudinal bulkheads, access in accordance with subparagraphs .1 to .6 should be provided for inspection of the upper parts of vertical structure on transverse and longitudinal bulkheads.

4 If there is no structure in the cargo tank, section 1.1 of table 1 should not be applied.

5 Section 1 of table 1 should also be applied to void spaces in the cargo area, comparable in volume to spaces covered by SOLAS regulation II-1/3-6, except those spaces covered by section 2.

6 The vertical distance below the overhead structure should be measured from the underside of the main deck plating to the top of the platform of the means of access at a given location.

7 The height of the tank should be measured at each tank. For a tank the height of which varies at different bays, item 1.1 should be applied to such bays of a tank that have a height of 6 m and over.

Technical background

Interpretation 7, if the height of the tank is increasing along the length of a ship, the permanent means of access should be provided locally where the height is above 6 m.

Reference

Paragraph 10 of the annex to MSC/Circ.686/Rev.1.

2.13 TABLE 1 – MEANS OF ACCESS FOR BALLAST AND CARGO TANKS OF OIL TANKERS, PARAGRAPH 1.1.2

Interpretation

There is a need to provide a continuous longitudinal permanent means of access when the deck longitudinals and deck transverses are fitted on deck but supporting brackets are fitted under the deck.

2.14 TABLE 1 – MEANS OF ACCESS FOR BALLAST AND CARGO TANKS OF OIL TANKERS, PARAGRAPH 1.1.3

Interpretation

Means of access to tanks may be used for access to the permanent means of access for inspection.

Technical background

As a matter of principle, in such a case where the means of access can be utilized for the purpose of accessing structural members for inspection there is no need of duplicated installation of the means of access.

2.15 TABLE 1 – MEANS OF ACCESS FOR BALLAST AND CARGO TANKS OF OIL TANKERS, PARAGRAPH 1.1.4

Interpretation

The permanent fittings required to serve alternative means of access such as wire lift platform, that should be used by crew and surveyors for inspection should provide at least an equal level of safety as the permanent means of access stated by the same paragraph. These means of access should be carried on board the ship and be readily available for use without filling of water in the tank. Therefore, rafting should not be acceptable under this provision. Alternative means of access should be part of the Ship Structure Access Manual which should be approved on behalf of the flag State. For water ballast tanks of 5 m or more in width, such as on an ore carrier, side shell plating should be considered in the same way as "longitudinal bulkhead".

2.16 TABLE 1 – MEANS OF ACCESS FOR BALLAST AND CARGO TANKS OF OIL TANKERS, PARAGRAPH 2.1

Interpretation

Section 2 of table 1 should also be applied to wing tanks designed as void spaces. Paragraph 2.1.1 represents requirements for access to under-deck structures, while paragraph 2.1.2 is a requirement for access for survey and inspection of vertical structures on longitudinal bulkheads (transverse webs).

Technical background

SOLAS regulation II-1/3-6.2.1 requires each space to be provided with means of access. Though void spaces are not addressed in the technical provisions contained in resolution MSC.158(78), it is arguable whether means of access are not required in void spaces. Means of access or portable means of access are necessary arrangements to facilitate inspection of the structural condition of the space and the boundary structure. Therefore, the requirements of section 2 of table 1 should be applied to double-hull spaces even when designed as void spaces.

2.17 TABLE 1 – MEANS OF ACCESS FOR BALLAST AND CARGO TANKS OF OIL TANKERS, PARAGRAPH 2.1.1

Interpretation

1 For a tank, the vertical distance between horizontal upper stringer and deck head of which varies at different sections, paragraph 2.1.1 should be applied to such sections that fall under the criteria.

2 The continuous permanent means of access may be a wide longitudinal, which provides access to critical details on the opposite side by means of platforms as necessary on web frames. In case the vertical opening of the web frame is located in the way of the open part between the wide longitudinal and the longitudinal on the opposite side, platforms should be provided on both sides of the web frames to allow safe passage through the web frame.

3 Where two access hatches are required by SOLAS regulation II-1/3-6.3.2, access ladders at each end of the tank should lead to the deck.

Technical background

Interpretation 1: The interpretation of varied tank height in column 1 of table 1 is applied to the vertical distance between horizontal upper stringer and deck head for consistency.

2.18 TABLE 1 – MEANS OF ACCESS FOR BALLAST AND CARGO TANKS OF OIL TANKERS, PARAGRAPH 2.1.2

Interpretation

The continuous permanent means of access may be a wide longitudinal, which provides access to critical details on the opposite side by means of platforms as necessary on web frames. In case the vertical opening of the web is located in the way of the open part between the wide longitudinal and the longitudinal on the opposite side, platforms should be provided on both sides of the web to allow safe passage through the web. A "reasonable deviation", as noted in paragraph 1.4 of the Technical provisions, of not more than 10% may be applied where the permanent means of access is integral with the structure itself.

2.19 TABLE 1 – MEANS OF ACCESS FOR BALLAST AND CARGO TANKS OF OIL TANKERS, PARAGRAPH 2.2

Interpretation

1 Permanent means of access between the longitudinal continuous permanent means of access and the bottom of the space should be provided.

2 The height of a bilge hopper tank located outside of the parallel part of the ship should be taken as the maximum of the clear vertical distance measured from the bottom plating to the hopper plating of the tank.

3 The foremost and aftmost bilge hopper ballast tanks with raised bottom, of which the height is 6 m and over, a combination of transverse and vertical means of access to the upper knuckle point for each transverse web, should be accepted in place of the longitudinal permanent means of access.

Technical background

Interpretation 2: The bilge hopper tanks at fore and aft of cargo area narrow due to raised bottom plating and the actual vertical distance from the bottom of the tank to hopper plating of the tank is more appropriate to judge if a portable means of access could be utilized for the purpose.

Interpretation 3: In the foremost or aftmost bilge hopper tanks where the vertical distance is 6 m or over but installation of longitudinal permanent means of access is not practicable, permanent means of access of combination of transverse and vertical ladders provides an alternative means of access to the upper knuckle point.

2.20 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 1.1

Interpretation

1 Means of access should be provided to the cross-deck structures of the foremost and aftermost part of each cargo hold.

2 Interconnected means of access under the cross deck for access to three locations at both sides and in the vicinity of the centreline should be acceptable as the three means of access.

3 Permanent means of access fitted at three separate locations accessible independently, one at each side and one in the vicinity of the centreline, should be acceptable.

4 Special attention should be paid to the structural strength where any access opening is provided in the main deck or cross deck.

5 The requirements for a bulk carrier cross-deck structure should also be considered applicable to ore carriers.

Technical background

Pragmatic arrangements of the means of access are provided.

2.21 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 1.3

Interpretation

Particular attention should be paid to preserve the structural strength in way of access opening provided in the main deck or cross deck.

2.22 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 1.4

Interpretation

"Full upper stools" are understood to be stools with a full extension between topside tanks and between hatch end beams.

2.23 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 1.5

Interpretation

1 The movable means of access to the under-deck structure of cross deck need not necessarily be carried on board the ship. It should be sufficient if it is made available when needed.

2 The requirements for a bulk carrier cross-deck structure should also be considered applicable to ore carriers.

2.24 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 1.6

Interpretation

The maximum vertical distance of the rungs of vertical ladders for access to hold frames should be 350 mm. If a safety harness is to be used, means should be provided for connecting the safety harness in suitable places in a practical way.

Technical background

The maximum vertical distance of the rungs of 350 mm is applied with a view to reducing trapping cargoes.

2.25 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 1.7

Interpretation

Portable, movable or alternative means of access should also be applied to corrugated bulkheads.

2.26 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 1.8

Interpretation

Readily available means able to be transported to location in cargo hold and safely erected by ships' crew.

2.27 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 2.3

Interpretation

If the longitudinal structures on the sloping plate are fitted outside of the tank, a means of access should be provided.

2.28 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 2.5

Interpretation

1 The height of a bilge hopper tank located outside of the parallel part of the vessel should be taken as the maximum of the clear vertical height measured from the bottom plating to the hopper plating of the tank.

2 It should be demonstrated that portable means for inspection can be deployed and made readily available in the areas where needed.

2.29 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 2.5.2

Interpretation

A wide longitudinal frame of at least 600 mm clear width may be used for the purpose of the longitudinal continuous permanent means of access. The foremost and aftermost bilge hopper ballast tanks with raised bottom, of which the height is 6 m and over, a combination of transverse and vertical means of access to the sloping plate of hopper tank connection with side shell plating for each transverse web can be accepted in place of the longitudinal permanent means of access.

2.30 TABLE 2 – MEANS OF ACCESS FOR BULK CARRIERS, PARAGRAPH 2.6

Interpretation

The height of web frame rings should be measured in way of side shell and tank base.

Technical background

In the bilge hopper tank the sloping plating is above the opening, while the movement of the surveyor is along the bottom of the tank. Therefore the measurement of 1 m should be taken from the bottom of the tank.

3 SOLAS CHAPTER II-1, PARTS B-2 – SUBDIVISION, WATERTIGHT AND WEATHERTIGHT INTEGRITY AND B-4 – STABILITY MANAGEMENT

DOORS IN WATERTIGHT BULKHEADS OF PASSENGER SHIPS AND CARGO SHIPS

Interpretation

This interpretation pertains to doors[1] located in way of the internal watertight subdivision boundaries and the external watertight boundaries necessary to ensure compliance with the relevant subdivision and damage stability regulations.

This interpretation does not apply to doors located in external boundaries above equilibrium or intermediate waterplanes.

The design and testing requirements for watertight doors vary according to their location relative to the equilibrium waterplane or intermediate waterplane at any stage of assumed flooding.

1 DEFINITIONS

For the purpose of this interpretation the following definitions apply:

1.1 Watertight: Capable of preventing the passage of water in any direction under a design head. The design head for any part of a structure should be determined by reference to its location relative to the bulkhead deck or freeboard deck, as applicable, or to the most unfavourable equilibrium/intermediate waterplane, in accordance with the applicable subdivision and damage stability regulations, whichever is the greater. A watertight door is thus one that will maintain the watertight integrity of the subdivision bulkhead in which it is located.

[1] Doors in watertight bulkheads of small cargo ships, not subject to any statutory subdivision and damage stability requirements, may be hinged quick-acting doors arranged to open out of the major space protected. They should be constructed in accordance with the requirements of the Administration and have notices affixed to each side stating: "To be kept closed at sea".

1.2 ***Equilibrium waterplane***: The waterplane in still water when, taking account of flooding due to an assumed damage, the weight and buoyancy forces acting on a ship are in balance. This relates to the final condition when no further flooding takes place or after cross flooding is completed.

1.3 ***Intermediate waterplane***: The waterplane in still water, which represents the instantaneous floating position of a ship at some intermediate stage between commencement and completion of flooding when, taking account of the assumed instantaneous state of flooding, the weight and buoyancy forces acting on a ship are in balance.

1.4 ***Sliding door or rolling door***: A door having a horizontal or vertical motion generally parallel to the plane of the door.

1.5 ***Hinged door***: A door having a pivoting motion about one vertical or horizontal edge.

2 STRUCTURAL DESIGN

Doors and their frames should be of approved design and substantial construction in accordance with the requirements of the Administration and should preserve the strength of the subdivision bulkheads in which they are fitted.

3 OPERATION MODE, LOCATION AND OUTFITTING

Doors should be fitted in accordance with all requirements regarding their operation mode, location and outfitting, i.e. provision of controls, means of indication, etc., as shown in table 1 below. This table should be read in conjunction with paragraphs 3.1 to 5.4 below.

3.1 Frequency of use whilst at sea

3.1.1 Normally closed*:* Kept closed at sea but may be used if authorized. To be closed again after use.

3.1.2 Permanently closed: The time of opening such doors in port and of closing them before the ship leaves port should be entered in the logbook. Should such doors be accessible during the voyage, they should be fitted with a device to prevent unauthorized opening.

3.1.3 Normally open*:* May be left open provided it is always ready to be immediately closed.

3.1.4 Used*:* In regular use, may be left open provided it is ready to be immediately closed.

3.2 Type

Power operated, sliding or rolling[2]	POS
Power operated, hinged	POH
Sliding or rolling	S
Hinged	H

[2] Rolling doors are technically identical to sliding doors.

3.3 Control

3.3.1 Local

3.3.1.1 All doors, except those which should be permanently closed at sea, should be capable of being opened and closed by hand locally,[3] from both sides of the doors, with the ship listed to either side.

3.3.1.2 For passenger ships, the angle of list at which operation by hand should be possible is 15º or 20º if the ship is allowed to heel up to 20º during intermediate stages of flooding.

3.3.1.3 For cargo ships, the angle of list at which operation by hand should be possible is 30º.

3.3.2 Remote

Where indicated in table 1, doors should be capable of being remotely closed by power from the bridge.[4] Where it is necessary to start the power unit for operation of the watertight door, means to start the power unit is also to be provided at remote control stations. The operation of such remote control should be in accordance with regulations II-1/13.8.1 to II-1/13.8.3.

3.4 Indication

3.4.1 Where shown in table 1, position indicators should be provided at all remote operating positions[5] as well as locally, on both sides of the doors,[6] to show whether the doors are open or closed and, if applicable, with all dogs/cleats fully and properly engaged.

3.4.2 The door position indicating system should be of self-monitoring type and the means for testing of the indicating system should be provided at the position where the indicators are fitted.

3.4.3 An indication (i.e. red light) should be placed locally showing that the door is in remote control mode ("doors closed mode"). Refer also to regulation II-1/13.8.1. Special care should be taken in order to avoid potential danger when passing through the door. Signboard/instructions should be placed in way of the door advising how to act when the door is in "doors closed" mode.

3.5 Alarms

3.5.1 Doors which should be capable of being remotely closed should be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever such a door is remotely closed. For passenger ships the alarm should sound for at least 5 seconds but not more than 10 seconds before the door begins to move and should continue sounding until the door is completely closed. In the case of remote closure by hand operation, an alarm is required to sound only while the door is actually moving.

3.5.2 In passenger areas and areas of high ambient noise, the audible alarms should be supplemented by visual signals at both sides of the doors.

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3 Arrangements for passenger ships should be in accordance with regulation II-1/13.7.1.4.

4 Arrangements for passenger ships should be in accordance with regulation II-1/13.7.1.5.

5 Indication at all remote control positions (regulation II-1/13.6).

6 Refer to regulation II-1/13-1.3.

3.6 Notices

As shown in table 1, doors which are normally closed at sea, but are not provided with means of remote closure, should have notices fixed to both sides of the doors stating: "To be kept closed at sea". Doors which should be permanently closed at sea should have notices fixed to both sides stating: "Not to be opened at sea".

3.7 Location

For passenger ships the watertight doors and their controls should be located in compliance with regulations II-1/13.5.3 and II-1/13.7.1.2.2.

4 FIRE DOORS

4.1 Watertight doors may also serve as fire doors but need not be fire tested when intended for use below the bulkhead deck. Where such doors are used at locations above the bulkhead deck they should, in addition to complying with the provisions applicable to fire doors at the same locations, also comply with means of escape provisions of regulation II-2/13.

4.2 Where a watertight door is located adjacent to a fire door, both doors should be capable of independent operation, remotely if required by regulations II-1/13.8.1 to II-1/13.8.3 and from both sides of each door.

5 TESTING

5.1 Doors which become immersed by an equilibrium or intermediate waterplane or are below the freeboard or bulkhead deck should be subjected to a hydrostatic pressure test.

5.2 For large doors intended for use in the watertight subdivision boundaries of cargo spaces, structural analysis may be accepted in lieu of pressure testing. 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.

5.3 Doors above freeboard or bulkhead deck, which are not immersed by an equilibrium or intermediate waterplane but become intermittently immersed at angles of heel in the required range of positive stability beyond the equilibrium position, should be hose tested.

5.4 Pressure testing

5.4.1 The head of water used for the pressure test should correspond at least to the head measured from the lower edge of the door opening, at the location in which the door should be fitted in the ship, to the bulkhead deck or freeboard deck, as applicable, or to the most unfavourable damage waterplane, if that be greater. Testing may be carried out at the factory or other shore-based testing facility prior to installation in the ship.

5.4.2 Leakage criteria

5.4.2.1 The following acceptable leakage criteria should apply:

Doors with gaskets	No leakage
Doors with metallic sealing	Maximum leakage 1 *l*/min

5.4.2.2 Limited leakage may be accepted for pressure tests on large doors located in cargo spaces employing gasket seals or guillotine doors located in conveyor tunnels, in accordance with the following:[7]

$$\text{Leakage rate (}l\text{/min)} = \frac{(P+4.572)\,h^3}{6568}$$

where P = perimeter of door opening (metres)
h = test head of water (metres)

5.4.2.3 However, in the case of doors where the water head taken for the determination of the scantling does not exceed 6.1 m, the leakage rate may be taken equal to 0.375 *l*/min if this value is greater than that calculated by the above-mentioned formula.

5.4.3 For doors of passenger ships which are normally open and used at sea and which become submerged by the equilibrium or intermediate waterplane, a prototype test should be conducted, on each side of the door, to check the satisfactory closing of the door against a force equivalent to a water height of at least 1 m above the sill on the centre line of the door.[8]

5.5 Hose testing after installation

All watertight doors should be subject to a hose test[9] after installation in a ship. Hose testing should be carried out from each side of a door unless, for a specific application, exposure to floodwater is anticipated only from one side. Where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation, or outfitting items, it may be replaced by means such as an ultrasonic leak test or an equivalent test.

7 Published in the ATM F 1196, Standard Specification for Sliding Watertight Door Assemblies and referenced in the Title 46 US Code of Federal Regulations 170.270 Door design, operation installation and testing.

8 Arrangements for passenger ships should be in accordance with regulation II-1/13.5.2.

9 Refer to IACS URS 14.2.3 IACS Reg. 1996/Rev.2, 2001.

Table 1 – Internal doors in watertight bulkheads in cargo ships and passenger ships

Position relative to equilibrium or intermediate waterplane	1 Frequency of use whilst at sea	2 Type	3 Remote control[6]	4 Indication locally and on bridge[6]	5 Audible alarm[6]	6 Notice	7 Comments	8 Regulation
I. Passenger ships								
A. At or below	Normally closed	POS	Yes	Yes	Yes	No	Certain doors may be left open, see regulation II-1/22.4	II-1/22.1 to II-1/22.4
	Permanently closed	S, H	No	No	No	Yes	See Notes 1 + 4	II-1/13.9.1 and II-1/13.9.2
B. Above	Normally open	POS, POH	Yes	Yes	Yes	No		II-1/22.4 II-1/17.1 MSC/Circ.541
	Normally closed	S, H	No	Yes	No	Yes	See Note 2	
		S, H	No	Yes	No	Yes	Doors giving access to ro-ro deck	II-1/17-1
II. Cargo ships								
A. At or below	Used	POS	Yes	Yes	Yes	No		II-1/13-1.2
	Normally closed	S, H	No	Yes	No	Yes	see Notes 2 + 3 + 5	II-1/13-1.3
	Permanently closed	S, H	No	No	No	Yes	see Notes 1 + 4	II-1/13-1.4 II-1/15-1
B. Above	Used	POS	Yes	Yes	Yes	No		II-1/13-1.2
	Normally closed	S, H	No	Yes	No	Yes	See Notes 2 + 5	II-1/13-1.3 II-1/15-1

Notes:

1 Doors in watertight bulkheads subdividing cargo spaces.

2 If hinged, this door should be of quick-acting or single-action type.

3 SOLAS requires remotely operated watertight doors to be sliding doors.

4 The time of opening such doors in port and closing them before the ship leaves port should be entered in the logbook.

5 The use of such doors should be authorized by the officer of the watch.

6 Cables for control and power systems to power-operated watertight doors and their status indication should comply with the requirements of IACS UR E15.

4 SOLAS REGULATION II-1/26 – GENERAL

4.1 PARAGRAPH 4

Interpretation

1 Dead ship condition for the purpose of regulation II-1/26.4 should be understood to mean a condition under which the main propulsion plant, boilers and auxiliaries are not in operation and in restoring the propulsion, no stored energy for starting and operating the propulsion plant, the main source of electrical power and other essential auxiliaries is assumed to be available.

2 Where the emergency source of power is an emergency generator which complies with regulation II-1/44, IACS SC185 and IACS SC124, this generator may be used for restoring operation of the main propulsion plant, boilers and auxiliaries where any power supplies necessary for engine operation are also protected to a similar level as the starting arrangements.

3 Where there is no emergency generator installed or an emergency generator does not comply with regulation II-1/44, the arrangements for bringing main and auxiliary machinery into operation should be such that the initial charge of starting air or initial electrical power and any power supplies for engine operation can be developed on board ships without external aid. If for this purpose an emergency air compressor or an electric generator is required, these units should be powered by a hand-starting oil engine or a hand-operated compressor. The arrangements for bringing main and auxiliary machinery into operation should have capacity such that the starting energy and any power supplies for engine operation are available within 30 min of a dead ship condition.

4.2 PARAGRAPH 11

Interpretation

1 Arrangements complying with this regulation and acceptable "equivalent arrangements", for the most commonly utilized fuel systems, are shown below.

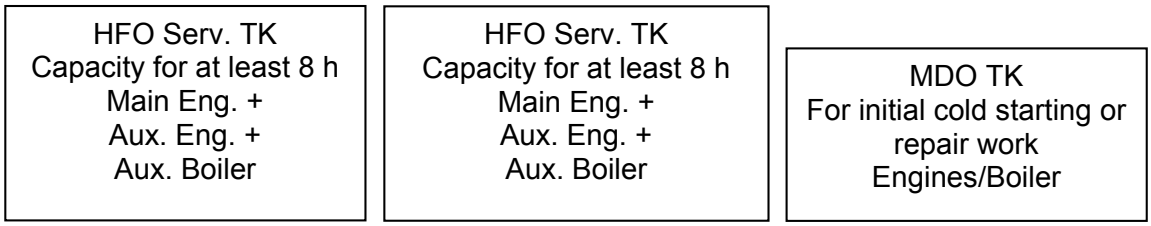
2 A service tank is a fuel oil tank which contains only fuel of a quality ready for use, i.e. fuel of a grade and quality that meets the specification required by the equipment manufacturer. A service tank should be declared as such and not be used for any other purpose.

3 Use of a setting tank with or without purifiers, or purifiers alone, and one service tank is not acceptable as an "equivalent arrangement" to two service tanks.

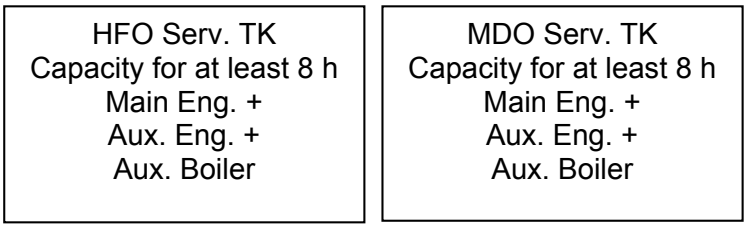
Examples of application for the most common systems

1 Example 1

1.1 Requirement according to SOLAS – Main and auxiliary engines and boiler(s) operating with heavy fuel oil (HFO) (one fuel ship)



1.2 Equivalent arrangement

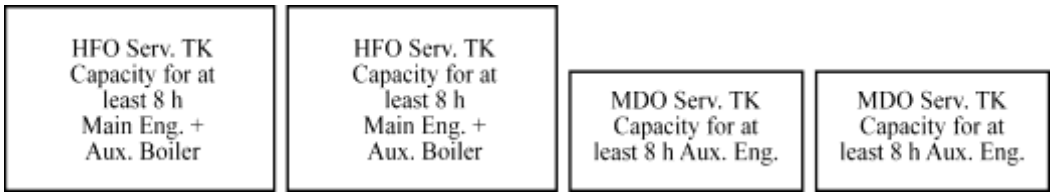


This interpretation only applies where main and auxiliary engines can operate with heavy fuel oil under all load conditions and, in the case of main engines, during manoeuvring.

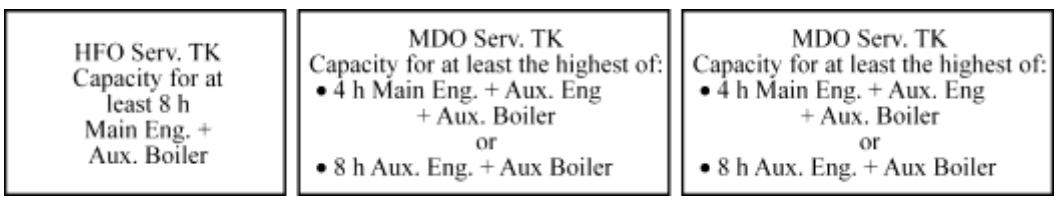
For pilot burners of auxiliary boilers if provided, an additional MDO tank for eight hours may be necessary.

2 Example 2

2.1 Requirement according to SOLAS – Main engine(s) and auxiliary boiler(s) operating with HFO and auxiliary engine operating with marine diesel oil (MDO)



2.2 Equivalent arrangement



The arrangements in paragraphs 1.2 and 2.2 apply, provided the propulsion and vital systems which use two types of fuel support rapid fuel changeover and are capable of operating in all normal operating conditions at sea with both types of fuel (MDO and HFO).

5 SOLAS REGULATIONS II-1/40 – GENERAL – AND II-1/41 – MAIN SOURCE OF ELECTRICAL POWER AND LIGHTING SYSTEMS

Interpretation

Essential services and arrangements of sources of power, supply, control and monitoring to the different categories of essential services

1 Classification of essential services

1.1 Essential services are those services essential for propulsion and steering, and safety of the ship, which are made up of "Primary Essential Services" and "Secondary Essential Services". Definitions and examples of such services are given in 2 and 3 below.

1.2 Services to ensure minimum comfortable conditions of habitability are those services defined in 4 below.

2 Primary Essential Services

Primary Essential Services are those services which need to be in continuous operation to maintain propulsion and steering. Examples of equipment for "Primary Essential Services" are as follows:

- steering gears;
- pumps for controllable pitch propellers;
- scavenging air blower, fuel oil supply pumps, fuel valve cooling pumps, lubricating oil pumps and cooling water pumps for main and auxiliary engines and turbines necessary for propulsion;
- forced draught fans, feed water pumps, water circulating pumps, vacuum pumps and condensate pumps for steam plants on steam turbine ships, and also for auxiliary boilers on ships where steam is used for equipment supplying primary essential services;
- oil burning installations for steam plants on steam turbine ships and for auxiliary boilers where steam is used for equipment supplying primary essential services;
- azimuth thrusters, which are the sole means for propulsion/steering with lubricating oil pumps, cooling water pumps;
- electrical equipment for electric propulsion plant with lubricating oil pumps and cooling water pumps;
- electric generators and associated power sources supplying the above equipment;
- hydraulic pumps supplying the above equipment;
- viscosity control equipment for heavy fuel oil;
- control, monitoring, and safety devices/systems for equipment to primary essential services;
- fire pumps and other fire extinguishing medium pumps;
- navigation lights, aids and signals;
- internal safety communication equipment; and
- lighting system.

3 Secondary Essential Services

Secondary Essential Services are those services which need not necessarily be in continuous operation to maintain propulsion and steering but which are necessary for maintaining the vessel's safety. Examples of equipment for secondary essential services are as follows:

- windlass;
- fuel oil transfer pumps and fuel oil treatment equipment;
- lubrication oil transfer pumps and lubrication oil treatment equipment;
- pre-heaters for heavy fuel oil;
- starting air and control air compressors;
- bilge, ballast and heeling pumps;
- ventilating fans for engine and boiler rooms;
- services considered necessary to maintain dangerous spaces in a safe condition;
- fire detection and alarm system;
- electrical equipment for watertight closing appliances;
- electric generators and associated power sources supplying the above equipment;
- hydraulic pumps supplying the above equipment;
- control, monitoring, and safety systems for cargo containment systems; and
- control, monitoring, and safety devices/systems for equipment to secondary essential services.

4 Services for habitability

Services for habitability are those services which need to be in operation for maintaining the ship's minimum comfort conditions for the crew and passengers. Examples of equipment for maintaining conditions of habitability are as follows:

- cooking;
- heating;
- domestic refrigeration;
- mechanical ventilation;
- sanitary and fresh water; and
- electrical generators and associated power sources supplying the above equipment.

5 Regulations II-1/40.1.1 and II-1/41.1.1 – For the purposes of these regulations, the services as included in paragraphs 2 to 4 should be considered.

6 Regulation II-1/40.1.2 – For the purposes of this regulation, the services as included in paragraphs 2 and 3 and the services in regulations II-1/42 or II-1/43, as applicable, should be considered.

7 Regulation II-1/41.1.2 – For the purposes of this regulation, the services as included in paragraphs 2 to 4, except for those also listed in the interpretation set out in section 6.1 below, should be considered.

8 Regulation II-1/41.1.5 – For the purposes of this regulation, the services as included in paragraphs 2, 3 and 4 should be considered.[10]

[10] See also IACS UI SC83.

9 Regulation II-1/41.5.1.2 – For the purposes of this regulation, the following interpretations are applicable:

.1 services in paragraph 2 should not be included in any automatic load shedding or other equivalent arrangements;

.2 services in paragraph 3 may be included in the automatic load shedding or other equivalent arrangement provided disconnection will not prevent services required for safety being immediately available when the power supply is restored to normal operating conditions; and

.3 services for habitability in paragraph 4 may be included in the load shedding or other equivalent arrangement.

6 SOLAS REGULATION II-1/41 – MAIN SOURCE OF ELECTRICAL POWER AND LIGHTING SYSTEMS

6.1 PARAGRAPH 1.2

Interpretation

Those services necessary to provide normal operational conditions of propulsion and safety do not include services such as:

.1 thrusters not forming part of the main propulsion;

.2 moorings;

.3 cargo handling gear;

.4 cargo pumps; and

.5 refrigerators for air conditioning (those which are not necessary to establish a minimum condition of habitability).

6.2 PARAGRAPH 1.3

Interpretation

Generators and generator systems, having the ship's main propulsion machinery as their prime mover, may be accepted as part of the ship's main source of electrical power, provided that:

.1 they are capable of operating under all weather conditions during sailing and during manoeuvring, also when the ship is stopped, within the specified limits for the voltage variation in IEC 60092-301 and the frequency variation in IACS UR E5;

.2 their rated capacity is safeguarded during all operations given under 1, and is such that in the event of any other one of the generators failing, the services given under regulation II-1/41.1.2 (see section 6.1 above) can be maintained;

.3 the short circuit current of the generator/generator system is sufficient to trip the generator/generator system circuit-breaker taking into account the selectivity of the protective devices for the distribution system. Protection should be arranged in order to safeguard the generator/generator system in case of a short circuit in the main busbar. The generator/generator system should be suitable for further use after fault clearance; and

.4 standby sets are started in compliance with paragraph 2 of the interpretation of regulation II-1/41.5.1.1 (see section 6.3 below).

6.3 PARAGRAPH 5

Interpretation of paragraph 5.1.1

1 Where the electrical power is normally supplied by more than one generator set simultaneously in parallel operation, provision of protection, including automatic disconnection of sufficient non-essential services and, if necessary, secondary essential services as defined in the unified interpretation of SOLAS regulations II-1/40 and II-1/41 (see chapter 5 above) and those provided for habitability, should be made to ensure that, in case of loss of any of these generating sets, the remaining ones are kept in operation to permit propulsion and steering and to ensure safety.

2 Where Administrations permit electrical power to be normally supplied by one generator, provision should be made, upon loss of power, for automatic starting and connecting to the main switchboard of stand-by generator(s) of sufficient capacity with automatic restarting of the essential auxiliaries, in sequential operation if required. Starting and connection to the main switchboard of one generator should be as rapid as possible, preferably within 30 seconds after loss of power. Where prime movers with longer starting time are used, this starting and connection time may be exceeded upon approval from the Administration.

Interpretation of paragraph 5.1.2

3 The load shedding should be automatic.

4 The non-essential services, service for habitable conditions, may be shed and, where necessary, additionally the Secondary Essential Services, sufficient to ensure the connected generator set(s) is/are not overloaded.

Interpretation of paragraph 5.1.3

1 Other approved means can be achieved by:

.1 circuit breaker without tripping mechanism; or

.2 disconnecting link or switch by which busbars can be split easily and safely.

2 Bolted links, for example bolted busbar sections, should not be accepted.

7 SOLAS REGULATIONS II-1/42 AND II-1/43 – EMERGENCY SOURCE OF ELECTRICAL POWER IN PASSENGER AND CARGO SHIPS

Interpretation

1 "Blackout" as used in regulations II-1/42.3.4 and II-1/43.3.4 should be understood to mean a "dead ship" condition-initiating event.

2 "Dead ship" condition, for the purpose of regulations II-1/42.3.4 and II-1/43.3.4, should be understood to mean a condition under which the main propulsion plant, boilers and auxiliaries are not in operation and in restoring the propulsion, no stored energy for starting the propulsion plant, the main source of electrical power and other essential auxiliaries should be assumed available. It is assumed that means are available to start the emergency generator at all times.

3 Emergency generator stored starting energy is not to be directly used for starting the propulsion plant, the main source of electrical power and/or other essential auxiliaries (emergency generator excluded).

4 For steam ships, the 30-min time limit given in SOLAS can be interpreted as time from blackout defined above to light-off of the first boiler.

5 Exceptionally is understood to mean conditions such as:

.1 blackout situation;

.2 dead ship situation;

.3 routine use for testing;

.4 short-term parallel operation with the main source of electrical power for the purpose of load transfer; and

.5 use of the emergency generator during lay time in port for the supply of the ship's main switchboard, provided the requirements of 6 (Suitable measures for the exceptional use of the emergency generator for power-supply of non-emergency circuits in port) are achieved and unless instructed otherwise by the Administration.

6 Suitable measures for the exceptional use of the emergency generator for power-supply of non-emergency circuits in port:

.1 To prevent the generator or its prime mover from becoming overloaded when used in port, arrangements should be provided to shed sufficient non-emergency loads to ensure its continued safe operation.

.2 The prime mover should be arranged with fuel oil filters and lubrication oil filters, monitoring equipment and protection devices as required for the prime mover for main power generation and for unattended operation.

.3 The fuel oil supply tank to the prime mover should be provided with a low-level alarm, arranged at a level ensuring sufficient fuel oil capacity for the emergency services for the period of time as required by SOLAS.

.4 The prime mover should be designed and built for continuous operation and should be subjected to a planned maintenance scheme ensuring that it is always available and capable of fulfilling its role in the event of an emergency at sea.

.5 Fire detectors should be installed in the location where the emergency generator set and emergency switchboard are installed.

.6 Means should be provided to readily change over to emergency operation.

.7 Control, monitoring and supply circuits, for the purpose of the use of emergency generator in port should be so arranged and protected that any electrical fault will not influence the operation of the main and emergency services.

.8 When necessary for safe operation, the emergency switchboard should be fitted with switches to isolate the circuits.

.9 Instructions should be provided on board to ensure that when the ship is under way all control devices (e.g. valves, switches) are in a correct position for the independent emergency operation of the emergency generator set and emergency switchboard.

8 SOLAS REGULATION II-1/44 – STARTING ARRANGEMENTS FOR EMERGENCY GENERATING SETS

8.1 PARAGRAPH 1

Interpretation (from MSC/Circ.736)

Emergency generating sets should be capable of being readily started in their cold condition at a temperature of 0ºC. If this is impracticable, or if lower temperatures are likely to be encountered, heating should be provided to ensure ready starting of the generating sets.

8.2 PARAGRAPH 2

Interpretation (from MSC/Circ.736)

Each emergency generating set arranged to be automatically started should be equipped with starting devices with a stored energy capability of at least three consecutive starts. A second source of energy should be provided for an additional three starts within 30 min unless manual starting can be demonstrated to be effective.

9 SOLAS REGULATION XII/12 – HOLD, BALLAST AND DRY SPACE WATER INGRESS ALARMS

When water level detectors are installed on bulk carriers in compliance with regulation XII/12, the *Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers*, annexed to resolution MSC.188(79) adopted on 3 December 2004, should be applied, taking into account the following interpretations to the paragraphs of the Performance standards.

9.1 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, PARAGRAPH 3.2.3

Interpretation

Detection equipment includes the sensor and any filter and protection arrangements for the detector installed in cargo holds and other spaces as required by regulation XII/12.1.

9.2 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, PARAGRAPH 3.2.5

Interpretation

1 In general, the construction and type testing should be in accordance with publication IEC 60079: Electrical Equipment for Explosive Gas Atmospheres to a minimum requirement of EX(ia). Where a ship is designed only for the carriage of cargoes that cannot create a combustible or explosive atmosphere then the requirement for intrinsically safe circuitry should not be insisted upon, provided the operational instructions included in the Manual required by 4.1 of the appendix to the annex specifically exclude the carriage of cargoes that could produce a potential explosive atmosphere. Any exclusion of cargoes identified in the annex should be consistent with the ship's Cargo Book and any Certification relating to the carriage of specifically identified cargoes.

2 The maximum surface temperature of equipment installed within cargo spaces should be appropriate for the combustible dusts and/or explosive gases likely to be encountered. Where the characteristics of the dust and gases are unknown, the maximum surface temperature of equipment should not exceed 85ºC.

3 Where intrinsically safe equipment is installed, it should be of a certified safe type.

4 Where detector systems include intrinsically safe circuits, plans of the arrangements should be appraised/approved by individual classification societies.

9.3 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, PARAGRAPH 3.3.2

Interpretation

The pre-alarm, as a primary alarm, should indicate a condition that requires prompt attention to prevent an emergency condition and the main alarm, as an emergency alarm should indicate that immediate actions must be taken to prevent danger to human life or to the ship.

9.4 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, PARAGRAPH 3.3.7

Interpretation

Fault monitoring should address faults associated with the system that include open circuit, short circuit, as well as arrangement details that would include loss of power supplies and CPU failure for computer based alarm/monitoring system, etc.

9.5 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, PARAGRAPH 3.3.8

Interpretation

1 The electrical power supply should be from two separate sources, one should be the main source of electrical power and the other should be the emergency source, unless a continuously charged dedicated accumulator battery is fitted, having arrangement, location and endurance equivalent to that of the emergency source (18 hours). The battery supply may be an internal battery in the water level detector system.

2 The changeover arrangement of supply from one electrical source to another need not be integrated into the water level detector system.

3 Where batteries are used for the secondary power supply, failure alarms for both power supplies should be provided.

9.6 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, FOOTNOTE TO PARAGRAPH 3.4.1

Interpretation

1 IACS UR E10 may be used as an equivalent test standard to IEC 60092-504.

2 The range of tests should include the following:

For alarm/monitoring panel:

.1 functional tests in accordance with resolution MSC.188(79) on the *Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers*;

.2 electrical power supply failure test;

.3 power supply variation test;

.4 dry heat tests;

.5 damp heat tests;

.6 vibration test;

.7 EMC tests;

.8 insulation resistance test;

.9 high-voltage test; and

.10 static and dynamic inclinations tests, if moving parts are contained.

For IS barrier unit, if located in the wheelhouse: in addition to the certificate issued by a competent independent testing laboratory, EMC tests should also be carried out.

For water ingress detectors:

.1 functional tests in accordance with resolution MSC.188(79) on the *Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers*;

.2 electrical power supply failure test;

.3 power supply variation test;

.4 dry-heat test;

.5 damp-heat test;

.6 vibration test;

.7 enclosure class in accordance with resolution MSC.188(79) on the *Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers*;

.8 insulation resistance test;

.9 high-voltage test; and

.10 static and dynamic inclinations tests (if the detectors contain moving parts).

9.7 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, APPENDIX, PARAGRAPH 2.1.1

Interpretation

The test procedure should satisfy the following criteria:

.1 the type tests should be witnessed by a classification society surveyor if the tests are not carried out by a competent independent test facility;

.2 type tests should be carried out on a prototype or randomly selected item(s) which are representative of the manufactured item that is being type tested; and

.3 type tests should be documented (type test reports) by the manufacturer and submitted for review by classification societies.

9.8 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, APPENDIX, PARAGRAPH 2.1.1.1

Interpretation

1 The submerged test period for electrical components intended to be installed in ballast tanks and cargo tanks used as ballast tanks should be not less than 20 days.

2 The submerged test period for electrical components intended to be installed in dry spaces and cargo holds not intended to be used as ballast tanks should be not less than 24 hours.

3 Where a detector and/or cable connecting device (e.g. junction box, etc.) is installed in a space adjacent to a cargo hold (e.g. lower stool, etc.) and the space is considered to be flooded under damage stability calculations, the detectors and equipment should satisfy the requirements of IP68 for a water head equal to the hold depth for a period of 20 days or 24 hours on the basis of whether or not the cargo hold is intended to be used as a ballast tank as described in the previous paragraphs.

9.9 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, APPENDIX, PARAGRAPH 2.1.1.2

Interpretation

1 The type test required for the sensor should be in accordance with the following:

.1 The test container for the cargo/water mixture should be dimensioned so that its height and volume are such that the sensor and any filtration fitted can be totally submerged for the repeated functionality tests required by paragraph 2.1.1.2 and the static and dynamic inclination tests identified in the previous interpretation.

.2 The sensor and any filtration fitted that should be submerged and should be arranged in the container as they would be installed in accordance with the installation instructions required by paragraph 4.4.

.3 The pressure in the container for testing the complete detector should be not more than 0.2 bar at the sensor and any filter arrangement. The pressure may be realized by pressurization or by using a container of sufficient height.

.4 The cargo/water mixture should be pumped into the test container and suitable agitation of the mixture provided to keep the solids in suspension. The effect of pumping the cargo/water mixture into the container should not affect the operation of the sensor and filter arrangements.

.5 The cargo/water mixture should be pumped into the test container to a predetermined level that submerges the detector and the operation of the alarm observed.

.6 The test container should then be drained and the deactivation of the alarm condition observed.

.7 The test container and sensor with any filter arrangement should be allowed to dry without physical intervention.

.8 The test procedure should be repeated consecutively ten times without cleaning any filter arrangement that may be fitted in accordance with the manufacturer's installation instructions (see also 2.1.1.2).

.9 Satisfactory alarm activation and deactivation at each of the 10 consecutive tests will demonstrate satisfactory type testing.

2 The cargo/water mixture used for type testing should be representative of the range of cargoes within the following groups and should include the cargo with the smallest particles expected to be found from a typical representative sample:

.1 iron ore particles and seawater;

.2 coal particles and seawater;

.3 grain particles and seawater; and

.4 aggregate (sand) particles and seawater.

The smallest and largest particle size together with the density of the dry mixture should be ascertained and recorded. The particles should be evenly distributed throughout the mixture. Type testing with representative particles will in general qualify all types of cargoes within the four groupings shown above.

The following provides guidance on the selection of particles for testing purposes:

.1 Iron ore particles should mainly consist of small loose screenings of iron ore and not lumps of ore (dust with particle size < 0.1 mm).

.2 Coal particles should mainly consist of small loose screenings of coal and not lumps of coal (dust with particle size < 0.1 mm).

.3 Grain particles should mainly consist of small loose grains of free-flowing grain (grain having a size > 3 mm, such as wheat).

.4 Aggregate particles should mainly consist of small loose grains of free-flowing sand and without lumps (dust with particle size < 0.1 mm).

9.10 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, APPENDIX, PARAGRAPH 3.1.1

Interpretation

The test procedure should satisfy the following criteria:

.1 type tests should be witnessed by a classification society surveyor if the tests are not carried out by a competent independent test facility;

.2 type tests should be carried out on a prototype or randomly selected item(s) which are representative of the manufactured item that is being type tested; and

.3 type tests should be documented (type test reports) by the manufacturer and submitted for review by classification societies.

9.11 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS, APPENDIX, SECTION 4 – MANUALS

Interpretation

For each ship, a copy of the manual should be made available to the surveyor at least 24 hours prior to survey of the water-level detection installation. Each classification society should ensure that any plans required for classification purposes have been appraised/approved as appropriate.

10 SOLAS REGULATION XII/13 – AVAILABILITY OF PUMPING SYSTEMS

SOLAS REGULATION XII/13.1 AND MSC/CIRC.1069

Dewatering of forward spaces of bulk carriers

Interpretation

1 Where the piping arrangements for dewatering closed dry spaces are connected to the piping arrangements for the drainage of water ballast tanks, two non-return valves should be provided to prevent the ingress of water into dry spaces from those intended for the carriage of water ballast. One of these non-return valves should be fitted with a shut-off isolation arrangement. The non-return valves should be located in readily accessible positions. The shut-off isolation arrangement should be capable of being controlled from the navigation bridge, the propulsion machinery control position or enclosed space which is readily accessible from the navigation bridge or the propulsion machinery control position without travelling exposed freeboard or superstructure decks. In this context, a position which is accessible via an under-deck passage, a pipe trunk or other similar means of access should not be taken as being in the "readily accessible enclosed space".

2 Under regulation XII/13.1:

.1 the valve specified under SOLAS regulation II-1/12.5.1 should be capable of being controlled from the navigation bridge, the propulsion machinery control position or enclosed space which is readily accessible from the navigation bridge or the propulsion machinery control position without travelling exposed freeboard or superstructure decks. In this context, a position which is accessible via an under-deck passage, a pipe trunk or other similar means of access should not be taken as being in the "readily accessible enclosed space";

.2 the valve should not move from the demanded position in the case of failure of the control system power or actuator power;

.3 positive indication should be provided at the remote control station to show that the valve is fully open or closed; and

.4 local hand-powered valve operation from above the freeboard deck, as permitted under SOLAS regulation II-1/12.5.1, is required. An acceptable alternative to such arrangement may be remotely operated actuators as specified in regulation XII/13.1, on the condition that all of the provisions of regulation XII/13.1 are met.

3 The dewatering arrangements should be such that any accumulated water can be drained directly by a pump or eductor.

4 The dewatering arrangements should be such that when they are in operation, other systems essential for the safety of the ship, including firefighting and bilge systems, remain available and ready for immediate use. The systems for normal operation of electric power supplies, propulsion and steering should not be affected by the operation of the dewatering systems. It should also be possible to immediately start fire pumps and have a readily available supply of firefighting water, and to be able to configure and use the bilge system for any compartment when the dewatering system is in operation.

5 Bilge wells should be provided with gratings or strainers that will prevent blockage of the dewatering system with debris.

6 The enclosures of electrical equipment for the dewatering system installed in any of the forward dry spaces should provide protection to IPX8 standard as defined in publication IEC 60529 for a water head equal to the height of the space in which the electrical equipment is installed for a time duration of at least 24 hours.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1573
9 June 2017

UNIFIED INTERPRETATION OF SOLAS REGULATIONS II-1/2.20 AND II-2/3.21

1 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), with a view to providing more specific guidance on the deadweight to be stated on certificates, approved the unified interpretation of SOLAS regulations II-1/2.20 and II-2/3.21, prepared by the Sub-Committee on Ship Design and Construction, at its fourth session (13 to 17 February 2017), as set out in the annex.

2 Member States are invited to use the annexed unified interpretation as guidance when applying SOLAS regulations II-1/2.20 and II-2/3.21 to determine the regulatory deadweight to be entered on relevant statutory certificates, and to bring the unified interpretations to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION OF SOLAS REGULATIONS II-1/2.20 AND II-2/3.21

Deadweight to be stated on certificates

Even-keel hydrostatics should be used to determine the regulatory deadweight to be entered on relevant statutory certificates.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1576
16 June 2017

UNIFIED INTERPRETATION OF THE PROVISIONS OF SOLAS RELATING TO THE ANNUAL TESTING OF THE VDR, S-VDR, AIS AND EPIRB

1 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), approved the unified interpretation of SOLAS regulations V/18.8, V/18.9 and IV/15.9 relating to the annual testing of VDR, S-VDR, AIS and EPIRB, prepared by the Sub-Committee on Navigation, Communications and Search and Rescue at its fourth session (6 to 10 March 2017), as set out in the annex.

2 Member States are invited to use the annexed unified interpretation as guidance when applying SOLAS regulations V/18.8, V/18.9 and IV/15.9, and to bring the unified interpretation to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION OF THE PROVISIONS OF SOLAS RELATING TO THE ANNUAL TESTING OF THE VDR, S-VDR, AIS AND EPIRB

SOLAS regulation V/18.8 – Annual performance test of voyage data recorder (VDR) and simplified voyage data recorder (S-VDR)

Interpretation

The annual performance test of VDR (or S-VDR) shall be carried out within the "time window" of the annual / periodical / renewal survey under the Harmonized System of Survey and Certification (HSSC), but not later than the date of completion of the survey for endorsement / renewal of the relevant Certificate.

SOLAS regulation V/18.9 – Annual performance test of automatic identification system (AIS)

Interpretation

The annual performance test of the AIS shall be carried out within the "time window" of the annual / periodical / renewal survey under the Harmonized System of Survey and Certification (HSSC), but not later than the date of completion of the survey for endorsement / renewal of the relevant Certificate.

SOLAS regulation IV/15.9 – Annual test of EPIRB

Interpretation

The annual test of the EPIRBs shall be carried out within the "time window" of the prescribed survey, but not later than the date of completion of the survey for endorsement / renewal of the relevant Certificate.

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INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1577
16 June 2017

UNIFIED INTERPRETATION ON THE APPLICATION OF COLREG WITH RESPECT TO THE PLACEMENT OF SIDELIGHTS

1 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), with a view to providing an interim solution related to the placement of sidelights in relation to annex I/9(a)(i) and annex I/10(a)(i) of COLREG 1972, as amended, approved a unified interpretation, as set out in the annex.

2 The unified interpretation, as set out in the annex, is limited to sidelights that are located "at or near the side" as interpreted by MSC.1/Circ.1260/Rev.1, and that are not fully visible for the horizontal plane applied throughout the vertical sector on the condition that the sidelights are visible at 1000 m from the stem at sea level.

3 Member States are invited to use the annexed unified interpretation as guidance on the placement of sidelights according to annex I/9(a)(i) and annex I/10(a)(i) of COLREG 1972, as amended, on ships contracted for construction on or after 1 July 2019, and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATION ON THE APPLICATION OF COLREG WITH RESPECT TO THE PLACEMENT OF SIDELIGHTS

Annex I/9(a)(i) and annex I/10(a)(i) of COLREG 1972, as amended, state:

"9 – Horizontal sectors

(a) (i) In the forward direction, sidelights as fitted on the vessel shall show the minimum required intensities. The intensities must decrease to reach practical cut-off between 1 degree and 3 degrees outside the prescribed sectors."

"10 – Vertical sectors

(a) The vertical sectors of electric lights as fitted, with the exception of lights on sailing vessels underway, shall ensure that:

(i) at least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the horizontal;"

Interpretations with respect to sidelights' horizontal sectors

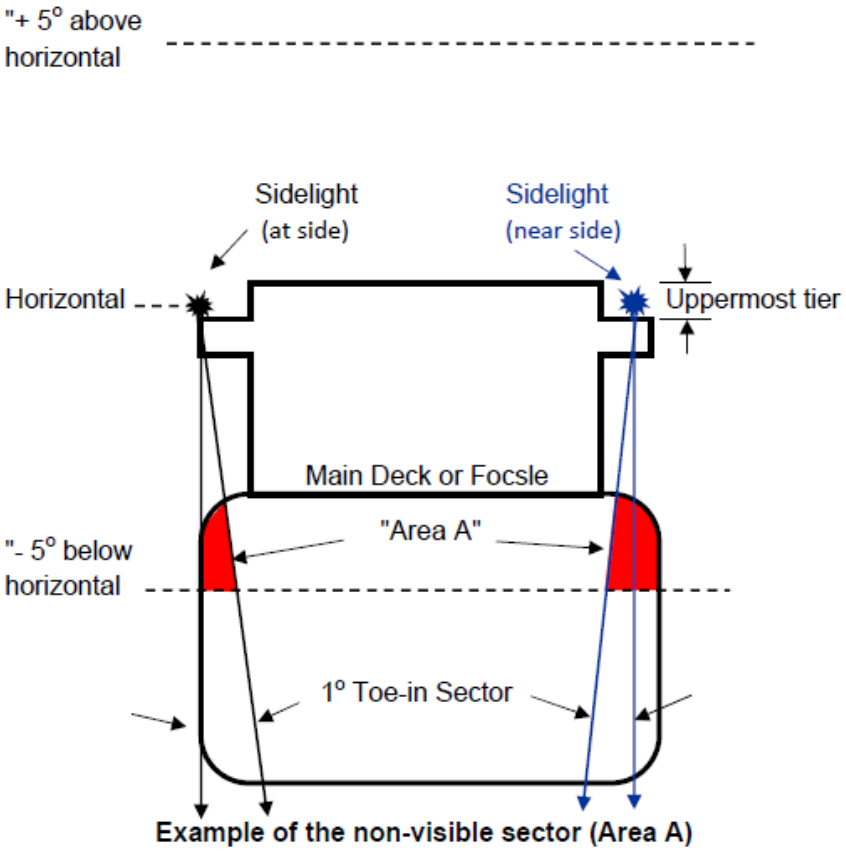
9(a)(i) – Horizontal sectors (noting MSC.1/Circ.1427 and MSC.1/Circ.1260/Rev.1)

COLREG annex I, section 9(a)(i) would require the full intensity of the sidelights to be maintained in the forward direction of 1° outside the prescribed sector (one-degree toe-in sector) with the practical cut-off between 1° and 3°. This is needed to enable other vessels to determine a "head-on-situation" as per COLREG rule 14.

10(a)(i) – Vertical sectors

Where sidelights, installed in a position at or "near the side",[1] are not fully visible at all angles from 5 degrees above to 5 degrees below the horizontal including the 1° toe-in sector (e.g. see Area A), then that installation is acceptable provided the installed sidelights are visible, with the ship in all normal conditions of trim corresponding to the lightest seagoing draught in the approved *Trim and stability booklet,* at a minimum distance of 1000 m measured from the stem when viewed from sea level throughout the horizontal plane of 112.5° defined by rule 21(b) including the horizontal 1° toe-in sector in the forward direction prescribed in 9(a)(i).

[1] Refer to MSC.1/Circ.1260, Rev.1 for interpretation of "near the side".



Example of the non-visible sector (Area A)

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1581
16 June 2017

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-2

1 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), with a view to providing more specific guidance on suitable means for the calibration of portable atmosphere testing instruments for cargo areas of tankers; fire integrity of the boundaries of spaces within the cargo area of tankers; and fire integrity of the bulkheads between the wheelhouse and the navigation lockers inside the wheelhouse, approved Unified interpretations of SOLAS chapter II-2, prepared by the Sub-Committee on Ship Systems and Equipment, at its fourth session (20 to 24 March 2017), as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying the provisions of SOLAS regulations II-2/4 and II-2/9, and to bring the unified interpretations to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF SOLAS CHAPTER II-2

REGULATION 4.5.7 – GAS MEASUREMENT AND DETECTION

Regulation 4.5.7.1 – Portable instrument

Compliance with the provision "suitable means shall be provided for the calibration of such instruments" in SOLAS regulation II-2/4.5.7.1, as adopted by resolution MSC.291(87), may be achieved by portable atmosphere testing instruments being calibrated on board or ashore in accordance with the manufacturer's instructions.

For the avoidance of any doubt, the above consideration refers to the calibration of portable instruments for measuring oxygen or flammable vapour concentrations, as required by SOLAS regulation II-2/4.5.7.1, and not to any pre-operational accuracy tests as recommended by the manufacturer.

REGULATION 9.2 – THERMAL AND STRUCTURAL BOUNDARIES

Regulation 9.2.2 – Passenger ships

Regulation 9.2.2.4.2

Regulation 9.2.3 – Cargo ships except tankers

Regulation 9.2.3.3.2

Regulation 9.2.4 – Tankers

Regulation 9.2.4.2.2

A navigation locker that can only be accessed from the wheelhouse should be considered as a control station with respect to the requirements in tables 9.3, 9.5 and 9.7 of regulation 9, and the bulkhead separating the wheelhouse and such a locker should have fire integrity of at least "B-0" class.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1582
16 June 2017

UNIFIED INTERPRETATIONS OF CHAPTER 15 OF THE FSS CODE

1 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), with a view to providing more specific guidance on requirements related to inert gas systems on tankers, approved Unified interpretations of chapter 15 of the FSS Code, prepared by the Sub-Committee on Ship Systems and Equipment, at its fourth session (20 to 24 March 2017), as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying paragraphs 15.2.2.2.2, 15.2.2.3.2.2, 15.2.2.4.1 and 15.2.2.4.5 of chapter 15 of the FSS Code, and to bring the unified interpretations to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF CHAPTER 15 OF THE FSS CODE

CHAPTER 15 – INERT GAS SYSTEMS

Paragraph 15.2.2.2.2

The automatic shutdown of the inert gas system and its components should involve the following:

.1 shutdown of fans and closing of regulating valve for the following:

.1 high water level in scrubber (not applicable for N_2);

.2 low pressure/flow to scrubber (not applicable for N_2); or

.3 high-high temperature of inert gas supply.

.2 closing of regulating valve in the event of:

.1 high oxygen content (in excess of 5% by volume); or

.2 failure of blowers/fans or N_2 compressors.

.3 activation of double-block and bleed arrangement upon:

.1 loss of inert gas supply (for ships with double block and bleed replacing water seal); or

.2 loss of power.

Paragraph 15.2.2.3.2.2

Unambiguous information regarding the operational status of stop valves in branch piping leading from the inert gas main to cargo tanks means position indicators providing open/intermediate/closed status information in the control panel required in paragraph 15.2.2.4. Limit switches should be used to positively indicate both open and closed positions. Intermediate position status should be indicated when the valve is in neither open nor closed position.

Paragraph 15.2.2.4.1

The operational status of the inert gas system should be based on indication that inert gas is being supplied downstream of the gas regulating valve and on the pressure or flow of the inert gas mains upstream of the non-return devices. However, the operational status of the inert gas system as required in paragraph 15.2.2.4.1 should not be considered to require additional indicators and alarms other than those specified in paragraphs 15.2.2.4 and 15.2.3.2 or 15.2.4.2, as appropriate.

Paragraph 15.2.2.4.5.3

The term "alarm system independent" means that a second pressure sensor, independent of the sensor serving the alarms for low pressure, high pressure and pressure indicator/recorder should be provided. Notwithstanding the above, a common programmable logic controller (PLC) should, however, be accepted for the alarms in the control system. The independent sensor should not be required if the system is arranged for the shutdown of cargo pumps. If a system for shutdown of cargo pumps is arranged, an automatic system shutting down all cargo pumps should be provided. The shutdown should be alarmed at the control station. The shutdown should not prevent the operation of ballast pumps or pumps used for bilge drainage of a cargo pump room.

INTERNATIONAL MARITIME ORGANIZATION

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

E

MSC.1/Circ.1583
16 June 2017

AMENDMENT TO THE UNIFIED INTERPRETATION OF SOLAS REGULATION II-1/29 (MSC.1/CIRC.1398)

1 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), with a view to keeping the references provided in the unified interpretation up to date, approved the amendment to the *Unified interpretation of SOLAS regulation II-1/29* (MSC.1/Circ.1398), prepared by the Sub-Committee on Ship Systems and Equipment, at its fourth session (20 to 24 March 2017), as set out in the annex.

2 Member States are invited to use the unified interpretation in conjunction with the annexed amendment as guidance when applying SOLAS regulation II-1/29, and to bring the amendment to the unified interpretation to the attention of all parties concerned.

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ANNEX

AMENDMENT TO THE MECHANICAL, HYDRAULIC AND ELECTRICAL INDEPENDENCY AND FAILURE DETECTION AND RESPONSE OF STEERING CONTROL SYSTEMS

The reference "; and IEC Publication 60092-204 *Electrical installations in ships. Part 204: System design – Electric and electrohydraulic steering gear (1987)*" in section 1 is deleted.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1590
11 June 2018

UNIFIED INTERPRETATION OF PARAGRAPH 13.3.5 OF THE IGC CODE (AS AMENDED BY RESOLUTION MSC.370(93))

1 The Maritime Safety Committee, at its ninety-ninth session (16 to 25 May 2018), with a view to providing more specific guidance on the expression "each dry-docking" in the context of testing of high-level alarms on liquefied gas tankers, approved the following unified interpretation of paragraph 13.3.5 of the International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) (as amended by resolution MSC.370(93)), prepared by the Sub-Committee on Carriage of Cargoes and Containers, at its fourth session:

UNIFIED INTERPRETATION OF PARAGRAPH 13.3.5 OF THE IGC CODE (AS AMENDED BY RESOLUTION MSC.370(93))

Testing of high-level alarms

The expression "each dry-docking" is considered to be the survey of the outside of the ship's bottom required for the renewal of the Cargo Ship Safety Construction Certificate and/or the Cargo Ship Safety Certificate.

2 Member States are invited to use the above unified interpretation as guidance when applying the relevant provision of the IGC Code and to bring it to the attention of all parties concerned.

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1591
11 June 2018

UNIFIED INTERPRETATIONS OF THE IGF CODE

1 The Maritime Safety Committee, at its ninety-ninth session (16 to 25 May 2018), with a view to providing more specific guidance for the application of the relevant requirements of the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code), approved unified interpretations of the Code, prepared by the Sub-Committee on Carriage of Cargoes and Containers, at its fourth session, as set out in the annex.

2 Member States are invited to use the annexed unified interpretations as guidance when applying relevant provisions of the IGF Code and to bring them to the attention of all parties concerned.

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ANNEX

UNIFIED INTERPRETATIONS OF THE IGF CODE

1 Storage tanks loading limits higher than calculated using the reference temperature (paragraph 6.8.2)

The alternative loading limit option given under 6.8.2 is understood to be an alternative to 6.8.1 and should only be applicable when the calculated loading limit using the formulae in 6.8.1 gives a lower value than 95%.

2 Other rooms with high fire risk (paragraph 11.3.3)

The following "other rooms with high fire risk" should as a minimum be considered, but not be restricted to:

.1 cargo spaces except cargo tanks for liquids with flashpoint above 60°C and except cargo spaces exempted in accordance with SOLAS regulations II-2/10.7.1.2 or II-2/10.7.1.4;

.2 vehicle, ro-ro and special category spaces;

.3 service spaces (high risk): galleys, pantries containing cooking appliances, saunas, paint lockers and store-rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids and workshops other than those forming part of the machinery space, as provided in SOLAS regulations II-2/9.2.2.4, II-2/9.2.3.3 and II-2/9.2.4; and

.4 accommodation spaces of greater fire risk: saunas, sale shops, barber shops and beauty parlours and public spaces containing furniture and furnishing of other than restricted fire risk and having deck area of 50 m^2 or more, as provided in SOLAS regulation II-2/9.2.2.3.

3 Level indicator in the bilge well of tank connection spaces of independent liquefied gas storage tanks (paragraph 15.3.2)

The "level indicator" required by 15.3.2 of the IGF Code is understood to be required for the purposes of indicating an alarm status only; a level switch (float switch) is an instrument example considered to meet this requirement.

4 Testing of high level alarms (paragraph 15.4.2.3)

The expression "each dry-docking" refers to:

.1 for cargo ships, the survey of the outside of the ship's bottom required for the renewal of the Cargo Ship Safety Construction Certificate and/or the Cargo Ship Safety Certificate; and

.2 for passenger ships, the survey of the outside of the ship's bottom to be carried out according to paragraphs 5.10.1 and 5.10.2 of the *Survey Guidelines under the Harmonized System of Survey and Certification, (HSSC), 2017* (resolution A.1121(30), as may be amended).