



MARITIME SAFETY COMMITTEE
79th session
Agenda item 23

MSC 79/23/Add.2
21 December 2004
Original: ENGLISH

**REPORT OF THE MARITIME SAFETY COMMITTEE
ON ITS SEVENTY-NINTH SESSION**

Attached are annexes 23 to 37, 39 and 41 to 45 to the report of the Maritime Safety Committee on its seventy-ninth session (MSC 79/23).

For reasons of economy, this document is printed in a limited number. Delegates are kindly asked to bring their copies to meetings and not to request additional copies.

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ANNEX 23

**DRAFT SOLAS REGULATION II-1/3-7 –
CONSTRUCTION DRAWINGS MAINTAINED ON BOARD AND ASHORE**

**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-1
STRUCTURE OF SHIPS**

The following new regulation 3-7 is added after existing regulation 3-6:

**“Regulation 3-7
Construction drawings maintained on board and ashore**

- 1 A set of as-built construction drawings* and other plans showing any subsequent structural alterations shall be kept on board a ship constructed on or after [1 January 2007].
- 2 An additional set of such drawings shall be kept ashore by the Company, as defined in regulation IX/1.2.”

* Refer to MSC/Circ.1135 on As-built construction drawings to be maintained on board the ship and ashore.

ANNEX 24

**DRAFT SOLAS REGULATION II-1/3-8 –
MOORING AND TOWING EQUIPMENT**

**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**

The following new regulation is added:

**“Regulation 3-8
Towing and mooring equipment**

- 1 This regulation applies to ships constructed on or after [...], but does not apply to emergency towing arrangements provided in accordance with regulation 3-4.
- 2 Ships shall be provided with arrangements, equipment and fittings of sufficient safe working load to enable the safe conduct of all towing and mooring operations associated with the normal operation of the ship.
- 3 Arrangements, equipment and fittings provided in accordance with paragraph 2 shall meet the appropriate requirements of the Administration or an organization recognized by the Administration under regulation I/6.*
- 4 Each fitting or item of equipment provided under this regulation shall be clearly marked with any restrictions associated with its safe operation, taking into account the strength of its attachment to the ship’s structure.”

* Refer to MSC/Circ.[...] to be developed.

ANNEX 25

**DRAFT SOLAS REGULATION II-1/23-3 – WATER LEVEL DETECTORS
ON SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS**

**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**

The following new regulation 23-3 is added after existing regulation 23-2:

**“Regulation 23-3
Water level detectors on single hold cargo ships other than bulk carriers**

- 1 Single hold cargo ships other than bulk carriers constructed before [...] shall comply with the requirements of this regulation not later than the date of the intermediate or renewal survey of the ship to be carried out after [...], whichever comes first.
- 2 For the purpose of this regulation, freeboard deck has the meaning defined in the International Convention on Load Lines in force.
- 3 Ships having a length (L_s as defined in part B-1 of this chapter) of less than 80 m, or 100 m if constructed before 1 July 1998, and a single cargo hold below the freeboard deck or cargo holds below the freeboard deck which are not separated by at least one bulkhead made watertight up to that deck, shall be fitted in such space or spaces with water level detectors*.
- 4 The water level detectors required by paragraph 3 shall:
 - .1 give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and
 - .2 be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, Administrations may require the fitting of additional detectors.
- 5 The water level detectors required by paragraph 3 need not be fitted in ships complying with regulation XII/12, or in ships having watertight side compartments each side of the cargo hold length extending vertically at least from inner bottom to freeboard deck.”

* Refer to resolution MSC.188(79) on Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers.

ANNEX 26

**RESOLUTION MSC.188(79)
(adopted on 3 December 2004)****PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS
ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS
OTHER THAN BULK CARRIERS**

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, at its seventy-sixth session, it adopted amendments to chapter XII of the International Convention for the Safety of Life at Sea (SOLAS), 1974, *inter alia*, by introducing new regulation 12 requiring the installation of water level detectors for hold, ballast and dry spaces, which entered into force on 1 July 2004,

RECALLING FURTHER that, at its seventy-ninth session, it approved proposed amendments to chapter II-1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, introducing new regulation 23-3 requiring the installation of water level detectors on single hold cargo ships other than bulk carriers,

BEARING IN MIND that the above-mentioned proposed amendments are expected to be adopted at its eightieth session in May 2005 and to enter into force on a date to be determined at that session, unless, prior to that date, specified conditions with regard to objections to the amendments are met,

RECOGNIZING that performance standards against which the operation and efficiency of water level detectors can be measured should be made available in good time before the above entry-into-force date,

RECOGNIZING ALSO the need to ensure that the required water level detectors operate reliably and that, to that extent, they are appropriately tested and installed,

HAVING CONSIDERED the recommendations made by the Sub-Committee on Ship Design and Equipment at its forty-sixth and forty-seventh sessions,

1. ADOPTS the Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers and the appended Guidelines on installation and testing of water level detection systems for bulk carriers and single hold cargo ships other than bulk carriers, as set out in the Annex to the present resolution;
2. URGES Governments to ensure that the annexed Performance standards and appended Guidelines are applied when water level detectors are installed on bulk carriers and single hold cargo ships other than bulk carriers flying their flags, in compliance with SOLAS regulation XII/12 and the afore-mentioned SOLAS regulation II-1/23-3, as appropriate;
3. REVOKES resolution MSC.145(77).

ANNEX

PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS

1 PURPOSE

These standards provide technical functional requirements for water level detection and alarm arrangements installed in bulk carriers for compliance with SOLAS regulation XII/12 or in single hold cargo ships other than bulk carriers for compliance with SOLAS regulation II-1/23-3.*

2 DEFINITIONS

2.1 *Water level detector* means a system comprising sensors and indication devices that detect and warn of water ingress in cargo holds and other spaces as required in SOLAS regulations XII/12.1 or II-1/23-3.

2.2 *Sensor* means a unit fitted at the location being monitored that activates a signal to identify the presence of water at the location.

2.3 *Pre-alarm level* means the lower level at which the sensor(s) in the cargo hold space will operate.

2.4 *Main alarm level* means the higher level at which the sensor(s) in the cargo hold space will operate or the sole level in spaces other than cargo holds to which the requirements of SOLAS regulations XII/12 or II-1/23-3 apply.

2.5 *Visual indication* means indication by activation of a light or other device that is visible to the human eye in all levels of light or dark at the location where it is situated.

2.6 *Audible indication* means an audible signal that is detectable at the location where it is signalled.

3 FUNCTIONAL REQUIREMENTS

3.1 Means of detecting the water level

3.1.1 The method of detecting the water level may be by direct or indirect means as defined below:

- .1 A direct means of detection determines the presence of water by physical contact of the water with the detection device.
- .2 Indirect means of detection include devices without physical contact with the water.

* Refer to the third, fourth and fifth preambular paragraphs of the covering MSC resolution.

3.1.2 The sensors should be capable of being located, in the case of single hold cargo ships complying with SOLAS regulation II-1/23-3, in the aft part of the hold or above its lowest point in such ships having an inner bottom not parallel to the designed waterline, or, in the case of bulk carriers complying with SOLAS regulation XII/12, in the aft part of each cargo hold or in the lowest part of the spaces other than cargo holds to which that regulation applies.

3.1.3 The systems of detecting the water level should be capable of continuous operation while the ship is at sea.

3.2 Detector system requirements

3.2.1 Detector systems should provide a reliable indication of water reaching a preset level.

3.2.2 The system should be capable of the following:

For cargo holds:

- .1 An alarm, both visual and audible, activated when the depth of water at the sensor reaches the pre-alarm level in the space being monitored. The indication should identify the space.
- .2 An alarm, both visual and audible, activated when the level of water at the sensor reaches the main alarm level, indicating increasing water level in a cargo hold. The indication should identify the space and the audible alarm should not be the same as that for the pre-alarm level.

For compartments other than cargo holds:

- .3 An alarm, both visual and audible, indicating the presence of water in a compartment other than a cargo hold when the level of water in the space being monitored reaches the sensor. The visual and audible characteristics of the alarm indication should be the same as those for the main alarm level in a hold space.

3.2.3 Detection equipment should be suitably corrosion resistant for all intended cargoes.

3.2.4 The detector indicating the water level should be capable of activating to an accuracy of ± 100 mm.

3.2.5 The part of the system which has circuitry in the cargo area should be intrinsically safe.

3.3 Alarm system requirements

3.3.1 The visual and audible alarms should be suitable for location on the navigation bridge.*

3.3.2 Visual and audible alarms should conform to the Code on Alarms and Indicators, 1995, as may be amended, as applicable to a primary alarm for the preservation or safety of the ship.

* Reference is made to the requirements of SOLAS regulations V/17 and V/18.

3.3.3 The visual and audible alarms should be capable of the following:

- .1 Visual indication using a light of a distinct colour, or digital display that is clearly visible in all expected light levels, which does not seriously interfere with other activities necessary for the safe operation of the ship. The visual indication should be capable of remaining visible until the condition activating it has returned below the level of the relevant sensor. The visual indication should not be capable of being extinguished by the operator.
- .2 In conjunction with the visual indication for the same sensor, the system should be capable of providing audible indication and alarms in the space in which the indicator is situated. The audible indication should be capable of being muted by the operator.

3.3.4 Time delays may be incorporated into the alarm system to prevent spurious alarms due to sloshing effects associated with ship motions.

3.3.5 The system may be provided with a capability of overriding indication and alarms for the detection systems installed only in tanks and holds that have been designed for carriage of water ballast (SOLAS regulation XII/12.1).

3.3.6 An override visual indication capability should be provided throughout deactivation of the water level detector for the holds or tanks referred to in 3.3.5 above. Where such an override capability is provided, cancellation of the override condition and reactivation of the alarm should automatically occur after the hold or tank has been de-ballasted to a level below the lowest alarm indicator level.

3.3.7 Requirements for malfunctions, alarms and indications should include a facility for continuous monitoring of the system which, on detecting a fault, activates a visual and audible alarm. The audible alarm should be capable of being muted, but the visual indication should remain active until the malfunction is cleared.

3.3.8 The water level detector system should be capable of being supplied with electrical power from two independent electrical supplies. Failure of the primary electrical power supply should be indicated by an alarm.

3.4 Testing

3.4.1 Water level detector systems should be type tested to demonstrate their robustness and suitability under the appropriate internationally recognized conditions*.

3.4.2 Detectors serving a cargo hold should be capable of being functionally tested, *in situ*, when the hold is empty using either direct or indirect methods.

* With regard to testing, reference is made to IEC 60092-504 and IEC 60529. Electrical components installed in cargo holds, ballast tanks and dry spaces should satisfy the requirements of IP68 in accordance with IEC 60529.

3.5 Manuals

Documented operating and maintenance procedures for the water level detection system should be kept on board and be readily accessible.

4 INSTALLATION AND TESTING

Guidelines on installation and testing of water level detection systems for bulk carriers and single hold cargo ships other than bulk carriers are set out in the appendix.

APPENDIX

GUIDELINES ON INSTALLATION AND TESTING OF WATER LEVEL DETECTION SYSTEMS FOR BULK CARRIERS AND SINGLE HOLD CARGO SHIPS OTHER THAN BULK CARRIERS

1 PURPOSE

These Guidelines provide procedures for installation and testing of water level detection and alarm systems installed in bulk carriers for compliance with SOLAS regulation XII/12 and in single hold cargo ships other than bulk carriers for compliance with SOLAS regulation II-1/23-3.*

2 EQUIPMENT

2.1 Detector equipment type test requirements

2.1.1 Detector equipment should provide a reliable indication of water reaching a preset level and should be type tested to demonstrate their robustness and suitability under the appropriate conditions of IEC 60092-504 and the following:

- .1 Protection of the enclosures of electrical components installed in the cargo holds, ballast tanks and dry spaces should satisfy the requirements of IP68 in accordance with IEC 60529. The water pressure testing of the enclosure should be based on a pressure head held for a period depending on the application. For detectors to be fitted in holds intended for the carriage of water ballast or ballast tanks the application head should be the hold or tank depth and the hold period should be 20 days. For detectors to be fitted in spaces intended to be dry the application head should be the depth of the space and the hold period should be 24 h.
- .2 Operation in cargo/water mixture for a selected range of cargo groups such as iron ore dust, coal dust, grains and oils using seawater with a suspension of representative fine material for each cargo group. For type test purposes an agitated suspension of representative fine materials in seawater, with a concentration of 50% by weight, should be used with the complete detector assembly including any filtration fitted. The functioning of the detection assembly with any filtration arrangements should be verified in the cargo/water mixture with immersion repeated ten times without cleaning any filtration arrangements.

2.1.2 Protection of the enclosures of electrical equipment installed above ballast and cargo spaces should satisfy the requirements of IP56 in accordance with IEC 60529.

2.2 Detector equipment installation requirements

2.2.1 The sensors should be located in a protected position that is in communication with the specified part of the cargo hold (usually the aft part) such that the position of the sensor detects

* Refer to the third, fourth and fifth preambular paragraphs of the covering MSC resolution.

the level that is representative of the levels in the actual hold space. These sensors should be located:

- .1 either as close to the centreline as practicable, or
- .2 at both the port and starboard sides of the cargo hold.

2.2.2 The detector installation should not inhibit the use of any sounding pipe or other water level gauging device for cargo holds or other spaces.

2.2.3 Detectors and equipment should be installed where they are accessible for survey, maintenance and repair.

2.2.4 Any filter element fitted to detectors should be capable of being cleaned before loading.

2.2.5 Electrical cables and any associated equipment installed in cargo holds should be protected from damage by cargoes or mechanical handling equipment associated with bulk carrier operations, such as in tubes of robust construction or in similar protected locations.

2.2.6 Any changes/modifications to the ship's structure, electrical systems or piping systems that involves cutting and/or welding should be approved by the classification society before work is carried out.

3 SYSTEMS

3.1 Alarm system requirements

3.1.1 Alarm systems should be type tested in accordance with IEC 60092-504, as appropriate.

3.1.2 A switch for testing audible and visual alarms should be provided at the alarm panel and the switch should return to the off position when not operated.

3.2 Alarm system testing requirements

The visual and audible alarms should be tested to demonstrate the following:

- .1 The visual indication may not be extinguished by the operator.
- .2 It should be set at a level that alerts operators but does not interfere with the safe operation of the ship.
- .3 They should be distinguishable from other alarms.

3.3 System test requirements

3.3.1 After installation, a functionality test should be carried out. The test should represent the presence of water at the detectors for every level monitored. Simulation methods may be used where the direct use of water is impracticable.

3.3.2 Each detector alarm should be tested to verify that the pre-alarm and main alarm levels operate for every space where they are installed and indicate correctly. Also, the fault monitoring arrangements should be tested as far as practicable.

3.3.3 Records of testing of alarm systems should be retained on board.

4 MANUALS

Manuals should be provided on board and should contain the following information and operational instructions:

- .1 A description of the equipment for detection and alarm arrangements together with a listing of procedures for checking that, as far as practicable, each item of equipment is working properly during any stage of ship operation.
- .2 Evidence that the equipment has been type tested to the requirements of 2.1 above.
- .3 Line diagrams of the detection and alarm system showing the positions of equipment.
- .4 Installation instructions for orientation, setting, securing, protecting and testing.
- .5 List of cargo groups for which the detector is suitable for operating in a 50% seawater slurry mixture (see 2.1.1.2).
- .6 Procedures to be followed in the event of equipment not functioning correctly.
- .7 Maintenance requirements for equipment and system.

ANNEX 27

**DRAFT AMENDMENTS TO THE GUIDELINES FOR THE AUTHORIZATION OF
ORGANIZATIONS ACTING ON BEHALF OF THE ADMINISTRATION
(RESOLUTION A.739(18))**

APPENDIX 1

**MINIMUM STANDARDS FOR RECOGNIZED ORGANIZATIONS ACTING
ON BEHALF OF THE ADMINISTRATION**

- 1 The following new paragraph 2-1 is added after the existing paragraph 2:

“2-1 The organization should perform survey and certification functions of a statutory nature by the use of only exclusive surveyors and auditors, being persons solely employed by the organization, duly qualified, trained and authorized to execute all duties and activities incumbent upon their employer, within their level of work responsibility. While still remaining responsible for the certification on behalf of the flag State, the organization may subcontract radio surveys to non-exclusive surveyors in accordance with the relevant provisions of resolution A.789(19).”

ANNEX 28

**NEW AND AMENDED TRAFFIC SEPARATION SCHEMES AND
ASSOCIATED ROUTEING MEASURES**

**NEW TRAFFIC SEPARATION SCHEME IN THE APPROACHES TO THE
CAPE FEAR RIVER**

(Reference charts: United States 11536, 2003 edition; 11537, 2004 edition.

Note: These charts are based on North American 1983 Datum.)

Description of the traffic separation scheme

(a) A traffic separation zone is bounded by a line connecting the following geographical positions:

- | | | |
|-----|--------------|---------------|
| (1) | 33° 44'.70 N | 078° 04'.90 W |
| (2) | 33° 32'.75 N | 078° 09'.66 W |
| (3) | 33° 34'.50 N | 078° 14'.70 W |
| (4) | 33° 44'.98 N | 078° 05'.10 W |

(b) A traffic lane for northbound traffic is established between the separation zone and a line connecting the following geographic positions:

- | | | |
|-----|--------------|---------------|
| (5) | 33° 32'.75 N | 078° 05'.99 W |
| (6) | 33° 44'.22 N | 078° 03'.80 W |

(c) A traffic lane for southbound traffic is established between the separation zone and a line connecting the following geographic positions:

- | | | |
|-----|--------------|---------------|
| (7) | 33° 36'.22 N | 078° 17'.30 W |
| (8) | 33° 45'.88 N | 078° 05'.60 W |

Precautionary area

(a) A precautionary area is established bounded by a line connecting the following geographical positions: from

- | | | |
|------|--------------|--|
| (9) | 33° 47'.65 N | 078° 04'.78 W to |
| (10) | 33° 48'.50 N | 078° 04'.27 W to |
| (11) | 33° 49'.53 N | 078° 03'.10 W to |
| (12) | 33° 48'.00 N | 078° 01'.00 W to |
| (13) | 33° 41'.00 N | 078° 01'.00 W to |
| (14) | 33° 41'.00 N | 078° 04'.07 W to |
| (15) | 33° 44'.25 N | 078° 03'.00 W thence by an arc of 2 nautical miles radius,
centred at |
| (16) | 33° 46'.20 N | 078° 03'.00 W thence to the point of origin at (9). |

Note: A pilot boarding area is located inside the precautionary area. Due to heavy ship traffic, mariners are advised not to anchor or linger in the precautionary area except to pick up or disembark a pilot.

NEW TRAFFIC SEPARATION SCHEME OFF MINA AL-AHMADI

(Reference charts: British Admiralty Chart Nos.: 3773 Edition No.4 dated 06/12/2001 and 1223 Edition No.4 dated 16/5/2002)

Note: All positions are in degrees, minutes and decimals of minutes and are referred to World Geodetic System 1984 Datum (WGS 84)).

Description of the new traffic separation schemes

North Scheme I

1. A separation zone for the North scheme No.1 bounded by a line joining the following geographical positions:

(1)	29° 03'.40 N	048° 45'.00 E
(2)	29° 05'.85 N	048° 30'.00 E
(3)	29° 06'.97 N	048° 27'.57 E
(4)	29° 05'.80 N	048° 26'.00 E
(5)	29° 03'.35 N	048° 28'.10 E
(6)	29° 03'.40 N	048° 34'.50 E
(7)	29° 01'.40 N	048° 45'.00 E

2. A traffic line for inbound traffic is established between the separation zones (in 1) and between the line joining the following geographical positions:

(8)	29° 04'.50 N	048° 45'.00 E
(9)	29° 06'.85 N	048° 30'.00 E
(10)	29° 07'.60 N	048° 28'.40 E

The established direction of in bound traffic flow is: 280° – 300° respectively.

3. A traffic line for outbound traffic is established between the separation zones (in 1) and between the line joining the following geographical positions:

(11)	29° 05'.28 N	048° 25'.22 E
(12)	29° 02'.40 N	048° 27'.80 E
(13)	29° 02'.55 N	048° 34'.50 E
(14)	29° 00'.50 N	048° 45'.00 E

The established direction of out bound traffic flow is: 143° – 089° – 104° respectively.

North Scheme II

1. A separation zone for the North scheme No.II bounded by a line joining the following geographical positions:

(15) 29° 07'.94 N 048° 25'.75 E
(16) 29° 07'.40 N 048° 24'.77 E
(17) 29° 09'.20 N 048° 23'.00 E

2. A separation line joining the co-ordinates of (17) above to the following geographical position:

(18) 29° 12'.30 N 048° 15'.00 E

3. A traffic lane for inbound traffic is established between the separation zones (in 1) and separation line (in 2) and between the line joining the following geographical positions:

(19) 29° 08'.40 N 048° 26'.62 E
(20) 29° 10'.05 N 048° 23'.40 E
(21) 29° 13'.20 N 048° 15'.00 E

The established direction of inbound traffic flow is: 300° – 294° respectively.

4. A traffic lane for outbound traffic is established between the separation zones (in 1) and separation line (in 2) and between the line joining the following geographical positions:

(22) 29° 11'.45 N 048° 15'.00 E
(23) 29° 08'.70 N 048° 22'.20 E
(24) 29° 06'.85 N 048° 23'.82 E

The established direction of in bound traffic flow is: 114° – 143° respectively.

5. A junction buoy “A” will be laid in position (17) above:

(17) 29° 09'.20 N 048° 23'.00 E special mark yellow.

6. A first precautionary area joining the following geographical positions:

(21) 29° 13'.20 N 048° 15'.00 E
(22) 29° 11'.45 N 048° 15'.00 E
(25) 29° 11'.45 N 048° 11'.60 E
(26) 29° 15'.00 N 048° 09'.60 E
(27) 29° 15'.00 N 048° 13'.40 E

7. A second precautionary area joining the following geographical positions:

(10) 29° 07'.60 N 048° 28'.40 E
(11) 29° 05'.28 N 048° 25'.22 E
(24) 29° 06'.90 N 048° 23'.82 E
(19) 29° 08'.40 N 048° 26'.62 E

8. Mina Al-Ahmadi deep departure channel still valid and in use for deep draft departing tankers.
9. Mina Al-Ahmadi restricted area will be re-designated through Notices To Mariners (NTM) to accommodate the above mentioned outbound lane upon the adoption of the scheme.

The South Scheme

1. A separation zone for the South scheme bounded by a line joining the following geographical positions:

(28)	28° 57'.70 N	048° 26'.95 E
(29)	28° 57'.00 N	048° 26'.00 E
(30)	29° 00'.40 N	048° 22'.96 E

2. A separation line joining the co-ordinates of position (30) above to the following geographical position:

(31)	29° 02'.60 N	048° 17'.65 E
------	--------------	---------------

3. A traffic lane for inbound traffic is established between the separation zone (in 1) and the separation line (in 2) and between the line joining the following geographical positions:

(32)	28° 58'.40 N	048° 27'.60 E
(33)	29° 01'.15 N	048° 23'.50 E
(34)	29° 03'.30 N	048° 18'.40 E

The established direction of inbound traffic flow is: 307° – 293° respectively.

4. A traffic lane for outbound traffic is established between the separation zone (in 1) and the separation line (in 2) and between the line joining the following geographical positions:

(35)	29° 01'.90 N	048° 17'.00 E
(36)	28° 59'.80 N	048° 22'.00 E
(37)	28° 56'.30 N	048° 25'.10 E

The established direction of outbound traffic flow is: 113° – 142° respectively.

5. A junction buoy (B) will be laid in position (30) above:

(30) (29° 00'.40 N, 048° 22'.96 E) – special mark yellow.

AMENDMENT TO THE EXISTING TRAFFIC SEPARATION SCHEME IN HARO STRAIT AND BOUNDARY PASS, AND IN THE STRAIT OF GEORGIA

(Reference charts: Canadian Hydrographic Service 3461, 2002 edition; 3462, 2002 edition; 3463, 2002 edition. United States 18421, 2003 edition; 18423, 2003 edition; 18431, 2002 edition; 18432, 2003 edition; 18433, 2002 edition.

Note: The charts are based on North America 1983 Datum.)

Description of the traffic separation scheme

The traffic separation schemes “In Haro Strait and Boundary Pass” and “In the Strait of Georgia” consists of a series of traffic separation schemes, two-way route, and precautionary areas broken into two geographic designations as follows:

- Part I: Haro Strait and Boundary Pass, (New)
- Part II: Strait of Georgia, (Amended)

Part I

Haro Strait and Boundary Pass

(a) A separation zone is established bounded by a line connecting the following geographical positions:

- (1) 48° 22'.25 N 123° 21'.12 W
- (2) 48° 22'.25 N 123° 17'.95 W
- (3) 48° 23'.88 N 123° 13'.18 W
- (4) 48° 24'.30 N 123° 13'.00 W
- (5) 48° 22'.55 N 123° 18'.05 W
- (6) 48° 22'.55 N 123° 21'.12 W

thence back to point of origin (1).

(b) A traffic lane for eastbound traffic is established between the separation zone and a line connecting the following geographical positions:

- (12) 48° 21'.67 N 123° 21'.12 W
- (13) 48° 21'.67 N 123° 17'.70 W
- (14) 48° 23'.10 N 123° 13'.50 W

(c) A traffic lane for westbound traffic is established between the separation zone and a line connecting the following geographical positions:

- (19) 48° 25'.10 N 123° 12'.67 W
- (20) 48° 23'.15 N 123° 18'.30 W
- (21) 48° 23'.15 N 123° 21'.12 W

(d) A precautionary area “V”, is established bounded by a line connecting the following geographical points:

(21)	48° 23'.15 N	123° 21'.12 W
(22)	48° 23'.71 N	123° 23'.88 W
(23)	48° 21'.83 N	123° 25'.56 W
(24)	48° 21'.15 N	123° 24'.83 W
(25)	48° 20'.93 N	123° 24'.26 W
(26)	48° 20'.93 N	123° 23'.22 W
(12)	48° 21'.67 N	123° 21'.12 W

thence back to point of origin (21).

(e) A separation zone is established bounded by a line connecting the following geographical positions:

(7)	48° 25'.96 N	123° 10'.65 W
(8)	48° 27'.16 N	123° 10'.25 W
(9)	48° 28'.77 N	123° 10'.84 W
(10)	48° 29'.10 N	123° 11'.59 W
(11)	48° 25'.69 N	123° 11'.28 W

thence back to point of origin (7).

(f) A traffic lane for north-bound traffic is established between the separation zone and a line connecting the following geographical positions:

(16)	48° 26'.57 N	123° 09'.22 W
(17)	48° 27'.86 N	123° 08'.81 W

(g) A traffic lane for south-bound traffic is established between the separation zone and a line connecting the following geographical positions:

(18)	48° 29'.80 N	123° 13'.15 W
(19)	48° 25'.10 N	123° 12'.67 W

(h) A precautionary area “DI” is established bounded by a line connecting the following geographical points:

(14)	48° 23'.10 N	123° 13'.50 W
(15)	48° 24'.30 N	123° 09'.95 W
(16)	48° 26'.57 N	123° 09'.22 W
(19)	48° 25'.10 N	123° 12'.67 W

thence back to point of origin (14).

(i) A two-way route is established between the following geographical positions:

(29)	48° 31'.60 N	123° 10'.65 W
(30)	48° 35'.21 N	123° 12'.61 W
(31)	48° 38'.37 N	123° 12'.36 W

(32)	48° 39'.32 N	123° 13'.14 W
(33)	48° 39'.41 N	123° 16'.06 W
(34)	48° 32'.83 N	123° 13'.45 W

thence back to point of origin (29).

(j) A precautionary area “HS”, is established bounded by a line connecting the following geographical points:

(17)	48° 27'.86 N	123° 08'.81 W
(27)	48° 29'.28 N	123° 08'.35 W
(28)	48° 30'.55 N	123° 10'.12 W
(29)	48° 31'.60 N	123° 10'.65 W
(34)	48° 32'.83 N	123° 13'.45 W
(18)	48° 29'.80 N	123° 13'.15 W

thence back to point of origin (17).

(k) A two-way route is established between the following geographical positions:

(35)	48° 42'.23 N	123° 11'.35 W
(36)	48° 45'.51 N	123° 01'.82 W
(37)	48° 47'.78 N	122° 59'.12 W
(38)	48° 48'.19 N	123° 00'.84 W
(39)	48° 46'.43 N	123° 03'.12 W
(40)	48° 43'.80 N	123° 10'.77 W

thence back to point of origin (35).

(l) A precautionary area “TP”, is established bounded by a line connecting the following geographical positions:

(43)	48° 41'.06 N	123° 11'.04 W
(35)	48° 42'.23 N	123° 11'.35 W
(40)	48° 43'.80 N	123° 10'.77 W
(41)	48° 43'.20 N	123° 16'.06 W
(33)	48° 9'.41 N	123° 16'.06 W
(32)	48° 39'.32 N	123° 13'.14 W
(42)	48° 39'.76 N	123° 11'.84 W

Part II

Strait of Georgia

In the Strait of Georgia there are two TSS's and two Precautionary Areas that are currently adopted by IMO. This amendment affects the six geographical positions (55) through (60) used to describe the TSS west of Deltaport and the precautionary area “PR”.

(a) Precautionary area “PR”, is amended by changing the following highlighted geographical points:

(53)	48° 55'.34 N	123° 12'.30 W
(54)	48° 57'.68 N	123° 08'.76 W
(55)	49° 02'.20 N	123° 16'.28 W
(56)	49° 00'.00 N	123° 19'.69 W

thence back to point of origin (53).

(b) A separation zone is established bounded by a line connecting the following geographical positions:

(57)	49° 01'.39 N	123° 17'.53 W
(58)	49° 03'.84 N	123° 21'.30 W
(59)	49° 03'.24 N	123° 22'.41 W
(60)	49° 00'.75 N	123° 18'.52 W

thence back to point of origin (57).

(c) A traffic lane for north-westbound traffic is established between the separation zone and a line connecting the following geographical positions:

(55)	49° 02'.20 N	123° 16'.28 W
(62)	49° 04'.52 N	123° 20'.04 W

(d) A traffic lane for south-eastbound traffic is established between the separation zone and a line connecting the following geographical positions:

(61)	49° 02'.51 N	123° 23'.76 W
(56)	49° 00'.00 N	123° 19'.69 W

AMENDMENTS TO THE EXISTING TRAFFIC SEPARATION SCHEME IN PUGET SOUND AND ITS APPROACHES

(Reference charts: Canadian Hydrographic Service 3461, 2002 edition; 3462, 2002 edition; United States 18421, 2003 edition; 18429, 2002 edition; 18430, 2003 edition; 18440, 2003 edition.

Note: These charts are based on North American 1983 Datum.)

Description of the traffic separation scheme

The traffic separation scheme “In Puget Sound and its approaches” consists of a series of traffic separation schemes and precautionary areas broken into three geographic designations as follows:

Part I:	Rosario Strait
Part II:	Approaches to Puget Sound
Part III:	Puget Sound

Parts I and III remain unchanged.

Part II: Approaches to Puget Sound

The traffic separation scheme in the approaches to Puget Sound consists of a north-east/south-west approach, a north-west/south-east approach, a north/south approach and an east/west approach connecting with precautionary areas.

North-west/south-east approach

(a) A separation zone is bounded by a line connecting the following geographical positions:

(55)	48° 28'.72 N	123° 08'.53 W
(56)	48° 25'.43 N	123° 03'.88 W
(57)	48° 22'.88 N	123° 00'.82 W
(58)	48° 20'.93 N	122° 59'.30 W
(59)	48° 20'.82 N	122° 59'.62 W
(60)	48° 22'.72 N	123° 01'.12 W
(61)	48° 25'.32 N	123° 04'.30 W
(62)	48° 28'.39 N	123° 08'.64 W

connecting with precautionary area “RA”, and thence to:

(63)	48° 18'.83 N	122° 57'.48 W
(64)	48° 13'.15 N	122° 51'.33 W
(65)	48° 13'.00 N	122° 51'.62 W
(66)	48° 18'.70 N	122° 57'.77 W

(b) A traffic lane for northbound traffic is established between the separation zone and a line connecting the following geographical positions:

(67)	48° 29'.28 N	123° 08'.35 W
(68)	48° 25'.60 N	123° 03'.13 W
(69)	48° 23'.20 N	123° 00'.20 W
(70)	48° 21'.00 N	122° 58'.50 W

connecting with precautionary area “RA”, and thence to:

(71)	48° 19'.20 N	122° 57'.03 W
(72)	48° 13'.35 N	122° 50'.63 W

(c) A traffic lane for southbound traffic is established between the separation zone and a line connecting the following geographical positions:

(73)	48° 27'.86 N	123° 08'.81 W
(74)	48° 25'.17 N	123° 04'.98 W
(75)	48° 22'.48 N	123° 01'.73 W
(76)	48° 20'.47 N	123° 00'.20 W

connecting with precautionary area “RA”, and thence to:

- | | | |
|------|--------------|---------------|
| (77) | 48° 18'.52 N | 122° 58'.50 W |
| (78) | 48° 12'.63 N | 122° 52'.15 W |

(d) Connecting with precautionary area “SA”, the waters contained within a circle of radius 2 miles centred at geographical position 48° 11'.45 N, 122° 49'.78 W.

AMENDMENTS TO THE EXISTING TRAFFIC SEPARATION SCHEME IN THE APPROACHES TO CHESAPEAKE BAY

(Reference charts: United States 12200, 2002 edition; 12207, 1998 edition; 12221, 2003 edition.
Note: These charts are based on North American 1983 Datum.)

Description of the traffic separation scheme

The traffic separation scheme “In the Approaches to Chesapeake Bay” consists of three parts:

Part I

Precautionary area

(a) A precautionary area of radius two miles is centred upon geographical position 36° 56'.13 N, 075° 57'.45 W.

Part II

Eastern approach

(a) A separation line connects the following geographical positions:

- | | | |
|-----|--------------|---------------|
| (1) | 36° 57'.50 N | 075° 48'.21 W |
| (2) | 36° 56'.40 N | 075° 52'.40 W |
| (3) | 36° 56'.40 N | 075° 54'.95 W |

(b) A traffic lane for westbound traffic is established between the separation line and a line connecting the following geographical positions:

- | | | |
|-----|--------------|---------------|
| (4) | 36° 57'.94 N | 075° 48'.41 W |
| (5) | 36° 56'.90 N | 075° 52'.40 W |
| (6) | 36° 56'.90 N | 075° 55'.14 W |

(c) A traffic lane for eastbound traffic is established between the separation line and a line connecting the following geographical positions:

- | | | |
|-----|--------------|---------------|
| (7) | 36° 57'.04 N | 075° 48'.01 W |
| (8) | 36° 55'.88 N | 075° 52'.40 W |
| (9) | 36° 55'.88 N | 075° 54'.95 W |

Part III
Southern approach

(a) A separation line connects the following geographical positions:

(10)	36° 50'.33 N	075° 46'.29 W
(11)	36° 52'.90 N	075° 51'.52 W
(12)	36° 55'.96 N	075° 54'.97 W

(b) A separation line connects the following geographical positions:

(13)	36° 55'.11 N	075° 55'.23 W
(14)	36° 52'.35 N	075° 52'.12 W
(15)	36° 49'.70 N	075° 46'.80 W

(c) A separation line connects the following geographical positions:

(16)	36° 49'.52 N	075° 46'.94 W
(17)	36° 52'.18 N	075° 52'.29 W
(18)	36° 54'.97 N	075° 55'.43 W

(d) A separation line connects the following geographical positions:

(19)	36° 54'.44 N	075° 56'.09 W
(20)	36° 51'.59 N	075° 52'.92 W
(21)	36° 48'.87 N	075° 47'.42 W

(e) A traffic lane for inbound traffic is established between the separation lines described in paragraphs (a) and (b).

(f) A traffic lane for outbound traffic is established between the separation lines described in paragraphs (c) and (d).

(g) A deep-water route is established between the separation lines described in paragraphs (b) and (c). The types of ships which are recommended to use the deep-water route are given in the description of the deep-water route (see Part C). All other ships using the southern approach traffic separation scheme should use the appropriate inbound or outbound traffic lane.

AMENDMENTS TO THE EXISTING TRAFFIC SEPARATION SCHEME
“OFF CAPE ROCA”

(Reference chart: "Cabo Finisterra a Casablanca", Number 21101, (INT 1081) Catalogue of Nautical Charts of the Portuguese Hydrographic Office, 4th impression - April 2002.

Note: This chart is based on European Datum 50.)

Description of the amended traffic separation scheme

(a) A separation zone bounded by lines connecting the following geographical positions:

(1)	38° 38'.61 N	009° 46'.52 W
(2)	38° 43'.43 N	009° 47'.95 W
(3)	38° 51'.99 N	009° 47'.95 W
(4)	38° 51'.99 N	009° 49'.40 W
(5)	38° 43'.28 N	009° 49'.40 W
(6)	38° 38'.35 N	009° 47'.94 W

(b) A northbound traffic lane between the separation zone described in (a) and a separation zone bounded by lines connecting the following geographical positions, for ships not carrying dangerous or pollutant cargoes in bulk:

(7)	38° 37'.64 N	009° 51'.78 W
(8)	38° 42'.93 N	009° 53'.35 W
(9)	38° 51'.99 N	009° 53'.35 W
(10)	38° 51'.99 N	009° 54'.80 W
(11)	38° 42'.79 N	009° 54'.80 W
(12)	38° 37'.38 N	009° 53'.20 W

(c) A northbound traffic lane between the separation zones described in (b) and a central separation zone bounded by lines connecting the following geographical positions, for ships carrying dangerous or pollutant cargoes in bulk:

(13)	38° 36'.63 N	009° 57'.29 W
(14)	38° 42'.39 N	009° 59'.00 W
(15)	38° 51'.99 N	009° 59'.00 W
(16)	38° 51'.99 N	010° 04'.25 W
(17)	38° 41'.91 N	010° 04'.25 W
(18)	38° 35'.69 N	010° 02'.41 W

(d) A southbound traffic lane between the separation zones described in (c) and a separation zone bounded by lines connecting the following geographical positions, for ships not carrying dangerous or pollutant cargoes in bulk:

(19)	38° 34'.96 N	010° 06'.35 W
(20)	38° 41'.56 N	010° 08'.30 W
(21)	38° 51'.99 N	010° 08'.30 W
(22)	38° 51'.99 N	010° 09'.75 W
(23)	38° 41'.40 N	010° 09'.75 W
(24)	38° 34'.70 N	010° 07'.76 W

(e) A southbound traffic lane between the separation zones described in (d) and a line connecting the following geographical positions, for ships carrying dangerous or pollutant cargoes in bulk:

(25)	38° 34'.00 N	010° 11'.61 W
(26)	38° 41'.04 N	010° 13'.69 W
(27)	38° 51'.99 N	010° 13'.70 W

(f) The area between the separation zone described in paragraph (a) and the Portuguese coast, bounded on the north by the parallel of 38° 51'.99 N and on the south by the line connecting point with position 38° 38'.61 N 010° 13'.48 W and Cape Raso lighthouse (38° 38'.61 N 010° 13'.48 W) is designated as an inshore traffic zone.

AMENDMENTS TO THE EXISTING TRAFFIC SEPARATION SCHEME “OFF CAPE S. VICENTE”

(Reference chart: "Cabo Finisterra a Casablanca", Number 21101, (INT 1081) Catalogue of Nautical Charts of the Portuguese Hydrographic Office, 4th impression - April 2002.

Note: This chart is based on European Datum 50.)

Description of the amended traffic separation scheme

(a) A separation zone bounded by lines connecting the following geographical positions:

(1)	36° 45'.16 N	008° 58'.93 W
(2)	36° 47'.10 N	009° 07'.54 W
(3)	36° 54'.44 N	009° 16'.05 W
(4)	37° 01'.40 N	009° 18'.07 W
(5)	37° 01'.14 N	009° 19'.48 W
(6)	36° 53'.87 N	009° 17'.38 W
(7)	36° 46'.06 N	009° 08'.32 W
(8)	36° 44'.04 N	008° 59'.32 W

(b) A northbound traffic lane between the separation zone described in (a) and a separation zone bounded by lines connecting the following geographical positions, for ships not carrying dangerous or pollutant cargoes in bulk:

(9)	36° 40'.97 N	009° 00'.39 W
(10)	36° 43'.24 N	009° 10'.45 W
(11)	36° 52'.33 N	009° 20'.99 W
(12)	37° 00'.42 N	009° 23'.33 W
(13)	37° 00'.16 N	009° 24'.74 W
(14)	36° 51'.76 N	009° 22'.32 W
(15)	36° 42'.21 N	009° 11'.24 W
(16)	36° 39'.85 N	009° 00'.78 W

(c) A northbound traffic lane between the separation zones described in (b) and a central separation zone bounded by lines connecting the following geographical positions, for ships carrying dangerous or pollutant cargoes in bulk:

(17)	36° 36'.57 N	009° 01'.92 W
(18)	36° 39'.19 N	009° 13'.52 W
(19)	36° 50'.12 N	009° 26'.18 W
(20)	36° 59'.39 N	009° 28'.86 W
(21)	36° 58'.43 N	009° 33'.99 W
(22)	36° 48'.06 N	009° 30'.99 W
(23)	36° 35'.42 N	009° 16'.36 W
(24)	36° 32'.48 N	009° 03'.33 W

(d) A southbound traffic lane between the separation zones described in (c) and a separation zone bounded by lines connecting the following geographical positions, for ships not carrying dangerous or pollutant cargoes in bulk:

(25)	36° 29'.36 N	009° 04'.41 W
(26)	36° 32'.55 N	009° 18'.53 W
(27)	36° 46'.48 N	009° 34'.66 W
(28)	36° 57'.70 N	009° 37'.90 W
(29)	36° 57'.44 N	009° 39'.32 W
(30)	36° 45'.91 N	009° 35'.99 W
(31)	36° 31'.50 N	009° 19'.32 W
(32)	36° 28'.22 N	009° 04'.80 W

(e) A southbound traffic lane between the separation zones described in (d) and a line connecting the following geographical positions, for ships carrying dangerous or pollutant cargoes in bulk:

(33)	36° 25'.15 N	009° 05'.87 W
(34)	36° 28'.68 N	009° 21'.45 W
(35)	36° 44'.37 N	009° 39'.59 W
(36)	36° 56'.72 N	009° 43'.16 W

(f) The area between the separation zone described in paragraph (a) and the Portuguese coast, bounded on the north by the parallel of 37° 01'.40 N and on the east by the line connecting point with position 36° 45'.16 N 009° 01'.07 W and Ponta de Sagres lighthouse (36° 59'.75 N, 008° 56'.87 W) is designated as an inshore traffic zone.

AMENDMENTS TO THE EXISTING TRAFFIC SEPARATION SCHEME IN THE APPROACHES TO PUERTO SAN MARTIN

(Reference charts: PERU HIDRONAV 226, 2262 and 2263

Note: These charts are based on World Geodetic System of 1984 Datum (WGS 84))

Description of the traffic separation scheme

1 The name of the traffic separation scheme has been amended to “In the approaches to Puerto Pisco”.

2 The traffic separation scheme “In the approaches to Puerto Pisco” consists of two parts:

Part I

Northern approaches

(a) Two separation zones bounded by a line connecting the following geographical points:

(1)	13° 36'.59 S	076° 18'.86 W	(5)	13° 42'.11 S	076° 18'.13 W
(2)	13° 41'.23 S	076° 18'.25 W	(6)	13° 44'.74 S	076° 17'.80 W
(3)	13° 41'.24 S	076° 18'.03 W	(7)	13° 44'.74 S	076° 17'.57 W
(4)	13° 36'.59 S	076° 18'.64 W	(8)	13° 42'.12 S	076° 17'.91 W

(b) A traffic lane for northbound traffic, between the separation zones and a line connecting the following geographical points:

(9)	13° 36'.59 S	076° 18'.32 W	(10)	13° 44'.74 S	076° 17'.25 W
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(c) A traffic lane for southbound traffic, between the separation zones and the lines connecting the following geographical points:

(11)	13° 44'.74 S	076° 18'.13 W	(13)	13° 41'.20 S	076° 18'.58 W
(12)	13° 42'.08 S	076° 18'.46 W	(14)	13° 36'.59 S	076° 19'.18 W

Part II

Western approaches

(a) A separation zone bounded by a line connecting the following geographical points:

(15)	13° 41'.53 S	076° 18'.53 W	(17)	13° 41'.28 S	076° 24'.99 W
(16)	13° 41'.75 S	076° 18'.50 W	(18)	13° 41'.06 S	076° 24'.99 W

(b) A traffic lane for westbound traffic, between the separation zone and a line connecting the following geographical points:

(19)	13° 41'.20 S	076° 18'.58 W	(20)	13° 40'.73 S	076° 24'.99 W
------	--------------	---------------	------	--------------	---------------

(c) A traffic lane for eastbound traffic, between the separation zones and a line connecting the following geographical points:

(21) 13° 42'.08 S 076° 18'.46 W (22) 13° 41'.60 S 076° 24'.99 W

Precautionary area

A precautionary area is established bounded by a line connecting the following geographical points and the east line of the traffic separation scheme:

(3) 13° 41'.24 S 076° 18'.03 W
(19) 13° 41'.20 S 076° 18'.58 W
(21) 13° 42'.08 S 076° 18'.46 W
(8) 13° 42'.12 S 076° 17'.91 W
and
(9) 13° 36'.59 S 076° 18'.32 W
(10) 13° 44'.74 S 076° 17'.25 W

Area to be avoided

There is a circular area to be avoided of 200 m radius centred on the following geographical position:

(23) 13° 41'.68 S 076° 18'.11 W

This area is to be avoided by all ships.

ANNEX 29**ROUTEING MEASURES OTHER THAN TRAFFIC SEPARATION SCHEMES****ESTABLISHMENT OF AN “AREA TO BE AVOIDED” AND A MANDATORY “NO ANCHORING AREA” AT EL PASO ENERGY BRIDGE DEEPWATER PORT IN THE GULF OF MEXICO**

(Reference chart: United States 11340, 2003 edition.

Note: This chart is based on North American 1983 Datum.)

Description of an area to be avoided

The area contained within a circle of radius 2,000 metres centred on the following geographical position is designated as an area to be avoided:

28° 05'.27 N 093° 03'.12 W

The area should be avoided by ships that are not going to carry out operations at the Deep Water Port.

(Reference chart: United States 11340, 2003 edition.

Note: This chart is based on North American 1983 Datum.)

Description of a mandatory no anchoring area

The area contained within a circle of radius 1,500 metres centred on the following geographical position is designated as a mandatory no anchoring area:

28° 05'.27 N 093° 03'.12 W

The mandatory no anchoring area applies to all vessels.

Appropriate charts will include the following notation:

The El Paso Energy Bridge Deepwater Port at 28° 05'.27 N, 093° 03'.12 W is surrounded by a Safety Zone of 500 metres radius. No vessel may enter the Safety Zone except those vessels intending to call or those assisting vessels at the Deepwater Port (DWP). There is a mandatory no anchoring area of 1,500 metres radius centred at 28° 05'.27 N, 093° 03'.12 W. No vessel may anchor within this area. Further, there is an Area to be Avoided (ATBA) of 2,000 metres radius also centred at 28° 05'.27 N, 093° 03'.12 W. The ATBA applies to all vessels not intending to call, or assisting vessels at the DWP.

DEEP-WATER ROUTE IN THE SOUTHERN APPROACH TO CHESAPEAKE BAY

(Reference chart: United States 12221, 2003 edition.

Note: This chart is based on North American 1983 Datum.)

Description of the deep-water route

The wording in the description in Ships' Routeing Guide remains the same.

Notes:

The wording in Notes 1 and 2 is amended as follows:

1 It is recommended that the following ships use the deep-water route when bound for Chesapeake Bay from sea or to sea from Chesapeake Bay:

Deep-draft ships, drafts defined as **12.8 metres/42 feet or greater*** in fresh water, and naval aircraft carriers. **Ships drawing less than 12.8 metres/42 feet may use the deep-water route when, in their master's judgement, the effects of ship characteristics, its speed, and prevailing environmental conditions may cause the draft of the ship to equal or exceed 12.8 metres/42 feet.**

2 It is recommended that a ship using the deep-water route:

.1 announce its intention on VHF-FM channel 16 as it approaches Chesapeake Bay Southern Approach Lighted Whistle Buoy CB on the south end, or Chesapeake Bay **Lighted Entrance Buoy CH***, on the north end of the route;

The wording in Notes 2.2, 2.3, and 3 in Ships' Routeing Guide remains the same.

AREA TO BE AVOIDED IN THE REGION OF THE BERLENGAS ISLANDS

(Reference chart: "Cabo Finisterra a Casablanca", Number 21101, (INT 1081) Catalogue of Nautical Charts of the Portuguese Hydrographic Office, 4th impression - April 2002.

Note: This chart is based on European Datum 50.)

Description of the area to be avoided in the region of the Berlengas Islands

The proposed ATBA applies to all vessels above than 300 GT, except duly authorized ships navigating between Portuguese ports and not carrying dangerous cargoes or other harmful substances.

The area to be avoided consists of an area bounded on the north by the parallel of 39° 30'.00 N, on the south by the parallel of 39° 20'.00 N, on the west by the line connecting the geographical positions 39° 20'.00 N 009° 42'.20 W and 39° 30'.00 N 009° 42'.20 W, and on the east by the Portuguese coastline.

* Bold text indicates amended text.

ANNEX 30

**AMENDMENTS TO THE GENERAL PROVISIONS ON SHIPS' ROUTEING
(RESOLUTION A.572(14), AS AMENDED)**

Amend the General Provisions on Ships' Routeing, (resolution A.572(14), as amended), as follows:

Section 3

Delete the existing text of subparagraph 3.11.6 and replace by the following text:

“the delineation of the routeing system as shown on a nautical chart (type of nautical chart as appropriate) and a description of the system including the geographical co-ordinates. The co-ordinates should be given in the WGS 84 datum; in addition, geographical co-ordinates should also be given in the same datum as the nautical chart if this chart is based on a datum other than WGS 84.”

ANNEX 31

**RESOLUTION MSC.189(79)
(adopted on 6 December 2004)**

**ADOPTION OF AMENDMENTS TO THE GUIDELINES AND CRITERIA FOR SHIP
REPORTING SYSTEMS**

THE MARITIME SAFETY COMMITTEE,

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

HAVING CONSIDERED, at its seventy-ninth session, the recommendation of the Sub-Committee on Safety of Navigation at its fiftieth session,

1. ADOPTS the amendments to section 3 of the Guidelines and Criteria for Ship Reporting Systems (resolution MSC.43(64) , as amended by resolution MSC.111(73)), set out in the Annex to the present resolution;
2. DETERMINES that the amendments to the Guidelines and Criteria for Ship Reporting Systems (resolution MSC.43(64), as amended by resolution MSC.111(73)) shall enter into force on 1 July 2005;
3. INVITES Governments developing ship reporting systems for adoption by the Organization in accordance with SOLAS regulation V/11 to take account of the amendments set out in the Annex to the present resolution;
4. REQUESTS the Secretary-General to bring this resolution to the attention of all Contracting Governments to the SOLAS Convention and to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO GUIDELINES AND CRITERIA FOR
SHIP REPORTING SYSTEMS (RESOLUTION MSC.43(64) AS AMENDED BY
RESOLUTION MSC.111(73))**

Section 3

Delete the existing text of subparagraph 3.3.4 and replace with the following text:

“the delineation of the reporting system as shown on a nautical chart (type of nautical chart as appropriate) and a description of the system including the geographical co-ordinates. The co-ordinates should be given in the WGS 84 datum; in addition, geographical co-ordinates should also be given in the same datum as the nautical chart if this chart is based on a datum other than WGS 84.”

ANNEX 32

**RESOLUTION MSC.190(79)
(adopted on 6 December 2004)**

**ADOPTION OF MANDATORY SHIP REPORTING SYSTEM IN THE WESTERN
EUROPEAN PARTICULARLY SENSITIVE SEA AREA**

THE MARITIME SAFETY COMMITTEE,

RECALLING article 28(b) of the Convention related to the creation of the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO regulation V/11 of the International Convention for the Safety of Life at Sea (SOLAS), 1974 concerning the adoption by the Organization of ship-reporting systems,

RECALLING FURTHER resolution A.858(20), which authorizes the Committee to perform the function of adopting ship-reporting systems on behalf of the Organization,

TAKING INTO ACCOUNT the Guidelines and criteria for ship-reporting systems, adopted by resolution MSC.43(64), as amended by resolution MSC.111(73),

HAVING CONSIDERED the recommendations of the Sub-Committee on Safety of Navigation at its fiftieth session,

HAVING ALSO NOTED that the Marine Environment Protection Committee, at its fifty-second session, endorsed the recommendations of the Sub-Committee on Safety of Navigation at its fiftieth session and designated the Western European Waters as a Particularly Sensitive Sea Area (PSSA) by resolution MEPC.121(52),

1. ADOPTS, in accordance with SOLAS regulation V/11, the ship-reporting system in the Western European Particularly Sensitive Sea Area as described in the Annexes to this resolution;
2. DECIDES that this mandatory ship-reporting system will enter into force at 0000 hours UTC on 1 July 2005;
3. REQUESTS the Secretary-General to bring this resolution and its Annexes to the attention of Contracting Governments to the SOLAS Convention and to members of the Organization who are not parties to the Convention.

ANNEX 1

DESCRIPTION OF THE MANDATORY SHIP REPORTING SYSTEM FOR THE WESTERN EUROPEAN PARTICULARLY SENSITIVE SEA AREA

The West European Tanker Reporting System (WETREP) is established in the Western European Particularly Sensitive Sea Area.

1 CATEGORIES OF SHIPS REQUIRED TO PARTICIPATE IN THE SYSTEM

1.1 Ships required to participate in the mandatory ship reporting system WETREP:

Every kind of oil tanker of more than 600 tonnes deadweight, carrying a cargo of:

- heavy crude oil, meaning crude oils with a density at 15°C of higher than 900 kg/m³;
- heavy fuel oils, meaning fuel oils with a density at 15°C of higher than 900 kg/m³, or a kinematic viscosity at 50°C of higher than 180 mm²/s;
- bitumen and tar and their emulsions.

1.2 Pursuant to SOLAS, the mandatory ship reporting system WETREP does not apply to any warship, naval auxiliary or other vessel owned or operated by a contracting government and used, for the time being, only on government non-commercial service.

2 GEOGRAPHICAL COVERAGE OF THE SYSTEM, AND NUMBER AND EDITION OF THE REFERENCE CHART USED FOR THE DELINEATION OF THE SYSTEM

2.1 The area covered by the reporting system WETREP is defined within the following co-ordinates and are also shown in the chartlet attached at appendix 3:

Number	Latitude	Longitude
1 (UK)	58° 30' N	UK coast
2 (UK)	58° 30' N	000° W
3 (UK)	62° N	000° W
4 (UK)	62° N	003° W
5 (UK+ Irl)	56° 30' N	012° W
6 (Irl)	54° 40'40".91 N	015° W
7 (Irl)	50° 56'45".36 N	015° W
8 (Irl+UK+F)	48° 27' N	006° 25' W
9 (F)	48° 27' N	008° W
10 (F+S)	44° 52' N	003° 10' W
11 (S)	44° 52' N	010° W
12 (S)	44° 14' N	011° 34' W
13 (S)	42° 55' N	012° 18' W
14 (S+P)	41° 50' N	011° 34' W
15(P)	37° N	009° 49' W

16 (P)	36° 20' N	009° 00' W
17(P)	36° 20' N	007° 47' W
18 (P)	Guadiana River mouth 37° 10' N	007° 25' W
19 (B)	51° 22'25" N	003° 21'52".5 E (border between B and NL)
20 (UK)	52° 12' N	UK east coast
21 (IRL)	52° 10'.3" N	006° 21'.8" W
22 (UK)	52° 01'.52" N	005° 04'.18" W
23 (UK)	54° 51'.43" N	005° 08'.47" W
24 (UK)	54° 40'.39" N	005° 34'.34" W

2.2 The reference chart is Admiralty Chart No. 4011 (World Geodetic System 1984 Datum (WGS 84)).

3 FORMAT, CONTENTS OF REPORT, TIMES AND GEOGRAPHICAL POSITIONS FOR SUBMITTING REPORT. AUTHORITIES TO WHOM THE REPORTS MUST BE SENT AND AVAILABLE SERVICES

3.1 Format

3.1.1 WETREP reports shall be sent to the nearest participating coastal or communication station listed in annex 1, appendix 1 and shall be drafted in accordance with the format as shown in appendix 2.

3.1.2 The format of the report described below is in accordance with resolution A.851(20) – appendix, paragraph 2.

3.2 Contents of report

3.2.1 The report required from participating ships contains information that is essential to achieve the objectives of the system:

- .1 the ship's name, call sign, IMO number/MMSI number and position are needed for establishing the identity of the ship and its initial position (letters A, B and C);
- .2 the ship's course, speed and destination, are important in order to maintain track of the ship so as to be able to implement search and rescue measures if a report from a ship fails to appear; to be able to instigate measures for the safe navigation of the ship; and to prevent pollution in the areas where weather conditions are severe (letters E, F, G and I). Proprietary information obtained as a requirement of the mandatory ship reporting system WETREP will be protected under this system consistent with the Guidelines and Criteria for Ship Reporting Systems, as amended (resolution A.851(20));
- .3 the number of persons on board and other relevant information are important in relation to the allocation of resources in a search and rescue operation (letters P, T and W); and

- .4 in accordance with the provisions of the SOLAS and MARPOL conventions, ships will provide information on defects, damage, deficiencies or other limitations (under “Q”) as well as, additional information (under “X”).

3.3 Time and geographical position for submitting report

3.3.1 Ships must report:

- .1 on entry into the Reporting Area as defined in paragraph 2; or
- .2 immediately on departing from a port, terminal or anchorage within the Reporting Area; or
- .3 when they deviate from routeing to their original declared destination port/terminal/anchorage or position “for orders” given at time of entry into Reporting Area; or
- .4 when deviation from planned route is necessary due to weather or equipment malfunction or a change in the navigational status; and
- .5 when finally exiting from Reporting Area.

3.3.2 Ships need not report if, while on normal passage routeing during transit of Reporting Area, the boundary of the Reporting Area is crossed on other occasions apart from the initial entry and final exit.

3.4 Shore-based authorities to whom reports are sent

3.4.1 Upon entering the WETREP reporting area, ships will notify the co-ordination centre of the responsible authority of the Coastal State participating in the system. The vessel traffic services, RCC, coastal radio station or others facilities to whom the reports must be sent to are listed in appendix 1.

3.4.2 Should the ship be unable to send the report to the nearest coastal radio station or other facility, the report shall be sent to the next-nearest coastal radio station or other facility as listed in appendix 1.

3.4.3 Reports may be sent by any modern communication form, including Inmarsat-C, telefax and e-mail as appropriate.

4 INFORMATION TO BE GIVEN TO PARTICIPATING SHIPS AND PROCEDURES TO BE FOLLOWED

4.1 If requested, coastal States can provide ships with information of importance for the safety of navigation in the ship reporting area, from broadcasting devices set up in the coastal States.

4.2 If necessary, individual information can be provided to a ship in relation to the special local conditions.

5 COMMUNICATIONS REQUIRED FOR THE SYSTEM, FREQUENCIES ON WHICH REPORTS SHOULD BE TRANSMITTED AND INFORMATION TO BE REPORTED

5.1 The vessel traffic services, RCC, coastal radio station or others facilities to whom the reports must be sent to are listed in appendix 1.

5.2 The reports required from a ship entering and navigating in the reporting area shall begin with the word WETREP and shall contain a two-letter abbreviation for identification of the report (Sailing Plan, Final Report or Deviation Report). Telegrams so prefixed are dispatched free of charge to ships.

5.3 Dependent on the type of report, the following information shall be included as referred to under paragraph 6 of appendix 2:

- A : Ship identification (ship name, call sign, IMO identification number and MMSI Number)
- B : Date time group
- C : Position
- E : True course
- F : Speed
- G: Name of last port of call
- I : Name of next port of call with the ETA
- P : Oil cargo type(s), quantity, grade(s) and density. If those tankers carry other hazardous cargo simultaneously: the type, quantity and IMO class of that cargo, as appropriate
- Q: To be used in cases of defects or deficiency affecting normal navigation
- T: Address for the communication of cargo information
- W : Number of persons on board
- X : Various information applicable for those tankers:
 - characteristics and estimated quantity of bunker fuel, for tankers carrying more than 5,000 tonnes of bunker fuel
 - navigational status, (for example, under way with engines, restricted in ability to manoeuvre, etc.)

5.4 Reports shall be in a format consistent with IMO resolution A.851(20).

5.5 Reports shall be free of charge for reporting ships.

6 RELEVANT RULES AND REGULATIONS IN FORCE IN THE AREA OF THE SYSTEM

6.1 Regulations for the Preventing Collisions at Sea

The International Regulations for Preventing Collisions at Sea, 1972 (COLREGs), as amended, apply throughout the area covered by the system.¹

6.2 Traffic separation schemes and other routing measures

6.2.1 The following IMO adopted Traffic Separation Schemes:

- West of the Scilly Isles
- South of the Scilly Isles
- Off Land's End, between Seven Stones and Longships
- South of the Scilly Isles
- West of the Scilly Isles
- Off Ushant
- Off Casquets
- In the Strait of Dover and adjacent waters
- Off Fastnet Rock
- Off Smalls
- Off Tuskar Rock
- Off Skerries
- In the North Channel
- Off Finisterre
- Off Cape Roca
- Off Cape S. Vicente

6.2.2 The following IMO adopted Deep-Water Routes:

- Deep-water route leading to the Port of Antifer
- Deep-water route forming part of the north-eastbound traffic lane of the Strait of Dover and adjacent waters traffic separation scheme
- Deep-water route west of the Hebrides

6.2.3 The following IMO adopted Areas to be Avoided:

- In the region of the Rochebonne Shelf
- In the English Channel and its approaches
- In the Dover Strait
- Around the F3 station within the separation scheme "In the Strait of Dover and adjacent waters"
- In the region of the Orkney Islands
- In the region of the Fair Isle
- In the region of the Shetland Islands
- Between the Smalls Lighthouse and Grassholme Island
- In the region of the Berlengas Islands

¹ Ships carrying dangerous or polluting goods coming from or bound for a port within the reporting area must comply with the European Community Directive on *Vessel Traffic Monitoring* (2002/59/EC).

6.2.4 The following other IMO adopted Routeing Measures:

Recommended directions of traffic flow in the English Channel
Recommended routes in the Fair Isle Channel
Recommendations on navigation around the United Kingdom coast

6.2.5 The following IMO adopted Mandatory Ship Reporting Systems:

Off "Les Casquets" and the adjacent coastal area
In the Dover Strait/Pas-de-Calais
Off Ushant
Off Finisterre

6.2.6 The following Coastal Vessel Traffic Services (VTS):

Corsen VTS
Dover, Channel Navigation Information Service (CNIS)
Finisterre VTS
Gris-Nez VTS

7 SHORE-BASED FACILITIES TO SUPPORT THE OPERATION OF THE SYSTEM

7.1 The vessel traffic services, RCC, coastal radio stations or others facilities to whom the reports must be sent to are listed in appendix 1.

7.2 The vessel traffic services, RCC, coastal radio stations or others facilities that form a part of the service, will at all times be manned.

7.3 All communications facilities

7.3.1 All IMO approved communication methods are accepted and available as detailed in appendix 1.

7.4 Staff training and qualification

7.4.1 Personnel are trained according to national and international recommendations. The training of personnel comprises an overall study of the navigation safety measures, the relevant international (IMO) and national provisions with respect to the safety of navigation.

8 PROCEDURES TO BE FOLLOWED IF SHORE BASED COMMUNICATIONS FAIL

Should the ship be unable to send the report to the nearest coastal radio station or other facility, the report shall be sent to the next-nearest coastal radio station or other facility as listed in appendix 1.

9 MEASURES TO BE TAKEN IF A SHIP FAILS TO COMPLY WITH THE REQUIREMENTS OF THE SYSTEM

The objectives of the system are to initiate SAR and measures to prevent pollution as fast and effective as possible if an emergency is reported or a report from a ship fails to appear, and it is impossible to establish communication with the ship. All means will be used to obtain the full participation of ships required to submit reports. If reports are not submitted and the offending ship can be positively identified, then information will be passed on to the relevant flag State Authorities for investigation and possible prosecution in accordance with national legislation. The mandatory ship reporting system WETREP is for the exchange of information only and does not provide any additional authority for mandating changes in the vessel's operations. This reporting system will be implemented consistent with UNCLOS, SOLAS and other relevant international instruments so that the reporting system will not provide the basis to impinge on a transiting vessel's passage through the reporting area.

Appendix 1

Vessel Traffic Services, RCC, coast radio station or other facilities to whom the reports must be submitted (Geographical positions refer to the World Geodetic System 1984 (WGS 84))

Position co-ordinates

BELGIUM

MRCC – SAR Oostende

51° 14' N 002° 55' E

Tel: +32 59 70 10 00

Tel.: +32 59 70 11 00

Fax: +32 59 70 36 05

Telex: 82125

VHF : 9, 16, 67, 70

MF: 2182

MMSI: 00 205 99 81

FRANCE

MRCC Gris-Nez

50° 52' N 001° 35' E

Tel.: +33 3 21 87 21 87

Fax: +33 3 21 87 78 55

Telex: 130680

Inmarsat-C: 422799256

VHF: 16, 70

MMSI: 002275100

MRCC Corsen

48° 25' N 004° 47' W

Tel.: +33 2 98 89 31 31

Fax: +33 2 98 89 65 75

Telex: 940086

Inmarsat-C: Nil

VHF: 16, 70

MMSI: 002275300

IRELAND

MRCC Dublin

Tel: +353 1 6620922/23

Fax: +353 1 6620795

e-mail: mrccdublin@irishcoastguard.ie

Communications may be sent to MRCC Dublin via:

MRSC Valentia (EJK) 51° 56' N 010° 21' W

MRSC Malin Head (EJM) 55° 22' N 007° 21' W

PORTUGAL

MRCC Lisbon 38° 40' N 009° 19' W
Tel: +351 21 4401950, or
+351 21 4401919 (for emergency only)
Fax: +351 21 4401954
Telex: 60747 P.
e-mail: mrcclisboa@netc.pt.

SPAIN

MRCC Madrid 40° 24' N 003° 43' W
Tel: +34 91 7559133
Fax: +34 91 5261440
Telex: +5241210, +5241224
e-mail: cncs@sasemar.es

MRCC Finisterre 42° 42' N 008° 59' W 002240993 (MMSI)
Tel: +34 981 767500
Fax: +34 981 767740
Telex: +5282268, +5286207
e-mail: finister@sasemar.es
VHF: 16 & 11
MF: 2182

MRCC Bilbao 43° 20'.8 N 003° 01' W 002241021 (MMSI)
Tel: +34 944 839286
Fax: +34 944 839161
e-mail: bilbao@sasemar.es
VHF: 16 & 10

UNITED KINGDOM

MRCC Falmouth
Tel: +(0)1326 317575
Fax: +(0)1326 318342
Telex: +51 42981
Inmarsat-A and Inmarsat-C
e-mail: falmouthcoastguard@mcga.gov.uk

Sea Area A2 – MF DSC Coast Stations

		(MMSI)
MRCC Aberdeen	57° 25' N 001° 51' W	002320004
MRCC Clyde	55° 58' N 004° 48' W	002320022
MRCC Falmouth	50° 08' N 005° 07' W	002320014
MRSC Holyhead	53° 19' N 004° 38' W	002320018
MRSC Humber	54° 05' N 001° 10' W	002320007
Cullercoats	55° 04' N 001° 28' W	(sub-station)
MRSC Milford Haven	51° 41' N 005° 03' W	002320017
MRCC Shetland	60° 09' N 001° 08' W	002320001
MRSC Stornoway	58° 13' N 006° 20' W	002320024

Appendix 2

Western European Ship Reporting System (WETREP)

Rules for Drafting of Reports

- 1 Ships on voyage to and from the Western European Reporting Area shall send reports:
 - .1 on entry into the Reporting Area; or
 - .2 immediately on departing from a port, terminal or anchorage within the Reporting Area; or
 - .3 when they deviate from routing to their original declared destination port/terminal/anchorage or position “for orders” given at time of entry into Reporting Area; or
 - .4 when deviation from planned route is necessary due to weather or equipment malfunction or where information under entry “Q” is necessary ; and
 - .5 when finally exiting from Reporting Area.
- 2 Ships need not report if, while on normal passage routing during transit of Reporting Area, the boundary of the Reporting Area is crossed on other occasions apart from the initial entry and final exit.
- 3 Upon entering the WETREP reporting area, ships will notify the co-ordination centre of the responsible authority of the Coastal State participating in the system. The vessel traffic services, RCC, coastal radio station or others facilities to whom the reports must be sent to are listed in appendix 1.
- 4 Should the ship be unable to send the report to the nearest coastal radio station or other facility, the report shall be sent to the next-nearest coastal radio station or other facility as listed in appendix 1.
- 5 Each report shall begin with the word WETREP and a 2-letter abbreviation for identification of the report. Messages so prefixed are dispatched free of charge to ships.
- 6 The reports shall be drawn up in accordance with the following table. The designators A, B, C, E, F, G, I, P, T, W and X are mandatory for a sailing plan report, A, B, C, E and F for a final report, A, B, C, E, F, and I for a deviation report. The designator Q shall also be included at any time where defects including breakdown, damage, deficiencies, circumstances affecting normal navigation should occur within the reporting area.

Designator	Function	Text
Name of system	Code word	“WETREP”
	Type of report: Sailing Plan Final Report Deviation Report	One of the following 2-letter identifiers: “SP” (Sailing Plan) “FR” (Final Report - on <u>final</u> leaving the Reporting Area) containing only A, B, C, E & F “DR” (Deviation Report) containing only A, B, C, E, F, and I
A	Ship	Name and call sign (ship name, call sign, IMO identification number and MMSI Number) (e.g.: NONESUCH/KTOI)
B	Date Time Group corresponding to the position under designator C given in UTC (Co-ordinated Universal Time)	A 6-digit group followed by a Z. The first 2 digits giving date of month, the next 2 digits giving hours and the last 2 digits minutes. The Z indicates that the time is given in UTC (e.g.: 081340Z).
C	Position by latitude and longitude	A 4-digit group giving latitude in degrees and minutes suffixed with N, and a 5-digit group giving longitude in degrees and minutes suffixed with W. (e.g.: 5512N 03420W).
E	Course	True course A 3-digit group (e.g.: 083).
F	Speed	Speed in knots A 2-digit group (e.g.: 14).
G	Name of last port of call	The name of the last port of call (e.g.: New York).
I	Destination and ETA (UTC)	The name of the destination followed by expected time of arrival, expressed as under designator B. (e.g.: Milford Haven 181400Z).
P	Cargo	Oil cargo type(s), quantity, grade(s) and density of heavy crude oil, heavy fuel oil and bitumen and tar. If those tankers carry other hazardous cargo simultaneously: the type, quantity and IMO class of that cargo, as appropriate.
Q	Defect, damage, deficiency, limitations	Brief details of defects including breakdown, damage, deficiencies or other circumstances affecting normal navigation.
T	Address for the communication of cargo information	Name, telephone number and either: facsimile, e-mail address or URL.
W	Total number of persons on board	State the number.
X	Various information	Various information applicable for those tankers: <ul style="list-style-type: none"> - characteristics and estimated quantity of bunker fuel, for tankers carrying more than 5,000 tonnes of bunker fuel, - navigational status (for example, under way with engines, at anchor, not under command, restricted in ability to manoeuvre, constrained by draught, moored, aground, etc.).

- 7 **Sailing Plan** (“SP”) to be sent as a first report:
- a On entering the Reporting Area as defined in paragraph 2.1.
 - b Immediately on departing from a port located within the Reporting Area.

Example:

Name of station to which the report is being sent

WETREP– SP

A. NONESUCH/KTOI

B. 161520Z

C. 4105N1115W

E. 026

F. 15

G. RAS TANNURAH

I. ROTTERDAM 230230Z

P. 56,000 TONNES HEAVY FUEL OILS

T. J. Smith, 00 47 22 31 56 10, Facsimile 00 47 22 31 56 11

W. 23

X. NONE, NONE

- 8 **Final Report** (“FR”) to be sent:
- a On leaving the Reporting Area.
 - b On arrival in a port situated within the Reporting Area.

Example:

Name of station to which the report is being sent

WETREP– FR

A. NONESUCH/KTOI

B. 201520Z

C. 5145N0238E

E. 044

F. 16

- 9 **Deviation Report** (“DR”) to be sent:
- a When they deviate from routing to their original declared destination/port/terminal/anchorage or position "for orders" given at time of entry into the Reporting Area.
 - b When deviation from planned route is necessary due to weather or equipment malfunction or a change in navigational status.

Example:

Name of station to which the report is being sent

WETREP– FR

A. NONESUCH/KTOI

B. 201520Z

C. 4957N0207W

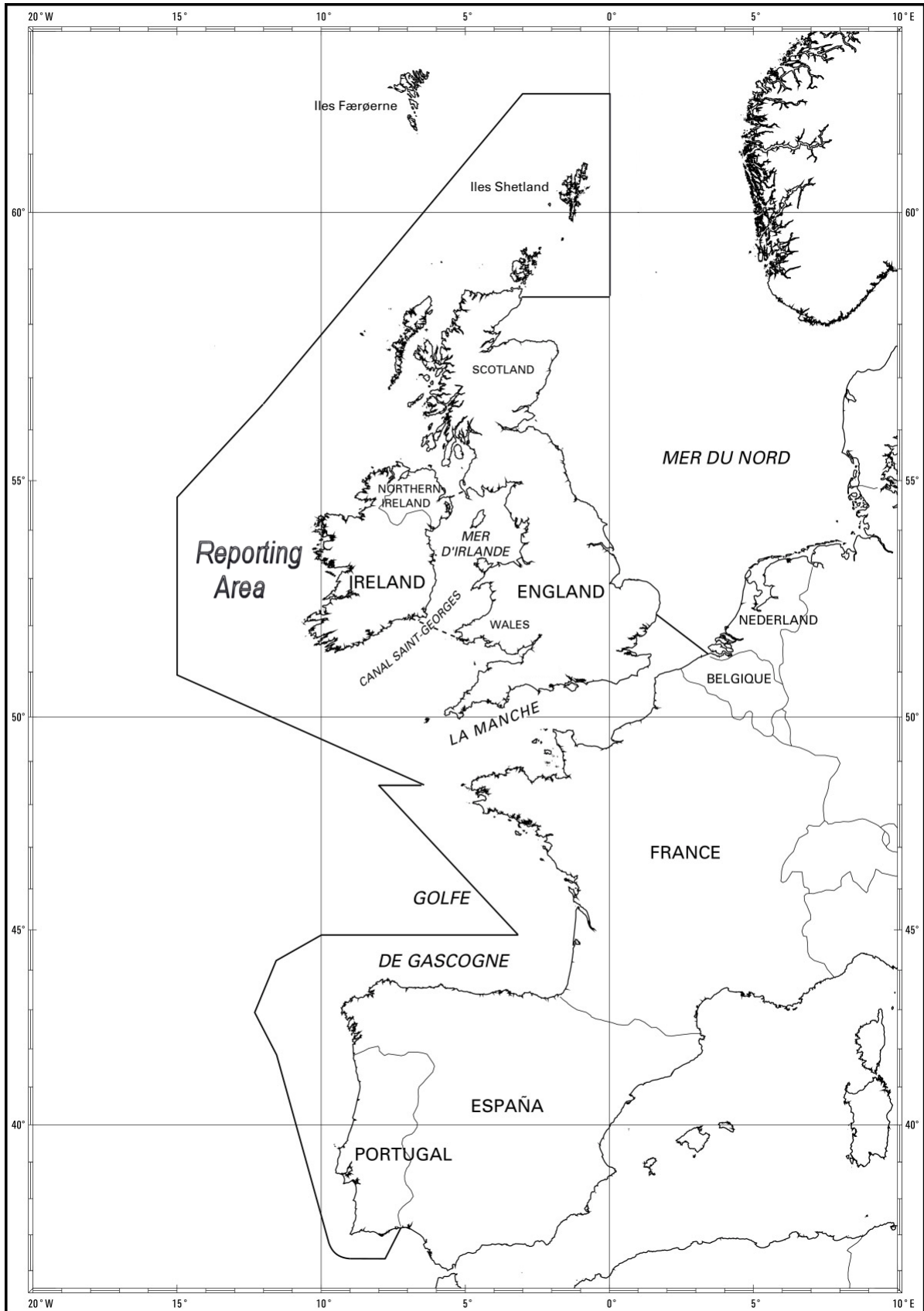
E. 073

F. 14

I. ROTTERDAM 270230Z

X. NONE, SATISFACTORY

Appendix 3 Chartlet



ANNEX 2

SUMMARY

1 Ships required to report

In the reporting system WETREP, every kind of oil tanker of more than 600 tonnes deadweight, carrying a cargo of:

- heavy crude oil, meaning crude oils with a density at 15°C of higher than 900 kg/m³;
- heavy fuel oils, meaning fuel oils with a density at 15°C of higher than 900 kg/m³, or a kinematic viscosity at 50°C of higher than 180 mm²/s;
- bitumen and tar and their emulsions.

2 Position for submitting reports

Ships on voyage to and from the Western European Reporting Area shall send reports:

- .1 on entry into the Reporting Area; or
- .2 immediately on departing from a port, terminal or anchorage within the Reporting Area; or
- .3 when they deviate from routing to their original declared destination port/terminal/anchorage or position "for orders" given at time of entry into the Reporting Area; or
- .4 when deviation from planned route is necessary due to weather or equipment malfunction or a change in the navigational status; and
- .5 when finally exiting from the Reporting Area.

Ships need not report if, while on normal passage routing during transit of the Reporting Area, the boundary of the Reporting Area is crossed on other occasions apart from the initial entry and final exit.

3 Reference chart

United Kingdom Hydrographic Office chart No. 4011. (World Geodetic System 1984 Datum (WGS 84)).

4 Reporting format

System identifier: WETREP

Data to be transmitted in WETREP:

- A : Ship identification (ship name, call sign, IMO identification number and MMSI Number)
- B : date time group
- C : Position
- E : True course
- F : Speed
- G : Name of last port of call
- I : Name of next port of call with ETA
- P : Oil cargo type(s), quantity, grade(s) and density (If those tankers carry other hazardous cargo simultaneously: the type, quantity and IMO class of that cargo, as appropriate)
- Q : To be used in cases of defects or deficiency affecting normal navigation
- T : Address for the communication of cargo information
- W : Number of persons on board
- X : Various information applicable for those tankers:
- characteristics and estimated quantity of bunker fuel, for tankers carrying more than 5,000 tonnes of bunker fuel
 - navigational status (for example, under way with engines, restricted in ability to manoeuvre, etc.)

5 Authority receiving the report

5.1 Upon entering the WETREP reporting area, ships will notify the coordination centre of the responsible authority of the Coastal State participating in the system. The vessel traffic services, RCC, coastal radio station or others facilities to whom the reports must be sent to are listed in appendix 1.

5.2 Should the ship be unable to send the report to the nearest coastal radio station or other facility, the report shall be sent to the next-nearest coastal radio station or other facility as listed in appendix 1.

6 Communication

Reports may be sent by any modern communication form, including Inmarsat-C, telefax and e-mail as appropriate.

ANNEX 33

**RESOLUTION MSC.191(79)
(adopted on 6 December 2004)**

**PERFORMANCE STANDARDS FOR THE PRESENTATION OF
NAVIGATION-RELATED INFORMATION ON
SHIPBORNE NAVIGATIONAL DISPLAYS**

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 on behalf of the Organization,

RECOGNIZING that harmonization of the requirements for the presentation of navigation-related information on the bridge will ensure that all navigational displays adopt a consistent human-machine interface philosophy and implementation,

RECOGNIZING FURTHER that, for safety reasons, the terms, abbreviations and symbols used for the display of navigation-related information on all shipborne navigation equipment and systems should be consistent,

HAVING CONSIDERED the recommendation on the performance standards for the presentation of navigation-related information on shipborne navigational displays made by the Sub-Committee on Safety of Navigation at its fiftieth session,

1. ADOPTS the Recommendation on Performance Standards for the Presentation of Navigation-related Information on Shipborne Navigational Displays, set out in the Annex to the present resolution;
2. RECOMMENDS Governments to ensure that navigational shipborne displays on the bridge of a ship installed on or after 1 July 2008 conform, from the presentation of navigation-related information point of view, to performance standards not inferior to those specified in the Annex to the present resolution.

ANNEX

RECOMMENDATION ON PERFORMANCE STANDARDS FOR THE PRESENTATION OF NAVIGATION-RELATED INFORMATION ON SHIPBORNE NAVIGATIONAL DISPLAYS

1 PURPOSE

These performance standards harmonize the requirements for the presentation of navigation-related information on the bridge of a ship to ensure that all navigational displays adopt a consistent human machine interface philosophy and implementation.

These performance standards supplement and, in case of a conflict, take priority over, presentation requirements of the individual performance standards adopted by the Organization for relevant navigational systems and equipment, and cover the presentation of navigation-related information by equipment for which performance standards have not been adopted.

2 SCOPE

These performance standards specify the presentation of navigational information on the bridge of a ship, including the consistent use of navigational terms, abbreviations, colours and symbols, as well as other presentation characteristics.

These performance standards also address the presentation of navigation information related to specific navigational tasks by recognizing the use of user selected presentations in addition to presentations required by the individual performance standards adopted by the Organization.

3 APPLICATION

The general principles of these standards are applicable for all displays on the bridge of a ship.*

These performance standards are applicable to any display equipment associated with the navigation systems and equipment for which individual performance standards have been adopted by the Organization. They also address display equipment associated with navigation systems and equipment for which individual performance standards have not been adopted.

In addition to the general requirements set out in resolution A.694(17)** display equipment should meet the requirements of these performance standards, as applicable.

4 DEFINITIONS

Definitions are given in the appendix.

* The general principles are addressed in paragraphs 5 and 8.

** IEC Publication 60945 (see Appendix 1).

5 GENERAL REQUIREMENTS FOR THE PRESENTATION OF INFORMATION

5.1 Arrangement of information

5.1.1 The presentation of information should be consistent with respect to screen layout and arrangement of information. Data and control functions should be logically grouped. Priority of information should be identified for each application, permanently displayed and presented to the user in a prominent manner by, for example, use of position, size and colour.

5.1.2 The presentation of information should be consistent with respect to values, units, meaning, sources, validity, and if available, integrity.

5.1.3 The presentation of information should be clearly separated into an operational display area (e.g. radar, chart) and one or more user dialogue areas (e.g. menus, data, control functions).

5.2 Readability

5.2.1 The presentation of alphanumeric data, text, symbols and other graphical information (e.g. radar image) should support readability from typical user positions under all ambient light conditions likely to be experienced on the bridge of a ship, and with due consideration to the night vision of the officer of the watch.

5.2.2 Alphanumeric data and text should be presented using a clearly legible non-italic, sans-serif font. The font size should be appropriate for the viewing distance from user positions likely to be experienced on the bridge of a ship.

5.2.3 Text should be presented using simple unambiguous language that is easy to understand. Navigation terms and abbreviations should be presented using the nomenclature defined in SN/Circ.243.

5.2.4 When icons are used, their purpose should be intuitively recognized by appearance, placement and grouping.

5.3 Colours and intensity

5.3.1 The colours used for the presentation of alphanumeric data, text, symbols and other graphical information should provide sufficient contrast against the background under all lighting conditions likely to be experienced on the bridge of a ship.

5.3.2 The colours and brightness should take into account the light conditions of daylight, dusk and night. The presentation should support night viewing by showing light foreground information on a dark non-reflecting background at night.

5.3.3 The background colour and contrast should be chosen to allow presented information to be easily discriminated without degrading the colour coding aspects of the presentation.

5.4 Symbols

5.4.1 Symbols used for the presentation of operational information are defined in SN/Circ.243.

5.4.2 Symbols used for the display of charted information should comply with relevant IHO standards.

5.5 Coding of information

5.5.1 When colour coding is used for discrimination or conspicuousness of alphanumeric text, symbols and other graphical information, all colours in the set should clearly differ from one another.

5.5.2 When colour coding is used, the colour red should be used for coding of alarm related information.

5.5.3 When colour coding is used, it should be used in combination with other symbol attributes, such as size, shape, and orientation.

5.5.4 Flashing of information should be reserved for unacknowledged alarms.

5.6 Integrity marking

5.6.1 The source, validity, and where possible, the integrity of information should be indicated. Invalid information or information with low integrity should be clearly marked, qualitatively and/or quantitatively. Invalid information or information with low integrity may be quantitatively indicated by displaying absolute or percentage values.

5.6.2 When colour coding is used, information with low integrity should be qualitatively marked by using yellow, and invalid information should be qualitatively marked by using red.

5.6.3 In order to show that the screen is being refreshed, means should be provided to immediately make the user aware of a presentation failure on an operational display (e.g. "picture freeze").

5.7 Alarms and indications

5.7.1 The operational status of information should be indicated as follows:

Status	Visual indication	Audible signal
Alarm, not acknowledged	Red, flashing	Accompanied by an audible signal
Alarm, acknowledged Invalid Information	Red	Suppression of audible signal
Important Indications (Warnings) (e.g. low integrity)	Yellow	Silence unless otherwise specified by the Organization
Normal state	None required, optionally green	Silence

5.7.2 A list of alarms should be provided based on the sequence of occurrence. Additional indication of priority, as set by the user, should be provided on displays showing alarms from multiple sources. Alarms that have been acknowledged and are no longer relevant should be deleted from the list of alarms, but may be retained in an alarm history list.

5.7.3 When a single display is used to present information from multiple navigation systems and equipment, the presentation of alarms and indications should be consistent for the display of the time of alarm occurrence, the cause of the alarm, the source of the alarm and the status of the alarm (e.g. acknowledged, not acknowledged).

5.8 Presentation modes

If displays are capable of presenting information in different mode(s), there should be a clear indication of the mode in use, for example orientation, stabilization, motion, and chart projection.

5.9 User manuals

The user manual and operator instructions should be available in the English language at least. The user manual or reference guide should include a list of all terms, abbreviations, and symbols and their explanations presented by the equipment.

6 PRESENTATION OF OPERATIONAL INFORMATION

6.1 Presentation of own ship information

6.1.1 When a graphical representation of own ship is provided, it should be possible for the user to select either a scaled ship's outline or a simplified symbol as specified in SN/Circ.243. The size of the ship's outline or the simplified symbol in the graphical presentation should be the true scale size of the ship or 6 mm, whichever is greater.

6.1.2 A heading line, and where appropriate a velocity vector, should be associated with own ship symbol and should originate at the position of the consistent common reference point (CCRP).

6.2 Presentation of charted information

6.2.1 The presentation of charted information that is issued by, or on the authority of a government authorized hydrographic office, or other relevant government institution should comply with the relevant IHO standards.

6.2.2 The presentation of proprietary charted information should comply with relevant IHO standards, as far as practical. There should be a clear indication when the presentation is not in accordance with IHO standards.

6.2.3 The presentation of user-added charted information should comply with the relevant IHO standards, as far as practical.

6.2.4 If chart data derived from different scales appear on the display, the scale boundary should be clearly indicated.

6.3 Presentation of radar information

6.3.1 Radar images should be displayed by using a basic colour that provides optimum contrast. Radar echoes should be clearly visible when presented on top of a chart background. The relative strength of echoes may be differentiated by tones of the same basic colour. The basic colour may be different for operation under different ambient light conditions.

6.3.2 Target trails should be distinguishable from targets and clearly visible under all ambient light conditions.

6.4 Presentation of target information

6.4.1 General

6.4.1.1 Target information may be provided by radar target tracking and/or by reported target information from the Automatic Identification System (AIS).

6.4.1.2 The operation of the radar target tracking function and the processing of reported AIS information, including the number of targets presented, related to screen size, is defined within the Performance standards for radar equipment, as adopted by the Organization. The presentation of radar target tracking and AIS information is defined within these performance standards.

6.4.1.3 As far as practical, the user interface and data format for operating, displaying and indicating radar tracking and AIS information should be consistent.

6.4.2 Target capacity

6.4.2.1 There should be an indication when the target tracking and/or reported target processing/display capacity is about to be exceeded.

6.4.2.2 There should be an indication when the target tracking and/or reported target processing/display capacity has been exceeded.

6.4.3 Filtering of AIS sleeping targets

6.4.3.1 To ensure that the clarity of the total presentation is not substantially impaired, it should be possible to filter the presentation of sleeping AIS targets (e.g. by target range, CPA/TCPA or AIS target class A/B, etc.).

6.4.3.2 If a filter is applied, there should be a clear and permanent indication. The filter criteria in use should be readily available.

6.4.3.3 It should not be possible to remove individual AIS targets from the display.

6.4.4 Activation of AIS targets

6.4.4.1 If zones for the automatic activation of AIS targets are provided, they should be the same as for automatic radar target acquisition, if available. Any user defined zones (e.g. acquisition/activation zones) in use should be presented in graphical form.

6.4.4.2 In addition, sleeping AIS targets should be automatically activated when meeting user defined parameters (e.g. target range, CPA/TCPA or AIS target class A/B).

6.4.5 Graphical presentation

6.4.5.1 Targets should be presented with their relevant symbols according to SN/Circ.243.

6.4.5.2 AIS information should be graphically presented either as sleeping or activated targets.

6.4.5.3 The course and speed of a tracked radar target or reported AIS target should be indicated by a vector that clearly shows the predicted motion. The vector time (length) should be consistent for presentation of any target regardless of its source.

6.4.5.4 The presentation of vector symbols should be consistent irrespective of the source of information. The presentation mode should be clearly and permanently indicated, including for example: True/Relative vector, vector time and vector stabilisation.

6.4.5.5 The orientation of the AIS target symbol should indicate its heading. If the heading information is not received, the orientation of the AIS symbol should be aligned to the COG. When available, the turn or rate of turn (ROT) indicator and/or the path prediction should indicate the manoeuvre of an activated AIS target.

6.4.5.6 A consistent common reference point should be used for the alignment of tracked target symbols and AIS target symbols with other information on the same display.

6.4.5.7 On large scale/low range displays, a means to present a true scale outline of an activated AIS target should be provided.

6.4.5.8 It should be possible to display the past positions of activated targets.

6.4.6 Target data

6.4.6.1 A target selected for the display of its alphanumeric information should be identified by the relevant symbol. If more than one target is selected for data display, the symbols and the corresponding data should be clearly identified.

6.4.6.2 There should be a clear indication to show that the target data is derived from radar or AIS or from a combination of these.

6.4.6.3 For each selected tracked radar target the following data should be presented in alphanumeric form: Source(s) of data, measured range of target, measured bearing of target, predicted target range at the closest point of approach (CPA), predicted time to CPA (TCPA), true course of target, true speed of target. Additional target information should be provided on request.

6.4.6.4 For each selected AIS target the following data should be presented in alphanumeric form: Source of data, ship's identification, position and its quality, calculated range of target, calculated bearing of target, CPA, TCPA, COG, SOG, navigational status. Ship's heading and rate of turn should also be made available. Additional target information should be provided on request.

6.4.6.5 If the received AIS information is incomplete, the absent information should be clearly indicated in the target data field as missing.

6.4.6.6 The data should be displayed and continually updated, until another target is selected for data display or until the window is closed.

6.4.6.7 Means should be provided to present own ship AIS data on request.

6.4.6.8 The alphanumeric displayed data should not obscure graphically presented operational information.

6.4.7 Operational alarms

6.4.7.1 A clear indication of the status of the alarms and of the alarm criteria should be given.

6.4.7.2 A CPA/TCPA alarm of a tracked radar or activated AIS target should be clearly indicated and the target should be clearly marked by a dangerous target symbol.

6.4.7.3 If a user defined acquisition/activation zone facility is provided, a target entering the zone should be clearly identified with the relevant symbol and for tracked radar targets an alarm should be given. The zone should be identified with the relevant symbology, and should be applicable to tracked radar and AIS targets.

6.4.7.4 The last position of a lost target should be clearly marked by a lost target symbol on the display, and the lost target alarm should be given. The lost target symbol should disappear if the signal is received again, or after the alarm has been acknowledged. There should be a clear indication whether the lost target alarm function for AIS targets is enabled or disabled.

6.4.8 AIS and radar target association

6.4.8.1 An automatic target association function serves to avoid the presentation of two target symbols for the same physical target. If target data from AIS and radar tracking are both available and if the AIS and radar information are considered as one target, then as a default condition, the activated AIS target symbol and the alphanumeric AIS target data should be automatically selected and displayed. The user should have the option to change the default condition to the display of tracked radar targets and should be permitted to select either radar tracking or AIS alphanumeric data.

6.4.8.2 If the AIS and radar information are considered as two distinct targets, one activated AIS target and one tracked radar target should be displayed. No alarm should be raised.

6.4.9 AIS presentation status

The AIS presentation status should be indicated as follows:

Function	Cases to be presented		Presentation
AIS ON/OFF	AIS processing switched ON / graphical presentation switched OFF	AIS processing switched ON / graphical presentation switched ON	Alphanumeric or graphical
Filtering of sleeping AIS targets (6.4.3)	Filter status	Filter status	Alphanumeric or graphical
Activation of Targets (6.4.4)		Activation criteria	Graphical
CPA/TCPA Alarm (6.4.7)	Function ON/OFF CPA/TCPA Criteria Sleeping targets included	Function ON/OFF CPA/TCPA Criteria Sleeping targets included	Alphanumeric and graphical
Lost Target Alarm (6.4.7)	Function ON/OFF Lost target filter criteria	Function ON/OFF Lost target filter criteria	Alphanumeric and graphical
Target Association (6.4.8)	Function ON/OFF Association criteria Default target priority	Function ON/OFF Association criteria Default target priority	Alphanumeric

6.4.10 Trial manoeuvre

A trial manoeuvre simulation should be clearly identified by the relevant symbol positioned astern of own ship within the operational display area of the screen.

7 OPERATIONAL DISPLAYS

7.1 General

7.1.1 If the display equipment is capable of supporting the presentation of multiple functions then there should be a clear indication of the primary function supported by the presentation (e.g. Radar, ECDIS). It should be possible to select the Radar presentation (see 7.2) or the ECDIS presentation (see 7.3) by a simple operator action.

7.1.2 If a radar image and an electronic chart are displayed together, the chart and the radar image should use a consistent common reference point and match in scale, projection and orientation. Any offset should be indicated.

7.1.3 Range scales of 0.25, 0.5, 0.75, 1.5, 3, 6, 12 and 24 NM should be provided. Additional range scales are permitted. These range scales do not apply when presenting raster chart data. The range scale should be permanently indicated.

7.1.4 When range rings are displayed, the range ring scale should be indicated.

7.1.5 No part of the operational display area should be permanently used for presentation of information that is not part of the navigation presentation (e.g. pop up displays, drop down menus and information windows). Temporary, limited and relevant alphanumeric data may be displayed adjacent to a selected symbol, graphic or target within the operational display area.

7.2 Radar display

7.2.1 General

7.2.1.1 Radar video, tracked radar targets and AIS targets should not be substantially degraded, masked or obscured by other presented information.

7.2.1.2 It should be possible to temporarily suppress all graphical information from the display, retaining only radar video and trails.

7.2.1.3 The brightness of radar echoes and associated graphic symbols for tracked radar targets should be variable. It should be possible to control the brightness of all displayed information. There should be independent means to adjust the brightness of groups of displayed graphics and alphanumeric data. The brilliance of the heading line should not be variable to extinction.

7.2.2 Display of chart information on radar

7.2.2.1 Vector chart information may be displayed on a radar presentation. This should be accomplished using layers selected from the chart database. As a minimum, the elements of the ECDIS Standard Display should be available for individual selection by category or layer, but not as individual objects. As far as practical, chart information should be presented in accordance with the ECDIS performance standards and with these presentation standards.

7.2.2.2 If chart information is displayed within the operational display area, the display of radar information should have priority. The chart information should be clearly perceptible as such. The chart information should not substantially degrade, mask or obscure the radar video, tracked radar targets and AIS targets.

7.2.2.3 When chart information is displayed, there should be a permanent indication of its status. Source and update information should also be made available.

7.2.3 Display of maps on radar

Map graphics may be displayed, but should not substantially degrade, mask or obscure the radar video, tracked radar targets and AIS targets.

7.3 ECDIS display

7.3.1 General

7.3.1.1 The ENC and all updates to it should be displayed without any degradation of their information content.

7.3.1.2 Chart information should not be substantially degraded, masked or obscured by other presented information.

7.3.1.3 It should be possible to temporarily suppress all supplemental information from the display, retaining only chart related information contained in the Display Base.

7.3.1.4 It should be possible to add or remove information from the ECDIS display. It should not be possible to remove information contained in the Display Base from the ECDIS display.

7.3.1.5 It should be possible to select a safety contour from the depth contours provided by the ENC. The safety contour should be emphasized over other contours on the display.

7.3.1.6 It should be possible to select a safety depth. Soundings equal to or less than the safety depth should be emphasized whenever spot soundings are selected for display.

7.3.1.7 An indication should be provided if the information is displayed at a larger scale than that contained in the ENC, or if own ship's position is covered by an ENC at a larger scale than that provided by the display.

7.3.1.8 Overscaled areas shown on the ECDIS display should be identified.

7.3.2 Display of radar information on ECDIS

7.3.2.1 Radar and target information may be displayed on ECDIS but should not substantially degrade, mask or obscure the chart information. As far as practical, radar and target information should be presented in accordance with the radar performance standard and with these presentation standards.

7.3.2.2 Radar and target information should be clearly distinguishable from the chart information. It should be possible to remove this information by a simple operator action.

7.3.3 Display of additional information on ECDIS

7.3.3.1 Information from additional sources may be displayed on ECDIS but should not substantially degrade, mask or obscure the chart information.

7.3.3.2 Additional information should be clearly distinguishable from the chart information. It should be possible to remove this information by a simple operator action.

7.4 User selected (task orientated) presentation

7.4.1 The user may configure a presentation for a specific task at hand. The presentation may include radar and/or chart information, in combination with other navigation or ship related data. When not fully compliant with the Radar or ECDIS performance standards, such a presentation should be identified as an auxiliary presentation.

7.4.2 As far as practical, the presentation of any radar and/or ECDIS related functions should be compliant with the requirements of the relevant performance standards and of these presentation standards, with the exception of size requirements for the operational area. Chartlets or windows of radar information may be presented along with other information associated with the task at hand.

8 PHYSICAL REQUIREMENTS

8.1 Display adjustment

8.1.1 It should be possible to adjust the contrast and brightness of the display provided, as applicable to the display technology. It should be possible to dim the display. The range of control should permit the display to be legible under all ambient light conditions.

8.1.2 It should be possible for the navigator to reset the values of contrast and/or brightness to a preset or default condition.

8.1.3 Where magnetic fields degrade the presentation of navigation information, a means to neutralise the effect of magnetic fields should be provided.

8.2 Screen size

8.2.1 Display equipment should be of sufficient size to support the requirements of the relevant performance standards adopted by the Organization.

8.2.2 The operational display area of the chart presentation for route monitoring should be at least 270 x 270 mm.

8.2.3 The operational display area of the radar presentation should be at least a circle of diameter of:

- 180 mm for ships smaller than 500 gross tonnage;
- 250 mm for ships larger than 500 gross tonnage and High-Speed Craft (HSC) less than 10,000 gross tonnage;
- 320 mm for ships larger than 10,000 gross tonnage.

8.3 Colours

8.3.1 Multicoloured display equipment should be used except where monochrome displays are permitted within individual performance standards adopted by the Organization.

8.3.2 Multicoloured operational displays including multifunction displays (e.g. conning displays) should provide a minimum of 64 colours except where permitted or not required by the Organization, or when used for a single specific purpose (e.g. speed log, echo-sounder).

8.4 Screen resolution

Operational display equipment including multifunction displays (e.g. conning displays) should provide a minimum screen resolution of 1280 x 1024, or equivalent for a different aspect ratio, except where permitted or not required by the Organization, or when used for a single specific purpose (e.g. speed log, echo-sounder).

8.5 Screen viewing angle

The display should support the reading of information under all ambient light conditions, simultaneously, by at least two users, from standing and sitting operator positions likely to be found on the bridge of a ship.

APPENDIX

DEFINITIONS

Activated AIS target	A target representing the automatic or manual activation of a sleeping target for the display of additional graphically presented information.
AIS target	A target generated from an AIS message.
Associated target	A target simultaneously representing a tracked radar target and AIS target having similar parameters (e.g. position, course, speed) and which comply with an association algorithm.
CCRP	The Consistent Common Reference Point is a location on own ship, to which all horizontal measurements such as target range, bearing, relative course, relative speed, closest point of approach (CPA) or time to closest point of approach (TCPA) are referenced, typically the conning position of the bridge.
Dangerous target	A target with a predicted CPA and TCPA that violates values preset by the operator. The respective target is marked by a “dangerous target” symbol.
Display base	The level of information which cannot be removed from the ECDIS display, consisting of information which is required at all times in all geographic areas and all circumstances. It is not intended to be sufficient for safe navigation.
ENC	Electronic Navigational Chart. The database standardized as to content, structure and format according to relevant IHO standards and issued by, or on the authority of, a Government.
Heading	Direction in which the bow of a ship is pointing expressed as an angular displacement from north.
Important indication	A marking of an operational status of displayed information which needs special attention, e.g. information with low integrity or invalid information.
Lost target	A target representing the last valid position of a target before its data was lost. The target is displayed by a “lost target” symbol.

Operational display area	Area of the display used to graphically present chart and radar information, excluding the user dialogue area. On the chart display this is the area of the chart presentation. On the radar display this is the area encompassing the radar image.
Past positions	Equally time-spaced past position marks of a tracked or reported target and own ship. The co-ordinates used to display past positions may be either relative or true.
Sleeping AIS target	A target indicating the presence and orientation of a vessel equipped with AIS in a certain location. The target is displayed by a “sleeping target” symbol. No additional information is presented until activated.
Selected target	A target selected manually for the display of detailed alphanumeric information in a separate data display area. The target is displayed by a “selected target” symbol.
Standard display	The level of information that should be shown when a chart is first displayed on ECDIS. The level of the information it provides for route planning or route monitoring may be modified by the mariner according to the mariner’s needs.
Trial manoeuvre	Facility used to assist the operator to perform a proposed manoeuvre for navigation and collision avoidance purposes, by displaying the predicted future status of all tracked and AIS targets as a result of own ship’s simulated manoeuvres.
User dialogue area	An area of the display consisting of data fields and/or menus that is allocated to the interactive presentation and entry or selection of operational parameters, data and commands mainly in alphanumeric form.
User selected presentation	An auxiliary presentation configured by the user for a specific task at hand. The presentation may include radar and/or chart information, in combination with other navigation or ship related data.

ANNEX 34**RESOLUTION MSC.192(79)
(adopted on 6 December 2004)****ADOPTION OF THE REVISED PERFORMANCE STANDARDS
FOR RADAR 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 functions of adopting performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

NOTING resolutions A.222(VII), A.278(VIII), A.477(XII), MSC.64(67), annex 4, A.820(19) and A.823(19) containing performance standards applicable to marine radars being produced and installed at different time periods in the past,

NOTING ALSO that marine radars are used in connection/integration with other navigational equipment required to carry on board ships such as, an automatic target tracking aid, ARPA, AIS, ECDIS and others,

RECOGNIZING the need for unification of maritime radar standards in general, and, in particular, for display and presentation of navigation-related information,

HAVING CONSIDERED the recommendation on the revised performance standards for radar equipment made by the Sub-Committee on Safety of Navigation at its fiftieth session,

1. ADOPTS the Revised Recommendation on Performance Standards for radar equipment set out in the Annex to the present resolution;
2. RECOMMENDS Governments to ensure that radar equipment installed on or after 1 July 2008 conform to performance standards not inferior to those set out in the Annex to the present resolution.

ANNEX

**REVISED RECOMMENDATION ON PERFORMANCE STANDARDS
FOR RADAR EQUIPMENT**

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1 SCOPE OF EQUIPMENT

The radar equipment should assist in safe navigation and in avoiding collision by providing an indication, in relation to own ship, of the position of other surface craft, obstructions and hazards, navigation objects and shorelines.

For this purpose, radar should provide the integration and display of radar video, target tracking information, positional data derived from own ship's position (EPFS) and geo referenced data. The integration and display of AIS information should be provided to complement radar. The capability of displaying selected parts of Electronic Navigation Charts and other vector chart information may be provided to aid navigation and for position monitoring.

The radar, combined with other sensor or reported information (e.g. AIS), should improve the safety of navigation by assisting in the efficient navigation of ships and protection of the environment by satisfying the following functional requirements:

- in coastal navigation and harbour approaches, by giving a clear indication of land and other fixed hazards;
- as a means to provide an enhanced traffic image and improved situation awareness;
- in a ship-to-ship mode for aiding collision avoidance of both detected and reported hazards;
- in the detection of small floating and fixed hazards, for collision avoidance and the safety of own ship; and
- in the detection of floating and fixed aids to navigation (see Table 2, note 3).

2 APPLICATION OF THESE STANDARDS

These Performance Standards should apply to all shipborne radar installations, used in any configuration, mandated by the 1974 SOLAS Convention, as amended, independent of the:

- type of ship;
- frequency band in use; and
- type of display,

providing that no special requirements are specified in Table 1 and that additional requirements for specific classes of ships (in accordance with SOLAS chapters V and X) are met.

The radar installation, in addition to meeting the general requirements as set out in resolution A.694(17)*, should comply with the following performance standards.

* IEC Publication 60945.

Close interaction between different navigational equipment and systems, makes it essential to consider these standards in association with other relevant IMO standards.

TABLE 1
Differences in the performance requirements for various sizes/categories of ship/craft to which SOLAS applies

Size of ship/craft	<500 gt	500 gt to <10,000 gt and HSC<10,000 gt	All ships/craft ≥10,000 gt
Minimum operational display area diameter	180 mm	250 mm	320 mm
Minimum display area	195 x 195 mm	270 x 270 mm	340 x 340 mm
Auto acquisition of targets	-	-	Yes
Minimum <i>acquired</i> radar target capacity	20	30	40
Minimum <i>activated</i> AIS target capacity	20	30	40
Minimum <i>sleeping</i> AIS target capacity	100	150	200
Trial Manoeuvre	-	-	Yes

3 REFERENCES

References are in appendix 1.

4 DEFINITIONS

Definitions are in appendix 2.

5 OPERATIONAL REQUIREMENTS FOR THE RADAR SYSTEM

The design and performance of the radar should be based on user requirements and up-to-date navigational technology. It should provide effective target detection within the safety-relevant environment surrounding own ship and should permit fast and easy situation evaluation.*

5.1 Frequency

5.1.1 Frequency spectrum

The radar should transmit within the confines of the ITU allocated bands for maritime radar and meet the requirements of the radio regulations and applicable ITU-R recommendations.

* Refer to MSC/Circ.878 - MEPC/Circ.346 on Interim Guidelines for the application of Human Element Analysing Process (HEAP) to the IMO rule-making process.

5.1.2 Radar Sensor Requirements

Radar systems of both X and S-Bands are covered in these performance standards:

- X-Band (9.2-9.5 GHz) for high discrimination, good sensitivity and tracking performance; and
- S-Band (2.9-3.1 GHz) to ensure that target detection and tracking capabilities are maintained in varying and adverse conditions of fog, rain and sea clutter.

The frequency band in use should be indicated.

5.1.3 Interference susceptibility

The radar should be capable of operating satisfactorily in typical interference conditions.

5.2 Radar Range and Bearing Accuracy

The radar system range and bearing accuracy requirements should be:

- Range* - within 30 m or 1% of the range scale in use, whichever is greater;
- Bearing* - within 1°.

5.3 Detection Performance and Anti-clutter Functions

All available means for the detection of targets should be used.

5.3.1 Detection

5.3.1.1 Detection in Clear Conditions

In the absence of clutter, for long range target and shoreline detection, the requirement for the radar system is based on normal propagation conditions, in the absence of sea clutter, precipitation and evaporation duct, with an antenna height of 15 m above sea level.

Based on:

- an indication of the target in at least 8 out of 10 scans or equivalent; and
- a probability of a radar detection false alarm of 10^{-4} ,

the requirement contained in Table 2 should be met as specified for X-Band and S-Band equipment.

The detection performance should be achieved using the smallest antenna that is supplied with the radar system.

Recognizing the high relative speeds possible between own ship and target, the equipment should be specified and approved as being suitable for classes of ship having normal (<30 kn) or high (>30 kn) own ship speeds (100 kn and 140 kn relative speeds respectively).

TABLE 2

Minimum detection ranges in clutter-free conditions

Target Description	Target Feature	Detection Range in NM ⁶	
		X-Band NM	S-Band NM
Target description ⁵	Height above sea level in metres		
Shorelines	Rising to 60	20	20
Shorelines	Rising to 6	8	8
Shorelines	Rising to 3	6	6
SOLAS ships (>5,000 gross tonnage)	10	11	11
SOLAS ships (>500 gross tonnage)	5.0	8	8
Small vessel with radar reflector meeting IMO Performance Standards ¹	4.0	5.0	3.7
Navigation buoy with corner reflector ²	3.5	4.9	3.6
Typical Navigation buoy ³	3.5	4.6	3.0
Small vessel of length 10 m with no radar reflector ⁴	2.0	3.4	3.0

5.3.1.2 Detection at Close Range

The short-range detection of the targets under the conditions specified in Table 2 should be compatible with the requirement in paragraph 5.4.

5.3.1.3 Detection in Clutter Conditions

Performance limitations caused by typical precipitation and sea clutter conditions will result in a reduction of target detection capabilities relative to those defined in 5.3.1.1 and Table 2.

5.3.1.3.1 The radar equipment should be designed to provide the optimum and most consistent detection performance, restricted only by the physical limits of propagation.

5.3.1.3.2 The radar system should provide the means to enhance the visibility of targets in adverse clutter conditions at close range.

1 IMO revised performance standards for radar reflectors (resolution MSC.164(78)) – Radar Cross Section (RCS) 7.5 m² for X-Band, 0.5 m² for S-Band.
 2 The corner reflector (used for measurement), is taken as 10 m² for X-Band and 1.0 m² for S-Band.
 3 The typical navigation buoy is taken as 5.0 m² for X-Band and 0.5 m² for S-Band; for typical channel markers, with an RCS of 1.0 m² (X-band) and 0.1 m² (S-band) and height of 1 metre, a detection range of 2.0 and 1.0 NM respectively.
 4 RCS for 10 m small vessel taken as 2.5 m² for X-Band and 1.4 m² for S-Band (taken as a complex target).
 5 Reflectors are taken as point targets, vessels as complex targets and shorelines as distributed targets (typical values for a rocky shoreline, but are dependent on profile).
 6 Detection ranges experienced in practice will be affected by various factors, including atmospheric conditions (e.g. evaporation duct), target speed and aspect, target material and target structure. These and other factors may either enhance or degrade the detection ranges stated. At ranges between the first detection and own ship, the radar return may be reduced or enhanced by signal multi-path, which depend on factors such as antenna/target centroid height, target structure, sea state and radar frequency band.

5.3.1.3.3 Degradation of detection performance (related to the figures in Table 2) at various ranges and target speeds under the following conditions, should be clearly stated in the user manual:

- light rain (4 mm per hour) and heavy rain (16 mm per hour);
- sea state 2 and sea state 5; and
- and a combination of these.

5.3.1.3.4 The determination of performance in clutter and specifically, range of first detection, as defined in the clutter environment in 5.3.1.3.3, should be tested and assessed against a benchmark target, as specified in the Test Standard.

5.3.1.3.5 Degradation in performance due to a long transmission line, antenna height or any other factors should be clearly stated in the user manual.

5.3.2 *Gain and Anti-Clutter Functions*

5.3.2.1 Means should be provided, as far as is possible, for the adequate reduction of unwanted echoes, including sea clutter, rain and other forms of precipitation, clouds, sandstorms and interference from other radars.

5.3.2.2 A gain control function should be provided to set the system gain or signal threshold level.

5.3.2.3 Effective manual and automatic anti-clutter functions should be provided.

5.3.2.4 A combination of automatic and manual anti-clutter functions is permitted.

5.3.2.5 There should be a clear and permanent indication of the status and level for gain and all anti-clutter control functions.

5.3.3 *Signal Processing*

5.3.3.1 Means should be available to enhance target presentation on the display.

5.3.3.2 The effective picture update period should be adequate, with minimum latency to ensure that the target detection requirements are met.

5.3.3.3 The picture should be updated in a smooth and continuous manner.

5.3.3.4 The equipment manual should explain the basic concept, features and limitations of any signal processing.

5.3.4 *Operation with SARTs and Radar Beacons*

5.3.4.1 The X-Band radar system should be capable of detecting radar beacons in the relevant frequency band.

5.3.4.2 The X-Band radar system should be capable of detecting SARTs and radar target enhancers.

5.3.4.3 It should be possible to switch off those signal processing functions, including polarization modes, which might prevent an X-Band radar beacon or SARTs from being detected and displayed. The status should be indicated.

5.4 Minimum Range

5.4.1 With own ship at zero speed, an antenna height of 15 m above the sea level and in calm conditions, the navigational buoy in Table 2 should be detected at a minimum horizontal range of 40 m from the antenna position and up to a range of 1 NM, without changing the setting of control functions other than the range scale selector.

5.4.2 Compensation for any range error should be automatically applied for each selected antenna, where multiple antennas are installed.

5.5 Discrimination

Range and bearing discrimination should be measured in calm conditions, on a range scale of 1.5 NM or less and at between 50% and 100% of the range scale selected:

5.5.1 Range

The radar system should be capable of displaying two point targets on the same bearing, separated by 40 m in range, as two distinct objects.

5.5.2 Bearing

The radar system should be capable of displaying two point targets at the same range, separated by 2.5° in bearing, as two distinct objects.

5.6 Roll and Pitch

The target detection performance of the equipment should not be substantially impaired when own ship is rolling or pitching up to +/-10°.

5.7 Radar Performance Optimization and Tuning

5.7.1 Means should be available to ensure that the radar system is operating at the best performance. Where applicable to the radar technology, manual tuning should be provided and additionally, automatic tuning may be provided.

5.7.2 An indication should be provided, in the absence of targets, to ensure that the system is operating at the optimum performance.

5.7.3 Means should be available (automatically or by manual operation) and while the equipment is operational, to determine a significant drop in system performance relative to a calibrated standard established at the time of installation.

5.8 Radar Availability

The radar equipment should be fully operational (RUN status) within 4 minutes after switch ON from cold. A STANDBY condition should be provided, in which there is no operational radar transmission. The radar should be fully operational within 5 sec from the standby condition.

5.9 Radar Measurements – Consistent Common Reference Point (CCRP)

5.9.1 Measurements from own ship (e.g. range rings, target range and bearing, cursor, tracking data) should be made with respect to the consistent common reference point (e.g. conning position). Facilities should be provided to compensate for the offset between antenna position and the consistent common reference point on installation. Where multiple antennas are installed, there should be provision for applying different position offsets for each antenna in the radar system. The offsets should be applied automatically when any radar sensor is selected.

5.9.2 Own ship's scaled outline should be available on appropriate range scales. The consistent common reference point and the position of the selected radar antenna should be indicated on this graphic.

5.9.3 When the picture is centred, the position of the Consistent Common Reference Point should be at the centre of the bearing scale. The off-centre limits should apply to the position of the selected antenna.

5.9.4 Range measurements should be in nautical miles (NM). In addition, facilities for metric measurements may be provided on lower range scales. All indicated values for range measurement should be unambiguous.

5.9.5 Radar targets should be displayed on a linear range scale and without a range index delay.

5.10 Display Range Scales

5.10.1 Range scales of 0.25, 0.5, 0.75, 1.5, 3, 6, 12 and 24 NM should be provided. Additional range scales are permitted outside the mandatory set. Low metric range scales may be offered in addition to the mandatory set.

5.10.2 The range scale selected should be permanently indicated.

5.11 Fixed Range Rings

5.11.1 An appropriate number of equally spaced range rings should be provided for the range scale selected. When displayed, the range ring scale should be indicated.

5.11.2 The system accuracy of fixed range rings should be within 1% of the maximum range of the range scale in use or 30 m, whichever is the greater distance.

5.12 Variable Range Markers (VRM)

5.12.1 At least two variable range markers (VRMs) should be provided. Each active VRM should have a numerical readout and have a resolution compatible with the range scale in use.

5.12.2 The VRMs should enable the user to measure the range of an object within the operational display area with a maximum system error of 1% of the range scale in use or 30 m, whichever is the greater distance.

5.13 Bearing Scale

5.13.1 A bearing scale around the periphery of the operational display area should be provided. The bearing scale should indicate the bearing as seen from the consistent common reference point.

5.13.2 The bearing scale should be outside of the operational display area. It should be numbered at least every 30° division and have division marks of at least 5°. The 5° and 10° division marks should be clearly distinguishable from each other. 1° division marks may be presented where they are clearly distinguishable from each other.

5.14 Heading Line (HL)

5.14.1 A graphic line from the consistent common reference point to the bearing scale should indicate the heading of the ship.

5.14.2 Electronic means should be provided to align the heading line to within 0.1°. If there is more than one radar antenna (see 5.35) the heading skew (bearing offset) should be retained and automatically applied when each radar antenna is selected.

5.14.3 Provision should be made to temporarily suppress the heading line. This function may be combined with the suppression of other graphics.

5.15 Electronic Bearing Lines (EBLs)

5.15.1 At least two electronic bearing lines (EBLs) should be provided to measure the bearing of any point object within the operational display area, with a maximum system error of 1° at the periphery of the display.

5.15.2 The EBLs should be capable of measurement relative to the ships heading and relative to true north. There should be a clear indication of the bearing reference (i.e. true or relative).

5.15.3 It should be possible to move the EBL origin from the consistent common reference point to any point within the operational display area and to reset the EBL to the consistent common reference point by a fast and simple action.

5.15.4 It should be possible to fix the EBL origin or to move the EBL origin at the velocity of own ship.

5.15.5 Means should be provided to ensure that the user is able to position the EBL smoothly in either direction, with an incremental adjustment adequate to maintain the system measurement accuracy requirements.

5.15.6 Each active EBL should have a numerical readout with a resolution adequate to maintain the system measurement accuracy requirements.

5.16 Parallel Index lines (PI)

5.16.1 A minimum of four independent parallel index lines, with a means to truncate and switch off individual lines, should be provided.

5.16.2 Simple and quick means of setting the bearing and beam range of a parallel index line should be provided. The bearing and beam range of any selected index line should be available on demand.

5.17 Offset Measurement of Range and Bearing

There should be a means to measure the range and bearing of one position on the display relative to any other position within the operational display area.

5.18 User Cursor

5.18.1 A user cursor should be provided to enable a fast and concise means to designate any position on the operational display area.

5.18.2 The cursor position should have a continuous readout to provide the range and bearing, measured from the consistent common reference point, and/or the latitude and longitude of the cursor position presented either alternatively or simultaneously.

5.18.3 The cursor should provide the means to select and de-select targets, graphics or objects within the operational display area. In addition, the cursor may be used to select modes, functions, vary parameters and control menus outside of the operational display area.

5.18.4 Means should be provided to easily locate the cursor position on the display.

5.18.5 The accuracy of the range and bearing measurements provided by the cursor should meet the relevant requirements for VRM and EBL.

5.19 Azimuth Stabilization

5.19.1 The heading information should be provided by a gyrocompass or by an equivalent sensor with a performance not inferior to the relevant standards adopted by the Organization.

5.19.2 Excluding the limitations of the stabilizing sensor and type of transmission system, the accuracy of azimuth alignment of the radar presentation should be within 0.5° with a rate of turn likely to be experienced with the class of ship.

5.19.3 The heading information should be displayed with a numerical resolution to permit accurate alignment with the ship gyro system.

5.19.4 The heading information should be referenced to the consistent common reference point (CCRP).

5.20 Display Mode of the Radar Picture

5.20.1 A True Motion display mode should be provided. The automatic reset of own ship may be initiated by its position on the display, or time related, or both. Where the reset is selected to occur at least on every scan or equivalent, this should be equivalent to True Motion with a fixed origin (in practice equivalent to the previous relative motion mode).

5.20.2 North Up and Course Up orientation modes should be provided. Head Up may be provided when the display mode is equivalent to True Motion with a fixed origin (in practice equivalent to the previous relative motion Head Up mode).

5.20.3 An indication of the motion and orientation mode should be provided.

5.21 Off-Centring

5.21.1 Manual off-centring should be provided to locate the selected antenna position at any point within at least 50% of the radius from the centre of the operational display area.

5.21.2 On selection of off-centred display, the selected antenna position should be capable of being located to any point on the display up to at least 50%, and not more than 75%, of the radius from the centre of the operational display area. A facility for automatically positioning own ship for the maximum view ahead may be provided.

5.21.3 In True Motion, the selected antenna position should automatically reset up to a 50% radius to a location giving the maximum view along own ship's course. Provision for an early reset of selected antenna position should be provided.

5.22 Ground and Sea Stabilization Modes

5.22.1 Ground and Sea stabilization modes should be provided.

5.22.2 The stabilization mode and stabilization source should be clearly indicated.

5.22.3 The source of own ships' speed should be indicated and provided by a sensor approved in accordance with the requirements of the Organization for the relevant stabilization mode.

5.23 Target Trails and Past Positions

5.23.1 Variable length (time) target trails should be provided, with an indication of trail time and mode. It should be possible to select true or relative trails from a reset condition for all true motion display modes.

5.23.2 The trails should be distinguishable from targets.

5.23.3 Either scaled trails or past positions or both, should be maintained and should be available for presentation within 2 scans or equivalent, following:

- the reduction or increase of one range scale;
- the offset and reset of the radar picture position; and
- a change between true and relative trails.

5.24 Presentation of Target Information

5.24.1 Targets should be presented in accordance with the performance standards for the Presentation of Navigation-related Information on Shipborne Navigational Displays adopted by the Organization and with their relevant symbols according to SN/Circ.243.

5.24.2 The target information may be provided by the radar target tracking function and by the reported target information from the Automatic Identification System (AIS).

5.24.3 The operation of the radar tracking function and the processing of reported AIS information is defined in these standards.

5.24.4 The number of targets presented, related to display size, is defined in Table 1. An indication should be given when the target capacity of radar tracking or AIS reported target processing/display capability is about to be exceeded.

5.24.5 As far as practical, the user interface and data format for operating, displaying and indicating AIS and radar tracking information should be consistent.

5.25 Target Tracking (TT) and Acquisition

5.25.1 General

Radar targets are provided by the radar sensor (transceiver). The signals may be filtered (reduced) with the aid of the associated clutter controls. Radar targets may be manually or automatically acquired and tracked using an automatic Target Tracking (TT) facility.

5.25.1.1 The automatic target tracking calculations should be based on the measurement of radar target relative position and own ship motion.

5.25.1.2 Any other sources of information, when available, may be used to support the optimum tracking performance.

5.25.1.3 TT facilities should be available on at least the 3, 6, and 12 NM range scales. Tracking range should extend to a minimum of 12 NM.

5.25.1.4 The radar system should be capable of tracking targets having the maximum relative speed relevant to its classification for normal or high own ship speeds (see 5.3).

5.25.2 *Tracked Target Capacity*

5.25.2.1 In addition to the requirements for processing of targets reported by AIS, it should be possible to track and provide full presentation functionality for a minimum number of tracked radar targets according to Table 1.

5.25.2.2 There should be an indication when the target tracking capacity is about to be exceeded. Target overflow should not degrade the radar system performance.

5.25.3 *Acquisition*

5.25.3.1 Manual acquisition of radar targets should be provided with provision for acquiring at least the number of targets specified in Table 1.

5.25.3.2 Automatic acquisition should be provided where specified in Table 1. In this case, there should be means for the user to define the boundaries of the auto-acquisition area.

5.25.4 *Tracking*

5.25.4.1 When a target is acquired, the system should present the trend of the target's motion within one minute and the prediction of the targets' motion within 3 minutes.

5.25.4.2 TT should be capable of tracking and updating the information of all acquired targets automatically.

5.25.4.3 The system should continue to track radar targets that are clearly distinguishable on the display for 5 out of 10 consecutive scans or equivalent.

5.25.4.4 The TT design should be such that target vector and data smoothing is effective, while target manoeuvres should be detected as early as possible.

5.25.4.5 The possibility of tracking errors, including target swap, should be minimized by design.

5.25.4.6 Separate facilities for cancelling the tracking of any one and of all target(s) should be provided.

5.25.4.7 Automatic tracking accuracy should be achieved when the tracked target has achieved a steady state, assuming the sensor errors allowed by the relevant performance standards of the Organization.

5.25.4.7.1 For ships capable of up to 30 kn true speed, the tracking facility should present, within 1 min steady state tracking, the relative motion trend and after 3 minutes, the predicted motion of a target, within the following accuracy values (95% probability):

TABLE 3

Tracked Target Accuracy (95% probability figures)

Time of steady state (minutes)	Relative Course (degrees)	Relative Speed (kn)	CPA (NM)	TCPA (minutes)	True Course (degrees)	True Speed (kn)
1 min: Trend	11	1.5 or 10% (whichever is greater)	1.0	-	-	-
3 min: Motion	3	0.8 or 1% (whichever is greater)	0.3	0.5	5	0.5 or 1% (whichever is greater)

Accuracy may be significantly reduced during or shortly after acquisition, own ship manoeuvre, a manoeuvre of the target, or any tracking disturbance and is also dependent on own ship's motion and sensor accuracy.

Measured target range and bearing should be within 50 m (or +/-1% of target range) and 2°.

The testing standard should have detailed target simulation tests as a means to confirm the accuracy of targets with relative speeds of up to 100 kn. Individual accuracy values shown in the table above may be adapted to account for the relative aspects of target motion with respect to that of own ship in the testing scenarios used.

5.25.4.7.2 For ships capable of speeds in excess of 30 kn (typically High-Speed Craft (HSC)) and with speeds of up to 70 kn, there should be additional steady state measurements made to ensure that the motion accuracy, after 3 minutes of steady state tracking, is maintained with target relative speeds of up to 140 kn.

5.25.4.8 A ground referencing function, based on a stationary tracked target, should be provided. Targets used for this function should be marked with the relevant symbol defined in SN/Circ.243.

5.26 Automatic Identification System (AIS) Reported Targets

5.26.1 General

Reported targets provided by the AIS may be filtered according to user-defined parameters. Targets may be sleeping, or may be activated. Activated targets are treated in a similar way to radar tracked targets.

5.26.2 AIS Target Capacity

In addition to the requirements for radar tracking, it should be possible to display and provide full presentation functionality for a minimum number of sleeping and activated AIS targets according to Table 1. There should be an indication when the capacity of processing/display of AIS targets is about to be exceeded.

5.26.3 Filtering of AIS Sleeping Targets

To reduce display clutter, a means to filter the presentation of sleeping AIS targets should be provided, together with an indication of the filter status. (e.g. by target range, CPA/TCPA or AIS target class A/B, etc.). It should not be possible to remove individual AIS targets from the display.

5.26.4 Activation of AIS Targets

A means to activate a sleeping AIS target and to deactivate an activated AIS target should be provided. If zones for the automatic activation of AIS targets are provided, they should be the same as for automatic radar target acquisition. In addition, sleeping AIS targets may be automatically activated when meeting user defined parameters (e.g. target range, CPA/TCPA or AIS target class A/B).

5.26.5 AIS Presentation Status

TABLE 4

The AIS presentation status should be indicated as follows:

Function	Cases to be Presented		Presentation
AIS ON/OFF	AIS processing switched ON/ graphical presentation switched OFF	AIS processing switched ON/ graphical presentation switched ON	Alphanumeric or graphical
Filtering of sleeping AIS targets	Filter status	Filter status	Alphanumeric or graphical
Activation of Targets		Activation criteria	Graphical
CPA/TCPA Alarm	Function ON/OFF Sleeping targets included	Function ON/OFF Sleeping targets included	Alphanumeric and graphical
Lost Target Alarm	Function ON/OFF Lost target filter criteria	Function ON/OFF Lost target filter criteria	Alphanumeric and graphical
Target Association	Function ON/OFF Association criteria Default target priority	Function ON/OFF Association criteria Default target priority	Alphanumeric

5.27 AIS Graphical Presentation

Targets should be presented with their relevant symbols according to the performance standards for the Presentation of Navigation-related Information on Shipborne Navigational Displays adopted by the Organization and SN/Circ.243.

5.27.1 AIS targets that are displayed should be presented as sleeping targets by default.

5.27.2 The course and speed of a tracked radar target or reported AIS target should be indicated by a predicted motion vector. The vector time should be adjustable and valid for presentation of any target regardless of its source.

5.27.3 A permanent indication of vector mode, time and stabilization should be provided.

5.27.4 The consistent common reference point should be used for the alignment of tracked radar and AIS symbols with other information on the same display.

5.27.5 On large scale/low range displays, a means to present the true scale outline of an activated AIS target should be provided. It should be possible to display the past track of activated targets.

5.28 AIS and Radar Target Data

5.28.1 It should be possible to select any tracked radar or AIS target for the alphanumeric display of its data. A target selected for the display of its alphanumeric information should be identified by the relevant symbol. If more than one target is selected for data display, the relevant symbols and the corresponding data should be clearly identified. There should be a clear indication to show that the target data is derived from radar or from AIS.

5.28.2 For each selected tracked radar target, the following data should be presented in alphanumeric form: source(s) of data, actual range of target, actual bearing of target, predicted target range at the closest point of approach (CPA), predicted time to CPA (TCPA), true course of target, true speed of target.

5.28.3 For each selected AIS target the following data should be presented in alphanumeric form: Source of data, ship's identification, navigational status, position where available and its quality, range, bearing, COG, SOG, CPA and TCPA. Target heading and reported rate of turn should also be made available. Additional target information should be provided on request.

5.28.4 If the received AIS information is incomplete, the absent information should be clearly indicated as 'missing' within the target data field.

5.28.5 The data should be displayed and continually updated, until another target is selected for data display or until the window is closed.

5.28.6 Means should be provided to present own ship AIS data on request.

5.29 Operational Alarms

A clear indication of the cause for all alarm criteria should be given.

5.29.1 If the calculated CPA and TCPA values of a tracked target or activated AIS target are less than the set limits:

- A CPA/TCPA alarm should be given.
- The target should be clearly indicated.

5.29.2 The preset CPA/TCPA limits applied to targets from radar and AIS should be identical. As a default state, the CPA/TCPA alarm functionality should be applied to all activated AIS targets. On user request the CPA/TCPA alarm functionality may also be applied to sleeping targets.

5.29.3 If a user defined acquisition/activation zone facility is provided, a target not previously acquired/activated entering the zone, or is detected within the zone, should be clearly identified with the relevant symbol and an alarm should be given. It should be possible for the user to set ranges and outlines for the zone.

5.29.4 The system should alert the user if a tracked radar target is lost, rather than excluded by a pre-determined range or pre-set parameter. The target's last position should be clearly indicated on the display.

5.29.5 It should be possible to enable or disable the lost target alarm function for AIS targets. A clear indication should be given if the lost target alarm is disabled.

If the following conditions are met for a lost AIS target:

- The AIS lost target alarm function is enabled.
- The target is of interest, according to lost target filter criteria.
- A message is not received for a set time, depending on the nominal reporting rate of the AIS target.

Then:

- The last known position should be clearly indicated as a lost target and an alarm be given.
- The indication of the lost target should disappear if the signal is received again, or after the alarm has been acknowledged.
- A means of recovering limited historical data from previous reports should be provided.

5.30 AIS and Radar Target Association

An automatic target association function based on harmonized criteria avoids the presentation of two target symbols for the same physical target.

5.30.1 If the target data from AIS and radar tracking are both available and if the association criteria (e.g. position, motion) are fulfilled such that the AIS and radar information are considered as one physical target, then as a default condition, the activated AIS target symbol and the alphanumeric AIS target data should be automatically selected and displayed.

5.30.2 The user should have the option to change the default condition to the display of tracked radar targets and should be permitted to select either radar tracking or AIS alphanumeric data.

5.30.3 For an associated target, if the AIS and radar information become sufficiently different, the AIS and radar information should be considered as two distinct targets and one activated AIS target and one tracked radar target should be displayed. No alarm should be raised.

5.31 Trial Manoeuvre

The system should, where required by table 1, be capable of simulating the predicted effects of own ships manoeuvre in a potential threat situation and should include own ship's dynamic characteristics. A trial manoeuvre simulation should be clearly identified. The requirements are:

- The simulation of own ship course and speed should be variable.
- A simulated time to manoeuvre with a countdown should be provided.
- During simulation, target tracking should continue and the actual target data should be indicated.
- Trial manoeuvre should be applied to all tracked targets and at least all activated AIS targets.

5.32 The Display of Maps, Navigation Lines and Routes

5.32.1 It should be possible for the user to manually create and change, save, load and display simple maps/navigation lines/routes referenced to own ship or a geographical position. It should be possible to remove the display of this data by a simple operator action.

5.32.2 The maps/navigation lines/routes may consist of lines, symbols and reference points.

5.32.3 The appearance of lines, colours and symbols are as defined in SN/Circ.243.

5.32.4 The maps/navigation lines/route graphics should not significantly degrade the radar information.

5.32.5 The maps/navigation lines/routes should be retained when the equipment is switched OFF.

5.32.6 The maps/navigation lines/route data should be transferable whenever a relevant equipment module is replaced.

5.33 The Display of Charts

5.33.1 The radar system may provide the means to display ENC and other vector chart information within the operational display area to provide continuous and real-time position monitoring. It should be possible to remove the display of chart data by a single operator action.

5.33.2 The ENC information should be the primary source of information and should comply with IHO relevant standards. Status of other information should be identified with a permanent indication. Source and update information should be made available.

5.33.3 As a minimum, the elements of the ECDIS Standard Display should be made available for individual selection by category or layer, but not as individual objects.

5.33.4 The chart information should use the same reference and co-ordinate criteria as the radar/AIS, including datum, scale, orientation, CCRP and stabilization mode.

5.33.5 The display of radar information should have priority. Chart information should be displayed such that radar information is not substantially masked, obscured or degraded. Chart information should be clearly perceptible as such.

5.33.6 A malfunction of the source of chart data should not affect the operation of the radar/AIS system.

5.33.7 Symbols and colours should comply with the performance standards for the Presentation of Navigation-related Information on Shipborne Navigational Displays adopted by the Organization (SN/Circ.243).

5.34 Alarms and Indications

Alarms and indications should comply with the performance standards for the Presentation of Navigation-related Information on Shipborne Navigational Displays adopted by the Organization.

5.34.1 A means should be provided to alert the user of “picture freeze”.

5.34.2 Failure of any signal or sensor in use, including; gyro, log, azimuth, video, sync and heading marker, should be alarmed. System functionality should be limited to a fall back mode or in some cases, the display presentation should be inhibited (see fallback modes, section 9).

5.35 Integrating Multiple Radars

5.35.1 The system should safeguard against single point system failure. Fail-safe condition should be applied in the event of an integration failure.

5.35.2 The source and any processing or combination of radar signals should be indicated.

5.35.3 The system status for each display position should be available.

6 ERGONOMIC CRITERIA

6.1 Operational Controls

6.1.1 The design should ensure that the radar system is simple to operate. Operational controls should have a harmonized user interface and be easy to identify and simple to use.

6.1.2 The radar system should be capable of being switched ON or OFF at the main system radar display or at a control position.

6.1.3 The control functions may be dedicated hardware, screen accessed or a combination of these; however the primary control functions should be dedicated hardware controls or soft keys, with an associated status indication in a consistent and intuitive position.

6.1.4 The following are defined as primary radar control functions and should be easily and immediately accessible:

Radar Standby/RUN, Range scale selection, Gain, tuning function (if applicable), Anti-clutter rain, Anti-clutter sea, AIS function on/off, Alarm acknowledge, Cursor, a means to set EBL/VRM, display brightness and acquisition of radar targets.

6.1.5 The primary functions may also be operated from a remote operating position in addition to the main controls.

6.2 Display Presentation

6.2.1 The display presentation should comply with the performance standards for the Presentation of Navigation-related Information on Shipborne Navigational Displays adopted by the Organization.

6.2.2 The colours, symbols and graphics presented should comply with SN/Circ.243.

6.2.3 The display sizes should conform to those defined in Table 1.

6.3 Instructions and Documentation

6.3.1 *Documentation Language*

The operating instructions and manufacturer's documentation should be written in a clear and comprehensible manner and should be available at least in the English language.

6.3.2 *Operating Instructions*

The operating instructions should contain a qualified explanation and/or description of information required by the user to operate the radar system correctly, including:

- appropriate settings for different weather conditions;
- monitoring the radar system's performance;
- operating in a failure or fall-back situation;
- limitations of the display and tracking process and accuracy, including any delays;
- using heading and SOG/COG information for collision avoidance;
- limitations and conditions of target association;
- criteria of selection for automatic activation and cancellation of targets;
- methods applied to display AIS targets and any limitations;
- principles underlying the trial manoeuvre technology, including simulation of own ship's manoeuvring characteristics, if provided;
- alarms and indications;
- installation requirements as listed under section 7.5;
- radar range and bearing accuracies; and
- any special operation (e.g. tuning) for the detection of SARTs; and
- the role of the CCRP for radar measurements and its specific value.

6.3.3 *Manufacturer's Documentation*

6.3.3.1 The manufacturer's documentation should contain a description of the radar system and factors that may affect detection performance, including any latency in signal processing.

6.3.3.2 Documentation should describe the basis of AIS filter criteria and AIS/radar target association criteria.

6.3.3.3 The equipment documentation should include full details of installation information, including additional recommendations on unit location and factors that may degrade performance or reliability.

7 DESIGN AND INSTALLATION

7.1 Design for Servicing

7.1.1 As far as is practical, the radar system should be of a design to facilitate simple fault diagnosis and maximum availability.

7.1.2 The radar system should include a means to record the total operational hours for any components with a limited life.

7.1.3 The documentation should describe any routine servicing requirements and should include details of any restricted life components.

7.2 Display

The display device physical requirements should meet those specified in the performance standards for the Presentation of Navigation-related Information on Shipborne Navigational Displays adopted by the Organization (SN/Circ.243) and those specified in Table 1.

7.3 Transmitter Mute

The equipment should provide a mute facility to inhibit the transmission of radar energy over a preset sector. The mute sector should be set up on installation. An indication of sector mute status should be available.

7.4 Antenna

7.4.1 The antenna should be designed to start operating and to continue to operate in relative wind speeds likely to be encountered on the class of ship on which it is installed.

7.4.2 The combined radar system should be capable of providing an appropriate information update rate for the class of ship on which it is installed.

7.4.3 The antenna side lobes should be consistent with satisfying the system performance as defined in this standard.

7.4.4 There should be a means to prevent antenna rotation and radiation during servicing, or while personnel are in the vicinity of up-mast units.

7.5 Radar System Installation

Requirements and guidelines for the radar system installation should be included in the manufacturers' documentation. The following subjects should be covered:

7.5.1 *The Antenna*

Blind sectors should be kept to a minimum, and should not be placed in an arc of the horizon from the right ahead direction to 22.5° abaft the beam and especially should avoid the right ahead direction (relative bearing 000°). The installation of the antenna should be in such a manner that the performance of the radar system is not substantially degraded. The antenna should be mounted clear of any structure that may cause signal reflections, including other antenna and deck structure or cargo. In addition, the height of the antenna should take account of target detection performance relating to range of first detection and target visibility in sea clutter.

7.5.2 *The Display*

The orientation of the display unit should be such that the user is looking ahead, the lookout view is not obscured and there is minimum ambient light on the display.

7.6 Operation and Training

7.6.1 The design should ensure that the radar system is simple to operate by trained users.

7.6.2 A target simulation facility should be provided for training purposes.

8 INTERFACING

8.1 Input Data

The radar system should be capable of receiving the required input information from:

- a gyro-compass or transmitting heading device (THD);
- a speed and distance measuring equipment (SDME);
- an electronic position fixing system (EPFS);
- an Automatic Identification System (AIS); or
- other sensors or networks providing equivalent information acceptable to the Organization.

The radar should be interfaced to relevant sensors required by these performance standards in accordance with recognized international standards.*

8.2 Input Data Integrity and Latency

8.2.1 The radar system should not use data indicated as invalid. If input data is known to be of poor quality this should be clearly indicated.

8.2.2 As far as is practical, the integrity of data should be checked, prior to its use, by comparison with other connected sensors or by testing to valid and plausible data limits.

8.2.3 The latency of processing input data should be minimized.

8.3 Output Data

8.3.1 Information provided by any radar output interface to other systems should be in accordance with international standards*.

8.3.2 The radar system should provide an output of the display data for the voyage data recorder (VDR).

8.3.3 At least one normally closed contact (isolated) should be provided for indicating failure of the radar.

8.3.4 The radar should have a bi-directional interface to facilitate communication so that alarms from the radar can be transferred to external systems and so that audible alarms from the radar can be muted from external systems, the interface should comply with relevant international standards.

* Refer to IEC publication 61162.

9 BACKUP AND FALLBACK ARRANGEMENTS

In the event of partial failures and to maintain minimum basic operation, the fallback arrangements listed below should be provided. There should be a permanent indication of the failed input information.

9.1 Failure of Heading Information (Azimuth Stabilization)

9.1.1 The equipment should operate satisfactorily in an unstabilized head-up mode.

9.1.2 The equipment should switch automatically to the unstabilized head up mode within 1 minute after the azimuth stabilization has become ineffective.

9.1.3 If automatic anti-clutter processing could prevent the detection of targets in the absence of appropriate stabilization, the processing should switch off automatically within 1 minute after the azimuth stabilization has become ineffective.

9.1.4 An indication should be given that only relative bearing measurements can be used.

9.2 Failure of Speed through the Water Information

A means of manual speed input should be provided and its use clearly indicated.

9.3 Failure of Course and Speed Over Ground Information

The equipment may be operated with course and speed through the water information.

9.4 Failure of Position Input Information

The overlay of chart data and geographically referenced maps should be disabled if only a single Reference Target is defined and used, or the position is manually entered.

9.5 Failure of Radar Video Input Information

In the absence of radar signals, the equipment should display target information based on AIS data. A frozen radar picture should not be displayed.

9.6 Failure of AIS Input Information

In the absence of AIS signals, the equipment should display the radar video and target database.

9.7 Failure of an Integrated or Networked System

The equipment should be capable of operating equivalent to a stand alone system.

Appendix 1 - References

IMO SOLAS chapters IV, V and X IMO resolution A.278(VII)	Carriage rules. Supplement to the recommendation on PS for navigational radar equipment.
IMO resolution A.424(XI)	Performance standards for gyro-compasses.
IMO resolution A.477(XII)	Performance standards for radar equipment.
IMO resolution A.694(17)	General Requirements for ship borne radio equipment forming part of the global maritime distress and safety system and for electronically navigational aids.
IMO resolution A.817(19), as amended IMO resolution A.821(19)	Performance Standards for ECDIS. Performance standards for gyro-compasses for high-speed craft.
IMO resolution A.824(19)	Performance standards for devices to indicate speed and distance.
IMO resolution MSC.86(70) IMO resolution MSC.64(67)	Performance standards for INS. Recommendations on new and amended performance standards (Annex 2 revised by MSC.114(73)).
IMO resolution MSC.112(73)	Revised performance standards for ship borne global positioning (GPS) receiver equipment.
IMO resolution MSC.114(73)	Revised performance standards for ship borne DGPS and DGLONASS maritime radio beacon receiver equipment.
IMO resolution MSC.116(73)	Performance standards for marine transmitting heading devices (THD).
IMO MSC/Circ.982	Guidelines on ergonomic criteria for bridge equipment and layout.
IHO S-52 appendix 2 IEC 62388	Colour and symbol specification for ECDIS. Radar Test Standard (replacing 60872 and 60936 series of test standards).
IEC 60945	Maritime navigation and radio communication equipment and systems – General requirements – Methods of testing and required test results.
IEC 61162	Maritime navigation and radio communication equipment and systems – Digital interfaces.
IEC 61174	Maritime navigation and radio communication equipment and systems – Electronic chart display and information system (ECDIS) – Operational and performance requirements, methods of testing and required test results.
IEC 62288	Presentation and display of navigation information.
ISO 9000 (all parts)	Quality management/assurance standards.

Appendix 2 – Definitions

Activated AIS target	<p>A target representing the automatic or manual activation of a sleeping target for the display of additional graphically presented information. The target is displayed by an “activated target” symbol including:</p> <ul style="list-style-type: none">• a vector (COG / SOG);• the heading; and• ROT or direction of turn indication (if available) to indicate initiated course changes.
Acquisition of a radar target	<p>Process of acquiring a target and initiating its tracking.</p>
Activation of an AIS target	<p>Activation of a sleeping AIS target for the display of additional graphical and alphanumeric information.</p>
Acquired radar target	<p>Automatic or manual acquisition initiates radar tracking. Vectors and past positions are displayed when data has achieved a steady state condition.</p>
AIS	<p>Automatic Identification System.</p>
AIS target	<p>A target generated from an AIS message. See activated target, lost target, selected target and sleeping target.</p>
Associated target	<p>If an acquired radar target and an AIS reported target have similar parameters (e.g. position, course, speed) complying with an association algorithm, they are considered to be the same target and become an associated target.</p>
Acquisition/activation zone	<p>A zone set up by the operator in which the system should automatically acquire radar targets and activate reported AIS targets when entering the zone.</p>
CCRP	<p>Consistent Common Reference Point: A location on own ship, to which all horizontal measurements such as target range, bearing, relative course, relative speed, closest point of approach (CPA) or time to closest point of approach (TCPA) are referenced, typically the conning position of the bridge.</p>
CPA/TCPA	<p>Closest Point of Approach / Time to the Closest Point of Approach: Distance to the closest point of approach (CPA) and time to the closest point of approach (TCPA). Limits are set by the operator related to own ship.</p>
Course Over Ground (COG)	<p>Direction of the ship's movement relative to the earth, measured on board the ship, expressed in angular units from true north.</p>

Course Through Water (CTW)	Direction of the ship's movement through the water, defined by the angle between the meridian through its position and the direction of the ship's movement through the water, expressed in angular units from true north.
Dangerous target	A target whose predicted CPA and TCPA are violating the values as preset by the operator. The respective target is marked by a “dangerous target” symbol.
Display modes	Relative motion: means a display on which the position of own ship remains fixed, and all targets move relative to own ship. True motion: a display across which own ship moves with its own true motion.
Display orientation	North up display: an azimuth stabilized presentation which uses the gyro input (or equivalent) and north is uppermost on the presentation. Course up display: an azimuth stabilized presentation which uses the gyro input or equivalent and the ship's course is uppermost on the presentation at the time of selection. Head up display: an unstabilized presentation in which own ship's heading is uppermost on the presentation.
ECDIS	Electronic Chart Display and Information System.
ECDIS Display Base	The level of information which cannot be removed from the ECDIS display, consisting of information which is required at all times in all geographic areas and all circumstances. It is not intended to be sufficient for safe navigation.
ECDIS Standard Display	The level of information that should be shown when a chart is first displayed on ECDIS. The level of the information it provides for route planning or route monitoring may be modified by the mariner according to the mariner's needs.
ENC	Electronic Navigational Chart. The database standardized as to content, structure and format according to relevant IHO standards and issued by, or on the authority of, a Government.
EPFS	Electronic Position Fixing System.
ERBL	Electronic bearing line carrying a marker, which is combined with the range marker, used to measure range and bearing from own ship or between two objects.

Evaporation duct	A low lying duct (a change in air density) that traps the radar energy so that it propagates close to the sea surface. Ducting may enhance or reduce radar target detection ranges.
Heading	Direction in which the bow of a ship is pointing expressed as an angular displacement from north.
HSC	High-speed craft (HSC) are vessels which comply with the definition in SOLAS for high speed craft.
Latency	The delay between actual and presented data.
Lost AIS target	A target representing the last valid position of an AIS target before the reception of its data was lost. The target is displayed by a “lost AIS target” symbol.
Lost tracked target	Target information is no longer available due to poor, lost or obscured signals. The target is displayed by a “lost tracked radar target” symbol.
Maps/Nav lines	Operator defined or created lines to indicate channels, Traffic Separation Schemes or borders of any area important for navigation.
Operational display area	Area of the display used to graphically present chart and radar information, excluding the user dialogue area. On the chart display this is the area of the chart presentation. On the radar display this is the area encompassing the radar image.
Past positions	Equally time-spaced past position marks of a tracked or reported target and own ship. The past positions’ track may be either relative or true.
Radar	(Radio <u>d</u>irection <u>a</u>nd <u>r</u>anging). A radio system that allows the determination of distance and direction of reflecting objects and of transmitting devices.
Radar beacon	A navigation aid which responds to the radar transmission by generating a radar signal to identify its position and identity.
Radar detection false alarm	The probability of a radar false alarm represents the probability that noise will cross the detection threshold and be called a target when only noise is present.
Radar target	Any object fixed or moving whose position and motion is determined by successive radar measurements of range and bearing.

Radar target enhancer	An electronic radar reflector, the output of which is an amplified version of the received radar pulse without any form of processing except limiting.
Reference target	Symbol indicating that the associated tracked stationary target (e.g. a navigational mark) is used as a speed reference for the ground stabilization.
Relative bearing	Direction of a target's position from own ship's reference location expressed as an angular displacement from own ship's heading.
Relative course	Direction of motion of a target relative to own ship's direction. (Bearing).
Relative motion	Combination of relative course and relative speed.
Relative speed	Speed of a target relative to own ship's speed data.
Rate of turn	Change of heading per time unit.
SART	Search And Rescue Transponder.
SDME	Speed and Distance Measuring Equipment.
Selected target	A manually selected target for the display of detailed alphanumeric information in a separate data display area. The target is displayed by a "selected target" symbol.
Sleeping AIS target	A target indicating the presence and orientation of a vessel equipped with AIS in a certain location. The target is displayed by a "sleeping target" symbol. No additional information is presented until activated.
Stabilization modes	Ground stabilization: Display mode in which speed and course information are referred to the ground, using ground track input data, or EPFS as reference. Sea stabilization: Display mode in which speed and course information are referred to the sea, using gyro or equivalent and water speed log input as reference.
Standard display	The level of information that should be shown when a chart is first displayed on ECDIS. The level of the information it provides for route planning or route monitoring may be modified by the mariner according to the mariner's needs.
Standard radar reflector	Reference reflector mounted 3.5 m above sea level with 10 m ² effective reflecting area at X-Band.

Steady state tracking	Tracking a target, proceeding at steady motion: <ul style="list-style-type: none">- after completion of the acquisition process, or- without a manoeuvre of target or own ship, or- without target swap or any disturbance.
Speed Over Ground (SOG)	Speed of the ship relative to the earth, measured on board of the ship.
Speed Through Water	Speed of the ship relative to the water surface.
SOLAS	International Convention for the Safety of Life at Sea.
Suppressed area	An area set up by the operator within which targets are not acquired.
Target swap	Situation in which the incoming radar data for a tracked target becomes incorrectly associated with another tracked target or a non-tracked radar echo.
Target's predicted motion	Prediction of a target's future course and speed based on linear extrapolation from its present motion as determined by past measurements of its range and bearing on the radar.
Target Tracking (TT)	Computer process of observing the sequential changes in the position of a radar target in order to establish its motion. Such a target is a Tracked Target.
Trails	Tracks displayed by the radar echoes of targets in the form of an afterglow. Trails may be true or relative.
Trial manoeuvre	Graphical simulation facility used to assist the operator to perform a proposed manoeuvre for navigation and collision avoidance purposes, by displaying the predicted future status of at least all acquired or activated targets as a result of own ship's simulated manoeuvres.
True bearing	Direction of a target from own ship's reference location or from another target's position expressed as an angular displacement from true north.
True course	Direction of motion relative to ground or to sea, of a target expressed as an angular displacement from north.
True motion	Combination of true course and true speed.
True speed	Speed of a target relative to ground, or to sea.

Vector modes

True vector: Vector representing the predicted true motion of a target, showing course and speed with reference to the ground.

Relative vector: Predicted movement of a target relative to own ship's motion.

User configured presentation

A display presentation configured by the user for a specific task at hand. The presentation may include radar and/or chart information, in combination with other navigation or ship related data.

User dialogue area

Is an area of the display consisting of data fields and/or menus that is allocated to the interactive presentation and entry or selection of operational parameters, data and commands mainly in alphanumeric form.

ANNEX 35

DRAFT AMENDMENTS TO SOLAS REGULATION V/19

CHAPTER V

SAFETY OF NAVIGATION

Regulation 19 – Carriage requirements for shipborne navigational systems and equipment

1 The following new subparagraph .8 is added to paragraph 2.4:

".8 The information provided through the AIS shall be presented to the OOW."

ANNEX 36

DRAFT AMENDMENTS TO SOLAS REGULATION V/22

CHAPTER V

SAFETY OF NAVIGATION

Regulation 22 – Navigation bridge visibility

1 The following new paragraph 4 is added after existing paragraph 3:

“4 Notwithstanding the requirements of paragraphs 1.1, 1.3, 1.4 and 1.5, ballast water exchange may be undertaken provided that:

- .1 the master has determined that it is safe to do so and takes into consideration any increased blind sectors or reduced horizontal fields of vision resulting from the operation to ensure that a proper lookout is maintained at all times;
- .2 the operation is conducted in accordance with the ship’s ballast water management plan, taking into account the recommendations on ballast water exchange adopted by the Organization; and
- .3 the commencement and termination of the operation are recorded in the ship’s record of navigational activities pursuant to regulation 28.”

ANNEX 37

DRAFT REVISED SOLAS CHAPTER II-1 PARTS A, B AND B-1

CHAPTER II-1
CONSTRUCTION - STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY
AND ELECTRICAL INSTALLATIONS“Part A
GeneralRegulation 1
Application

1.1 Unless expressly provided otherwise, this chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after [*date to be inserted*].

1.2 For the purpose of this chapter, the term *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 one per cent of the estimated mass of all structural material, whichever is less.

1.3 For the purpose of this chapter:

- .1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;
- .2 the expression *all ships* means ships constructed before, on or after [*date to be inserted*];
- .3 a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences;
- .4 the expression *alterations and modifications of a major character* means, in the context of cargo ship subdivision and stability, any modification to the construction which affects the level of subdivision of that ship. Where a cargo ship is subject to such modification, it shall be demonstrated that the A/R ratio calculated for the ship after such modifications is not less than the A/R ratio calculated for the ship before the modification. However, in those cases where the ship's A/R ratio before modification is equal to or greater than unity, it is only necessary that the ship after modification has an 'A' value which is not less than 'R', calculated for the modified ship.

2 Unless expressly provided otherwise, for ships constructed before [*date to be inserted*], the Administration shall 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) and MSC.134(76) are complied with.

3 All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before the date on which any relevant amendments enter into force, shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after the date on which any relevant amendments enter into force, in so far as the Administration deems reasonable and practicable.

4 The Administration of a State may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships entitled to fly the flag of that State which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

5 In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration of the State whose flag such ships are entitled to fly, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of:

- .1 the rules annexed to the Special Trade Passenger Ships Agreement, 1971; and
- .2 the rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Regulation 2 *Definitions*

For the purpose of this chapter, unless expressly provided otherwise:

- 1 *Subdivision length (L_s)* of the ship is the greatest projected moulded length of that part of the ship at or below deck or decks limiting the vertical extent of flooding with the ship at the deepest subdivision draught.
- 2 *Mid-length* is the mid-point of the subdivision length of the ship.
- 3 *Aft terminal* is the aft limit of the subdivision length.
- 4 *Forward terminal* is the forward limit of the subdivision length.
- 5 *Length (L)* is the length as defined in the International Convention on Load Lines in force.

- 6 *Freeboard deck* is the deck as defined in the International Convention on Load Lines in force.
- 7 *Forward perpendicular* is the forward perpendicular as defined in the International Convention on Load Lines in force.
- 8 *Breadth (B)* is the greatest moulded breadth of the ship at or below the deepest subdivision draught.
- 9 *Draught (d)* is the vertical distance from the keel line at mid-length to the waterline in question.
- 10 *Deepest subdivision draught (d_s)* is the waterline which corresponds to the summer load line draught of the ship.
- 11 *Light service draught (d_l)* is the service draught corresponding to the lightest anticipated loading and associated tankage, including, however, such ballast as may be necessary for stability and/or immersion. Passenger ships should include the full complement of passengers and crew onboard.
- 12 *Partial subdivision draught (d_p)* is the light service draught plus 60% of the difference between the light service draught and the deepest subdivision draught.
- 13 *Trim* is the difference between the draught forward and the draught aft, where the draughts are measured at the forward and aft terminals respectively, disregarding any rake of keel.
- 14 *Permeability (μ)* of a space is the proportion of the immersed volume of that space which can be occupied by water.
- 15 *Machinery spaces* are spaces between the watertight boundaries of a space containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion. In the case of unusual arrangements, the Administration may define the limits of the machinery spaces.
- 16 *Weathertight* means that in any sea conditions water will not penetrate into the ship.
- 17 *Watertight* means having scantlings and arrangements capable of preventing the passage of water in any direction under the head of water likely to occur in intact and damaged conditions. In the damaged condition, the head of water is to be considered in the worst situation at equilibrium, including intermediate stages of flooding.
- 18 *Design pressure* means the hydrostatic pressure for which each structure or appliance assumed watertight in the intact and damage stability calculations is designed to withstand.
- 19 *Bulkhead deck* in a passenger ship means the uppermost deck 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.

The bulkhead deck may be a stepped deck. In a cargo ship the freeboard deck may be taken as the bulkhead deck.

20 *Deadweight* is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the draught corresponding to the assigned summer freeboard and the lightweight of the ship.

21 *Lightweight* is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.

22 *Oil tanker* is the oil tanker defined in regulation 1 of Annex 1 of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973.

23 *Ro-ro passenger ship* means a passenger ship with ro-ro cargo spaces or special category spaces as defined in regulation II-2/3.

24 *Keel line* is a line parallel to the slope of the keel passing amidships through:

- .1 the top of the keel at centreline or line of intersection of the inside of shell plating with the keel if a bar keel extends below that line, on a ship with a metal shell; or
- .2 in wood and composite ships, the distance is measured from the lower edge of the keel rabbet. When the form at the lower part of the midship section of a hollow character, or where thick garboards are fitted, the distance is measured from the point where the line of the flat of the bottom continued inward intersects the centreline amidships.

25 *Amidship* is at the middle of the length (L).

Regulation 3

Definitions relating to parts C, D and E

1 *Steering gear control system* is the equipment by which orders are transmitted from the navigating bridge to the steering gear power units. Steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables.

2 *Main steering gear* is the machinery, rudder actuators, steering gear, power units, if any, and ancillary equipment and the means of applying torque to the rudder stock (e.g. tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the ship under normal service conditions.

3 *Steering gear power unit* is:

- .1 in the case of electric steering gear, an electric motor and its associated electrical equipment;
- .2 in the case of electrohydraulic steering gear, an electric motor and its associated electrical equipment and connected pump;

- .3 in the case of other hydraulic steering gear, a driving engine and connected pump.
- 4 *Auxiliary steering gear* is the equipment other than any part of the main steering gear necessary to steer the ship in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose.
- 5 *Normal operational and habitable condition* is a condition under which the ship as a whole, the machinery, services, means and aids ensuring propulsion, ability to steer, safe navigation, fire and flooding safety, internal and external communications and signals, means of escape, and emergency boat winches, as well as the designed comfortable conditions of habitability are in working order and functioning normally.
- 6 *Emergency condition* is a condition under which any services needed for normal operational and habitable conditions are not in working order due to failure of the main source of electrical power.
- 7 *Main source of electrical power* is a source intended to supply electrical power to the main switchboard for distribution to all services necessary for maintaining the ship in normal operational and habitable conditions.
- 8 *Dead ship condition* is the condition under which the main propulsion plant, boilers and auxiliaries are not in operation due to the absence of power.
- 9 *Main generating station* is the space in which the main source of electrical power is situated.
- 10 *Main switchboard* is a switchboard which is directly supplied by the main source of electrical power and is intended to distribute electrical energy to the ship's services.
- 11 *Emergency switchboard* is a switchboard which in the event of failure of the main electrical power supply system is directly supplied by the emergency source of electrical power or the transitional source of emergency power and is intended to distribute electrical energy to the emergency services.
- 12 *Emergency source of electrical power* is a source of electrical power, intended to supply the emergency switchboard in the event of a failure of the supply from the main source of electrical power.
- 13 *Power actuating system* is the hydraulic equipment provided for supplying power to turn the rudder stock, comprising a steering gear power unit or units, together with the associated pipes and fittings, and a rudder actuator. The power actuating systems may share common mechanical components, i.e., tiller, quadrant and rudder stock, or components serving the same purpose.
- 14 *Maximum ahead service speed* is the greatest speed which the ship is designed to maintain in service at sea at the deepest sea-going draught.
- 15 *Maximum astern speed* is the speed which it is estimated the ship can attain at the designed maximum astern power at the deepest sea-going draught.

16 *Machinery spaces* are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

17 *Machinery spaces of category A* are those spaces and trunks to such spaces which contain:

- .1 internal combustion machinery used for main propulsion; or
- .2 internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or
- .3 any oil-fired boiler or oil fuel unit.

18 *Control stations* are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralized.

19 *Chemical tanker* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in either:

- .1 chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Maritime Safety Committee by resolution MSC.4(48), hereinafter referred to as "the International Bulk Chemical Code", as may be amended by the Organization; or
- .2 chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Assembly of the Organization by resolution A.212(VII), hereinafter referred to as "the Bulk Chemical Code", as has been or may be amended by the Organization,

whichever is applicable.

20 *Gas carrier* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products listed in either:

- .1 chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Maritime Safety Committee by resolution MSC.5(48), hereinafter referred to as "the International Gas Carrier Code", as may be amended by the Organization; or
- .2 chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Organization by resolution A.328(IX), hereinafter referred to as "the Gas Carrier Code", as has been or may be amended by the Organization;

whichever is applicable.

Part A-1
Structure of ships

Regulation 3-1

Structural, mechanical and electrical requirements for ships
(This regulation applies to ships constructed on or after 1 July 1986)

In addition to the requirements contained elsewhere in the present regulations, ships shall be designed, constructed and maintained in compliance with the structural, mechanical and electrical requirements of a classification society which is recognized by the Administration in accordance with the provisions of regulation XI/1, or with applicable national standards of the Administration which provide an equivalent level of safety.

Regulation 3-2

Corrosion prevention of seawater ballast tanks in oil tankers and bulk carriers
(This regulation applies to oil tankers and bulk carriers constructed on or after 1 July 1998)

All dedicated seawater ballast tanks shall have an efficient corrosion prevention system, such as hard protective coatings or equivalent. The coatings should preferably be of a light colour. The scheme for the selection, application and maintenance of the system shall be approved by the Administration, based on the guidelines adopted by the Organization.* Where appropriate, sacrificial anodes shall also be used.

Regulation 3-3

Safe access to tanker bows

1 For the purpose of this regulation and regulation 3-4, tankers include oil tankers as defined in regulation 2, chemical tankers as defined in regulation VII/8.2 and gas carriers as defined in regulation VII/11.2.

2 Every tanker shall be provided with the means to enable the crew to gain safe access to the bow even in severe weather conditions. Such means of access shall be approved by the Administration based on the guidelines developed by the Organization.**

* Refer to the Guidelines for the selection, application and maintenance of corrosion prevention systems of dedicated seawater ballast tanks, adopted by the Organization by resolution A.798(19).

** Refer to the Guidelines for safe access to tanker bows, adopted by the Maritime Safety Committee by resolution MSC.62(67).

Regulation 3-4

Emergency towing arrangements on tankers

- 1 Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight.
- 2 For tankers constructed on or after 1 July 2002:
 - .1 the arrangements shall, at all times, be capable of rapid deployment in the absence of main power on the ship to be towed and easy connection to the towing ship. At least one of the emergency towing arrangements shall be pre-rigged ready for rapid deployment; and
 - .2 emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of the emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.
- 3 For tankers constructed before 1 July 2002, the design and construction of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.*

Regulation 3-5

New installation of materials containing asbestos

- 1 This regulation shall apply to materials used for the structure, machinery, electrical installations and equipment covered by the present Convention.
- 2 For all ships, new installation of materials which contain asbestos shall be prohibited except for:
 - .1 vanes used in rotary vane compressors and rotary vane vacuum pumps;
 - .2 watertight joints and linings used for the circulation of fluids when, at high temperature (in excess of 350°C) or pressure (in excess of 7×10^6 Pa), there is a risk of fire, corrosion or toxicity; and
 - .3 supple and flexible thermal insulation assemblies used for temperatures above 1000°C.

* Refer to the Guidelines on emergency towing arrangements for tankers, adopted by the Maritime Safety Committee by resolution MSC.35(63), as may be amended.

Regulation 3-6*

Access to and within spaces in the cargo area of oil tankers and bulk carriers

1 Application

1.1 Except as provided for in paragraph 1.2, this regulation applies to oil tankers of 500 gross tonnage and over and bulk carriers, as defined in regulation IX/1, of 20,000 gross tonnage and over, constructed on or after 1 January 2005.

1.2 Oil tankers of 500 gross tonnage and over constructed on or after 1 October 1994 but before 1 January 2005 shall comply with the provisions of regulation II-1/12-2 adopted by resolution MSC.27(61).

2 Means of access to cargo and other spaces

2.1 Each space within the cargo area shall be provided with a permanent means of access to enable, throughout the life of a ship, overall and close-up inspections and thickness measurements of the ship's structures to be carried out by the Administration, the company, as defined in regulation IX/1, and the ship's personnel and others as necessary. Such means of access shall comply with the requirements of paragraph 5 and with the Technical provisions for means of access for inspections, adopted by the Maritime Safety Committee by resolution MSC.133(76), 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.

2.2 Where a permanent means of access may be susceptible to damage during normal cargo loading and unloading operations or where it is impracticable to fit permanent means of access, the Administration may allow, in lieu thereof, the provision of movable or portable means of access, as specified in the Technical provisions, provided that the means of attaching, rigging, suspending or supporting the portable means of access forms a permanent part of the ship's structure. All portable equipment shall be capable of being readily erected or deployed by ship's personnel.

2.3 The construction and materials of all means of access and their attachment to the ship's structure shall be to the satisfaction of the Administration. The means of access shall be subject to survey prior to, or in conjunction with, its use in carrying out surveys in accordance with regulation I/10.

3 Safe access to cargo holds, cargo tanks, ballast tanks and other spaces

3.1 Safe access** to cargo holds, cofferdams, ballast tanks, cargo tanks and other spaces in the cargo area shall be direct from the open deck and such as to ensure their complete inspection. Safe access** to double bottom spaces may be from a pump-room, deep cofferdam, pipe tunnel, cargo hold, double hull space or similar compartment not intended for the carriage of oil or hazardous cargoes.

* Text needs to be revisited upon entry into force of amendments to regulation 3-6 on 1 January 2006.

** Refer to the Recommendations for entering enclosed spaces aboard ships, adopted by the Organization by resolution A.864(20).

3.2 Tanks, and subdivisions of tanks, having a length of 35 m or more, shall be fitted with at least two access hatchways and ladders, as far apart as practicable. Tanks less than 35 m in length shall be served by at least one access hatchway and ladder. When a tank is subdivided by one or more swash bulkheads or similar obstructions which do not allow ready means of access to the other parts of the tank, at least two hatchways and ladders shall be fitted.

3.3 Each cargo hold shall be provided with at least two means of access as far apart as practicable. In general, these accesses should be arranged diagonally, for example one access near the forward bulkhead on the port side, the other one near the aft bulkhead on the starboard side.

4 Ship structure access manual

4.1 A ship's means of access to carry out overall and close-up inspections and thickness measurements shall be described in a Ship structure access manual approved by the Administration, an updated copy of which shall be kept on board. The Ship structure access manual shall include the following for each space in the cargo area:

- .1 plans showing the means of access to the space, with appropriate technical specifications and dimensions;
- .2 plans showing the means of access within each space to enable an overall inspection to be carried out, with appropriate technical specifications and dimensions. The plans shall indicate from where each area in the space can be inspected;
- .3 plans showing the means of access within the space to enable close-up inspections to be carried out, with appropriate technical specifications and dimensions. The plans shall indicate the positions of critical structural areas, whether the means of access is permanent or portable and from where each area can be inspected;
- .4 instructions for inspecting and maintaining the structural strength of all means of access and means of attachment, taking into account any corrosive atmosphere that may be within the space;
- .5 instructions for safety guidance when rafting is used for close-up inspections and thickness measurements;
- .6 instructions for the rigging and use of any portable means of access in a safe manner;
- .7 an inventory of all portable means of access; and
- .8 records of periodical inspections and maintenance of the ship's means of access.

4.2 For the purpose of this regulation "critical structural areas" are locations which have been identified from calculations to require monitoring or from the service history of similar or sister ships to be sensitive to cracking, buckling, deformation or corrosion which would impair the structural integrity of the ship.

5 General technical specifications

5.1 For access through horizontal openings, hatches or manholes, the dimensions shall be sufficient to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend any ladder without obstruction and also provide a clear opening to facilitate the hoisting of an injured person from the bottom of the space. The minimum clear opening shall not be less than 600 mm x 600 mm. When access to a cargo hold is arranged through the cargo hatch, the top of the ladder shall be placed as close as possible to the hatch coaming. Access hatch coamings having a height greater than 900 mm shall also have steps on the outside in conjunction with the ladder.

5.2 For access through vertical openings, or manholes, in swash bulkheads, floors, girders and web frames providing passage through the length and breadth of the space, the minimum opening shall be not less than 600 mm x 800 mm at a height of not more than 600 mm from the bottom shell plating unless gratings or other foot holds are provided.

5.3 For oil tankers of less than 5,000 tonnes deadweight, the Administration may approve, in special circumstances, smaller dimensions for the openings referred to in paragraphs 5.1 and 5.2, if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Administration.

Part B **Subdivision and stability**

Regulation 4 *General*

1 The damage stability requirements in Parts B-1 through B-4 shall apply to cargo ships of 80 m in length (L) and upwards and to all passenger ships regardless of length but shall exclude those cargo ships which are shown to comply with subdivision and damage stability regulations in other instruments* developed by the Organization.

2 The Administration may for a particular ship or group of ships accept alternative methodologies, if it is satisfied that at least the same degree of safety as represented by these regulations is achieved. Any Administration which allows such alternative methodologies shall communicate to the Organization particulars thereof.

* Cargo ships shown to comply with the following regulations may be excluded from the application of part B-1:

- .1 Annex I to MARPOL 73/78, except OBO ships with type B freeboards are not excluded;
- .2 International Bulk Chemical Code;
- .3 International Gas Carrier Code;
- .4 Guidelines for the design and construction of offshore supply vessels (resolution A.469(XII));
- .5 Code of Safety for Special Purpose Ships (resolution A.534(13), as amended);
- .6 Damage stability requirements of regulation 27 of the 1966 Load Line 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).

3 Ships shall be as efficiently subdivided as is possible having regard to the nature of the service for which they are intended. The degree of subdivision shall vary with the subdivision length (L_s) of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest subdivision length (L_s), primarily engaged in the carriage of passengers.

4 Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, the Administration shall be satisfied that proper consideration is given to beneficial or adverse effects of such structures in the calculations.

Part B-1 **Stability**

Regulation 5 *Intact stability information**

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 and the elements of its stability determined.

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 weight 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_s is found.

3 The Administration may also allow the inclining test of an individual ship or class of ships especially designed for the carriage of liquids or ore in bulk to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements more than sufficient metacentric height will be available in all probable loading conditions.

4 Where any alterations are made to a ship so as to materially affect the stability information supplied to the master, amended stability information shall be provided. If necessary the ship shall be re-inclined. The ship shall be re-inclined if anticipated deviations exceed one of the values specified in paragraph 5.

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_s is found or anticipated.

* Refer to the Code on Intact Stability for All Types of Ships covered by IMO Instruments, adopted by the Organization by resolution A.749(18).

6 Every ship shall have scales of draughts marked clearly at the bow and stern. In the case where the draught marks are not located where they are easily readable, or operational constraints for a particular trade make it difficult to read the draught marks, then the ship shall also be fitted with a reliable draught indicating system by which the bow and stern draughts can be determined.

Regulation 5-1

*Stability information to be supplied to the master**

1 The master shall be supplied with such information satisfactory to 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.

2 The information should include:

- .1 curves or tables of minimum operational metacentric height (GM) versus draught which assures compliance with the relevant intact and damage stability requirements, alternatively corresponding curves or tables of the maximum allowable vertical centre of gravity (KG) versus draught, or with the equivalents of either of these curves;
- .2 instructions concerning the operation of cross-flooding arrangements; and
- .3 all other data and aids which might be necessary to maintain the required intact stability and stability after damage.

3 The stability information shall show the influence of various trims in cases where the operational trim range exceeds +/- 0.5% of L_s .

4 For ships which have to fulfil the stability requirements of part B-1, information referred to in paragraph 2 are determined from considerations related to the subdivision index, in the following manner: Minimum required GM (or maximum permissible vertical position of centre of gravity KG) for the three draughts d_s , d_p and d_l are equal to the GM (or KG values) of corresponding loading cases used for the calculation of survival factor "s". For intermediate draughts, values to be used shall be obtained by linear interpolation applied to the GM value only between the deepest subdivision draught and the partial subdivision draught and between the partial load line and the light service draught respectively.* Intact stability criteria will also be taken into account by retaining for each draft the maximum among minimum required GM values or the minimum of maximum permissible KG values for both criteria. If the subdivision index is calculated for different trims, several required GM curves will be established in the same way.

5 When curves or tables of minimum operational metacentric height (GM) versus draught are not appropriate, the Master should ensure that the operating condition does not deviate from a studied loading condition, or verify by calculation that the stability criteria are satisfied for this loading condition.

* Refer also to: MSC/Circ.456, Guidelines for the preparation of intact stability information; MSC/Circ.706, Guidance on intact stability of existing tankers during transfer operations; and MSC/Circ.707, Guidance to the master for avoiding dangerous situations in following and quartering seas.

Regulation 6
*Required subdivision index R**

1 The subdivision of a ship is considered sufficient if the attained subdivision index A, determined in accordance with regulation 7, is not less than the required subdivision index R calculated in accordance with this regulation and if, in addition, the partial indices A_s, A_p and A_l are not less than 0.9R for passenger ships and 0.5 R for cargo ships.

2 For all ships to which the damage stability requirements of this chapter apply, the degree of subdivision to be provided shall be determined by the required subdivision index R, as follows:

- .1 In the case of cargo ships greater than 100m in length (L_s):

$$R = 1 - \frac{128}{L_s + 152}$$

- .2 In the case of cargo ships not less than 80m in length (L_s) and not greater than 100m in length (L_s):

$$R = 1 - \left[1 / \left(1 + \frac{L_s}{100} \times \frac{R_0}{1 - R_0} \right) \right]$$

Where R₀ is the value R as calculated in accordance with the formula in subparagraph .1.

- .3 In the case of passenger ships:

$$R = 1 - \frac{5000}{L_s + 2.5N + 15225}$$

where:

$$N = N_1 + 2N_2$$

N₁ = number of persons for whom lifeboats are provided

N₂ = number of persons (including officers and crew) the ship is permitted to carry in excess of N₁.

- .4 Where the conditions of service are such that compliance with paragraph 2.3 of this regulation on the basis of N = N₁ + 2N₂ 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 = N₁ + N₂.

* [The Maritime Safety Committee, in adopting the regulations contained in parts B to B-4, invited Administrations to note that the regulations should be applied in conjunction with the explanatory notes developed by the Organization in order to ensure their uniform application.]

Regulation 7
Attained subdivision index A

1 The Attained Subdivision Index A is obtained by the summation of the partial indices A_s , A_p and A_l , (weighted as shown) calculated for the draughts d_s , d_p and d_l defined in Regulation 2 in accordance with the following formula:

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

Each partial index is a summation of contributions from all damage cases taken in consideration, using the following formula:

$$A = \sum p_i s_i$$

where:

- i represents each compartment or group of compartments under consideration,
- p_i accounts for the probability that only the compartment or group of compartments under consideration may be flooded, disregarding any horizontal subdivision, as defined in regulation 7-1,
- s_i accounts for the probability of survival after flooding the compartment or group of compartments under consideration, and includes the effect of any horizontal subdivision, as defined in regulation 7-2.

2 In the calculation of A, the level trim shall be used for the deepest subdivision draught and the partial subdivision draught. The actual service trim shall be used for the light service draught. If in any service condition, the trim variation in comparison with the calculated trim is greater than 0.5% of L_s , one or more additional calculations of A are to be submitted for the same draughts but different trims so that, for all service conditions, the difference in trim in comparison with the reference trim used for one calculation will be less than 0.5% of L_s .

3 When determining the positive righting lever (GZ) of the residual stability curve, the displacement used should be that of the intact condition. That is, the constant displacement method of calculation should be used.

4 The summation indicated by the above formula shall be taken over the ship's subdivision length (L_s) for all cases of flooding in which a single compartment or two or more adjacent compartments are involved. In the case of unsymmetrical arrangements, the calculated A value should be the mean value obtained from calculations involving both sides. Alternatively, it should be taken as that corresponding to the side which evidently gives the least favourable result.

5 Wherever wing compartments are fitted, contribution to the summation indicated by the formula shall be taken for all cases of flooding in which wing compartments are involved. Additionally, cases of simultaneous flooding of a wing compartment or group of compartments and the adjacent inboard compartment or group of compartments, but excluding damage of transverse extent greater than one half of the ship breadth B, may be added. For the purpose of

this regulation, transverse extent is measured inboard from ship's side, at right angle to the centreline at the level of the deepest subdivision draught.

6 In the flooding calculations carried out according to the regulations, only one breach of the hull and only one free surface need to be assumed. The assumed vertical extent of damage is to extend from the baseline upwards to any watertight horizontal subdivision above the waterline or higher. However, if a lesser extent of damage will give a more severe result, such extent is to be assumed.

7 If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements are to be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. However, the Administration may permit minor progressive flooding if it is demonstrated that its effects can be easily controlled and the safety of the ship is not impaired.

Regulation 7-1

Calculation of the factor p_i

1 The factor " p_i " for a compartment or group of compartments shall be calculated in accordance with paragraphs 1.1 and 1.2 using the following notations:

- j = the aftmost damage zone number involved in the damage starting with no. 1 at the stern;
- n = the number of adjacent damage zones involved in the damage;
- k = is the number of a particular longitudinal bulkhead as barrier for transverse penetration in a damage zone counted from shell towards the centre line. The shell has $k = 0$;
- x_1 = the distance from the aft terminal of L_s to the aft end of the zone in question;
- x_2 = the distance from the aft terminal of L_s to the forward end of the zone in question;
- b = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision loadline 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 loadline the vertical plane used for determination of b is assumed to extend upwards to the deepest subdivision waterline.

If the damage involves a single zone only:

$$p_i = p(x_1, x_2) \cdot [r(x_1, x_2, b_k) - r(x_1, x_2, b_{k-1})]$$

If the damage involved two adjacent zones:

$$p_i = p(x1_j, x2_{j+1}) \cdot [r(x1_j, x2_{j+1}, b_k) - r(x1_j, x2_{j+1}, b_{k-1})] \\ - p(x1_j, x2_j) \cdot [r(x1_j, x2_j, b_k) - r(x1_j, x2_j, b_{k-1})] \\ - p(x1_{j+1}, x2_{j+1}) \cdot [r(x1_{j+1}, x2_{j+1}, b_k) - r(x1_{j+1}, x2_{j+1}, b_{k-1})]$$

If the damage involves three or more adjacent zones:

$$p_i = p(x1_j, x2_{j+n-1}) \cdot [r(x1_j, x2_{j+n-1}, b_k) - r(x1_j, x2_{j+n-1}, b_{k-1})] \\ - p(x1_j, x2_{j+n-2}) \cdot [r(x1_j, x2_{j+n-2}, b_k) - r(x1_j, x2_{j+n-2}, b_{k-1})] \\ - p(x1_{j+1}, x2_{j+n-1}) \cdot [r(x1_{j+1}, x2_{j+n-1}, b_k) - r(x1_{j+1}, x2_{j+n-1}, b_{k-1})] \\ + p(x1_{j+1}, x2_{j+n-2}) \cdot [r(x1_{j+1}, x2_{j+n-2}, b_k) - r(x1_{j+1}, x2_{j+n-2}, b_{k-1})]$$

and where $r(x1, x2, b0) = 0$

1.1 The factor $p(x1, x2)$ is to be calculated according to the following formulae:

Overall normalized max damage length:	$J_{\max} = 10/33$
Knuckle point in the distribution:	$J_{kn} = 5/33$
Cumulative probability at J_{kn} :	$p_k = 11/12$
Maximum absolute damage length:	$l_{\max} = 60 \text{ m}$

Probability density at $y = 0$:

$$b_{12} = 2 \left(\frac{p_k}{J_{kn}} - \frac{1 - p_k}{J_{\max} - J_{kn}} \right)$$

Maximum normalized damage length:

$$J_m = \min \left\{ J_{\max}, \frac{l_{\max}}{L_s} \right\}, \text{ but not less than } \frac{2}{b_{12}}$$

$$J_k = \frac{J_m}{2} + \frac{1 - \sqrt{1 + (1 - 2p_k)b_{12}J_m + \frac{1}{4}b_{12}^2J_m^2}}{b_{12}}$$

$$b_{11} = 4 \frac{1 - p_k}{(J_m - J_k)J_k} - 2 \frac{p_k}{J_k^2}$$

$$b_{21} = -2 \frac{1 - p_k}{(J_m - J_k)^2}$$

$$b_{22} = -b_{21}J_m$$

The non-dimensional damage length:

$$J = \frac{(x2 - x1)}{L_s}$$

The normalized length of a compartment or group of compartments:

J_n is to be taken as the lesser of J and J_m

1.1.1 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$J \leq J_k$:

$$p(x1, x2) = p_1 = \frac{1}{6} J^2 (b_{11} J + 3b_{12})$$

$J > J_k$:

$$p(x1, x2) = p_2 = -\frac{1}{3} b_{11} J_k^3 + \frac{1}{2} (b_{11} J - b_{12}) J_k^2 + b_{12} J J_k - \frac{1}{3} b_{21} (J_n^3 - J_k^3) + \frac{1}{2} (b_{21} J - b_{22}) (J_n^2 - J_k^2) + b_{22} J (J_n - J_k)$$

1.1.2 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$J \leq J_k$:

$$p(x1, x2) = \frac{1}{2} (p_1 + J)$$

$J > J_k$:

$$p(x1, x2) = \frac{1}{2} (p_2 + J)$$

1.1.3 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_S):

$$p(x1, x2) = 1$$

1.2 The factor $r(x1, x2, b)$ shall be determined by the following formulae:

$$r(x1, x2, b) = 1 - (1 - C) \cdot \left[1 - \frac{G}{p(x1, x2)} \right]$$

where:

$$C = 12 \cdot J_b \cdot (-45 \cdot J_b + 4), \text{ where}$$

$$J_b = \frac{b}{15 \cdot B}$$

1.2.1 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_S):

$$G = G_1 = \frac{1}{2} b_{11} J_b^2 + b_{12} J_b$$

1.2.2 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$$G = G_2 = -\frac{1}{3} b_{11} J_0^3 + \frac{1}{2} (b_{11} J - b_{12}) J_0^2 + b_{12} J J_0, \text{ where}$$

$$J_0 = \min(J, J_b)$$

1.2.3 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$$G = \frac{1}{2} \cdot (G_2 + G_1 \cdot J)$$

Regulation 7-2

Calculation of the factor s_i

1 The factor “ s_i ” shall be determined for each case of assumed flooding, involving a compartment or group of compartments, in accordance with the following notations and the provisions in this regulation.

“ θ_e ” is the equilibrium heel angle in any stage of flooding, in degrees;

“ θ_v ” is the angle, in any stage of flooding, where the righting lever becomes negative, or the angle at which an opening incapable of being closed weathertight becomes submerged;

“ GZ_{max} ” is the maximum positive righting lever, in metres, up to the angle θ_v ;

“Range” is the range of positive righting levers, in degrees, measured from the angle θ_e . The positive range is to be taken up to the angle θ_v ;

“Flooding stage” is any discrete step during the flooding process, including the stage before equalization (if any) until final equilibrium has been reached.

1.1 The factor “ s_i ”, for any damage case at any initial loading condition, “ d_i ”, shall be obtained from the formula:

$$s_i = \text{minimum} \{ S_{\text{intermediate},i} \text{ OR } S_{\text{final},i} \cdot S_{\text{mom},i} \}$$

where:

“ $S_{\text{intermediate},i}$ ” is the probability to survive all intermediate flooding stages until the final equilibrium stage, and is calculated in accordance with paragraph 2;

“ $S_{\text{final},i}$ ” is the probability to survive in the final equilibrium stage of flooding. It is calculated in accordance with paragraph 3;

“ $S_{\text{mom},i}$ ” is the probability to survive heeling moments, and is calculated in accordance with paragraph 4.

2 The factor “ $S_{\text{intermediate},i}$ ” is applicable only to passenger ships (for cargo ships $S_{\text{intermediate},i}$ should be taken as unity) and shall be taken as the least of the s-factors obtained from all flooding stages including the stage before equalisation, if any, and is to be calculated as follows:

$$S_{\text{intermediate},i} = \left[\frac{GZ_{\text{max}}}{0.05} \cdot \frac{Range}{7} \right]^{\frac{1}{4}}$$

where GZ_{max} is not to be taken as more than 0.05 m and $Range$ as not more than 7 degrees. $S_{\text{intermediate}} = 0$ if the intermediate heel angle exceeds 15°. Where cross-flooding fittings are required the time for equalization shall not exceed 10 minutes.

3 The factor “ $S_{\text{final},i}$ ” shall be obtained from the formula:

$$S_{\text{final},i} = K \cdot \left[\frac{GZ_{\text{max}}}{0.12} \cdot \frac{Range}{16} \right]^{\frac{1}{4}}$$

where:

GZ_{max} is not to be taken as more than 0.12 m;

$Range$ is not to be taken as more than 16 degrees;

$K = 1$ if $\theta_e \leq \theta_{\text{min}}$

$K = 0$ if $\theta_e \geq \theta_{\text{max}}$

$K = \sqrt{\frac{\theta_{\text{max}} - \theta_e}{\theta_{\text{max}} - \theta_{\text{min}}}}$ otherwise;

where:

“ θ_{\min} ” is 7 degrees for passenger ships and 25 degrees for cargo ships, and

“ θ_{\max} ” is 15 degrees for passenger ships and 30 degrees for cargo ships.

4 The factor “ $s_{\text{mom},i}$ ” is applicable only to passenger ships (for cargo ships $s_{\text{mom},i}$ shall be taken as unity) and shall be calculated at the final equilibrium from the formula:

$$s_{\text{mom},i} = \frac{(GZ_{\max} - 0.04) \cdot \text{Displacement}}{M_{\text{heel}}}$$

where:

“Displacement” is the intact displacement at the subdivision draught;

“ M_{heel} ” is the maximum assumed heeling moment as calculated in accordance with subparagraph 4.1; and

$$s_{\text{mom},i} \leq 1.0$$

4.1 The heeling moment M_{heel} is to be calculated as follows:

$$M_{\text{heel}} = \text{maximum} \{ M_{\text{passenger}} ; M_{\text{wind}} ; M_{\text{SurvivalCraft}} \}$$

4.1.1 $M_{\text{passenger}}$ is the maximum assumed heeling moment resulting from movement of passengers; and is to be obtained as follows:

$$M_{\text{passenger}} = (0.075 \cdot N) \cdot (0.45 \cdot B) \quad (\text{ton-m})$$

where:

“N” 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 beam of the ship.

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 force acting in a damage situation:

$$M_{\text{wind}} = (P \cdot A \cdot Z) / 9806 \quad (\text{ton-m})$$

where:

$$P = 120 \text{ N/m}^2$$

A = projected lateral area above water line

Z = distance from centre of lateral projected area above water line to T/2
T = ship's draught, d_i

4.1.3 $M_{\text{SurvivalCraft}}$ is the maximum assumed heeling moment due to the launching of all fully loaded davit-launched survival craft on one side of the ship. It shall be calculated using the following assumptions:

- .1 all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;
- .2 for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;
- .3 a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;
- .4 persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment; and
- .5 life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position.

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 equalisation devices are provided they shall be operable from above the bulkhead deck. These fittings together with their controls shall be acceptable to the Administration.* Suitable information concerning the use of equalisation devices shall be supplied to the master of the ship.

5.1 Tanks and compartments taking part in such equalisation shall be fitted with air pipes or equivalent means of sufficient cross-section to ensure that the flow of water into the equalization compartments is not delayed.

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

- .1 the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor s . Such openings shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers; and
- .2 any part of the bulkhead deck in passenger ships considered a horizontal evacuation route for compliance with chapter II-2.

* Reference is made to the Recommendation on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passenger ships, adopted by the Organization by resolution A.266(VIII), as may be amended.

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 intended for compliance with chapter II-2;
- .2 any controls intended for the operation of watertight doors, equalisation devices, valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the bulkhead deck become inaccessible or inoperable;
- .3 immersion of any part of piping or ventilation ducts carried through a watertight boundary that is located within any compartment included in damage cases contributing to the attained index A, if not fitted with watertight means of closure at each boundary.

5.4 However, where compartments assumed flooded due to progressive flooding are taken into account in the damage stability calculations multiple values of “ $s_{\text{intermediate},i}$ ” may be calculated assuming equalisation in additional flooding phases.

5.5 Except as provided in 5.3.1 openings closed by means of watertight manhole covers and flush scuttles, small watertight hatch covers, remotely operated sliding watertight doors, side scuttles of the non-opening type as well as watertight access doors and hatch covers required to be kept closed at sea may need not be considered.

6 Where horizontal watertight boundaries are fitted above the waterline under consideration the s -value calculated for the lower compartment or group of compartments shall be obtained by multiplying the value as determined in paragraph 1.1 by the reduction factor v_m according to paragraph 6.1, which represents the probability that the spaces above the horizontal subdivision will not be flooded.

6.1 The factor v_m shall be obtained from the formula:

$$v_m = v(H_{j, n, m}, d) - v(H_{j, n, m-1}, d)$$

where:

$H_{j, n, m}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)} \dots x_{2(j+n-1)}$ of the m^{th} horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

$H_{j, n, m-1}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)} \dots x_{2(j+n-1)}$ of the $(m-1)^{\text{th}}$ horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

“ j ” signifies the aft terminal of the damaged compartments under consideration;

“ m ” represents each horizontal boundary counted upwards from the waterline under consideration;

“d” is the draught in question as defined in regulation 2; and

“x₁” and “x₂” represent the terminals of the compartment or group of compartments considered in regulation 7-1.

6.1.1 The factors $v(H_{j, n, m}, d)$ and $v(H_{j, n, m-1}, d)$ shall be obtained from the formulas:

$$v(H, d) = 0.8 \frac{(H - d)}{7.8} \quad \text{if } (H_m - d) \text{ is less than or equal to } 7.8 \text{ m;}$$

$$v(H, d) = 0.8 + 0.2 \left[\frac{(H - d) - 7.8}{4.7} \right] \quad \text{in all other cases}$$

where:

$v(H_{j, n, m}, d)$ is to be taken as 1 if H_m coincides with the uppermost watertight boundary of the vessel within the range $(x_{1(j)} \dots x_{2(j+n-1)})$, and

$v(H_{j, n, 0}, d)$ is to be taken as 0.

In no case is v_m to be taken as less than zero or more than 1.

6.2 In general each contribution dA to the index A in the case of horizontal subdivisions is obtained from the formula:

$$dA = p_i \cdot [v_1 \cdot s_{\min 1} + (v_2 - v_1) \cdot s_{\min 2} + \dots + (1 - v_{m-1}) \cdot s_{\min m}]$$

where:

v_m = the v-value calculated in accordance with paragraph 6.1
 s_{\min} = the least s-factor for all combinations of damages obtained when the assumed damage extends from the assumed damage height H_m downwards

Regulation 7-3 *Permeability*

1 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each general compartment or part of a compartment shall be as follows:

Spaces	Permeability
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Void spaces	0.95
Intended for liquids	0 or 0.95 ¹

¹ Whichever results in the more severe requirement.

2 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each cargo compartment or part of a compartment shall be as follows:

Spaces	Permeability at draught d_s	Permeability at draught d_p	Permeability at draught d_l
Dry cargo spaces	0.70	0.80	0.95
Container spaces	0.70	0.80	0.95
Ro-ro cargo spaces	0.90	0.90	0.95
Cargo liquids	0.70	0.80	0.95

3 Other figures for permeability may be used if substantiated by calculations.

Regulation 8

Special requirements concerning passenger ship stability

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 the 3 loading conditions on which is based the calculation of the subdivision index and for a damage involving all the compartments within 0.08L measured from the forward perpendicular.

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 3 loading conditions on which is based the calculation of the subdivision index.

3 The damage extent to be assumed when demonstrating compliance with paragraph 2, is to be dependent on both N as defined in regulation 6, and L_s as defined in regulation 2, such that:

- .1 the vertical extent of damage is to extend from the ship's moulded baseline to a position up to 12.5 m above the position of the deepest subdivision draught as defined in regulation 2, unless a lesser vertical extent of damage were to give a lower value of 's', in which case this reduced extent is to be used.
- .2 where 400 or more persons are to be carried, a damage length of $0.03L_s$ but not less than 3 m is to be assumed at any position along the side shell, in conjunction with a penetration inboard of $0.1B$ but not less than 0.75 m measured inboard from the ship side, at right angle to the centreline at the level of the deepest subdivision draught.
- .3 where less than 400 persons are carried, damage length is to be assumed at any position along the shell side between transverse watertight bulkheads provided that the distance between two adjacent transverse watertight bulkheads is not less than the assumed damage length. If the distance between adjacent transverse watertight bulkheads is less than the assumed damage length, only one of these bulkheads shall be considered effective for the purpose of demonstrating compliance with paragraph 2.

- .4 where 36 persons are carried, a damage length of $0.015L$ s but not less than 3 m is to be assumed, in conjunction with a penetration inboard of $0.05B$ but not less than 0.75 m.
- .5 where more than 36, but fewer than 400 persons are carried the values of damage length and penetration inboard, used in the determination of the assumed extent of damage, are to be obtained by linear interpolation between the values of damage length and penetration which apply for $N=36$ and $N=400$ as specified in present sub-paragraphs 3.4 and 3.2.

Part B-2
Subdivision, watertight and weathertight integrity

Regulation 9

Double bottoms in passenger ships and cargo ships other than tankers

1 A double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead, as far as this is practicable and compatible with the design and proper working of the ship.

2 Where a double bottom is required to be fitted the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. Such protection will be deemed satisfactory if the inner bottom is not lower at any part than a plane parallel with the keel line and which is located not less than a vertical distance h measured from the keel line, as calculated by the formula:

$$h = B/20$$

However, in no case is the value of h to be less than 760 mm, and need not be taken as more than 2000 mm.

3 Small wells constructed in the double bottom in connection with drainage arrangements of holds, etc., shall not extend downward more than necessary. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel. 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. In no case shall the vertical distance from the bottom of such a well to a plane coinciding with the keel line be less than 500 mm.

4 A double bottom need not be fitted in way of watertight tanks, including dry tanks of moderate size, provided the safety of the ship is not impaired in the event of bottom or side damage.

5 In the case of passenger ships to which the provisions of regulation 1.5 apply and which are engaged on regular service within the limits of a short international voyage as defined in regulation III/3.22, the Administration may permit a double bottom to be dispensed with if satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.

6 Any part of a passenger ship or a cargo ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5 of this regulation shall be capable of withstanding bottom damages as specified in paragraph 8 in that part of the ship.

7 In the case of unusual bottom arrangements in a passenger ship or a cargo ship it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8.

8 Compliance with paragraphs 6 or 7 is to be achieved by demonstrating that s_i , when calculated in accordance with regulation 7-2, is not less than 1.0 for all service conditions when subject to a bottom damage assumed at any position along the ship's bottom and with an extent specified in .2 below for 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:

	<i>For 0.3 L from the forward perpendicular of the ship</i>	<i>Any other part of the ship</i>
<i>Longitudinal extent</i>	1/3 $L^{2/3}$ or 14.5 m, whichever is less	1/3 $L^{2/3}$ or 14.5 m, whichever is less
<i>Transverse extent</i>	B/6 or 10 m, whichever is less	B/6 or 5 m, whichever is less
<i>Vertical extent, measured from the keel line</i>	B/20 or 2 m, whichever is less	B/20 or 2 m, whichever is less

- .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.

9 In case of large lower holds in passenger ships, the Administration may require an increased double bottom height of not more than B/10 or 3 m, whichever is less, measured from the keel line. Alternatively, bottom damages may be calculated for these areas, in accordance with paragraph 8, but assuming an increased vertical extent.

Regulation 10

Construction of watertight bulkheads

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.

2 Steps and recesses in watertight bulkheads shall be as strong as the bulkhead at the place where each occurs.

Regulation 11

Initial testing of watertight bulkheads, etc.

1 Testing watertight spaces not intended to hold liquids and cargo holds intended to hold ballast by filling them with water is not compulsory. When testing by filling with water is not carried out, a hose test shall be carried out where practicable. This test shall be carried out in the most advanced stage of the fitting out of the ship. Where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation or outfitting items, it may be replaced by a careful visual examination of welded connections, supported where deemed necessary by means such as a dye penetrant test or an ultrasonic leak test or an equivalent test. In any case a thorough inspection of the watertight bulkheads shall be carried out.

2 The forepeak, double bottoms (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of regulation 10.1.

3 Tanks which are intended to hold liquids, and which form part of the watertight subdivision of the ship, shall be tested for tightness and structural strength with water to a head corresponding to its design pressure. The water head is in no case to be less than the top of the air pipes or to a level of 2.4 m above the top of the tank, whichever is the greater.

4 The tests referred to in paragraphs 2 and 3 are for the purpose of ensuring that the subdivision structural arrangements are watertight and are not to be regarded as a test of the fitness of any compartment for the storage of oil fuel or for other special purposes for which a test of a superior character may be required depending on the height to which the liquid has access in the tank or its connections.

Regulation 12

Peak and machinery space bulkheads, shaft tunnels, etc.

1 A collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than 0.05L or 10 m, whichever is the less, and, except as may be permitted by the Administration, not more than 0.08L or 0.05L + 3 m, whichever is the greater.

2 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 0.015L forward of the forward perpendicular; or
- .3 at a distance 3 m forward of the forward perpendicular;

whichever gives the smallest measurement.

3 The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 1 or 2.

4 No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck.

5.1 Except as provided in paragraph 5.2, the collision bulkhead may be pierced below the bulkhead deck 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, the valve chest being secured inside the forepeak to 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. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.

5.2 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 by two pipes, each of which is fitted as required by paragraph 5.1, 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.

6 Where a long forward superstructure is fitted the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in paragraph 1 or 2 with the exception permitted by paragraph 7 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 causing damage to it in the case of damage to, or detachment of, a bow door.

7 Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck 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 bulkhead deck may extend forward of the limit specified in paragraph 1 or 2. Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

8 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.

9 Bulkheads shall be fitted separating the machinery space from cargo and accommodation spaces forward and aft and made watertight up to the bulkhead deck. In passenger ships an afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

10 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

- 1 The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship, satisfactory means shall be provided for closing these openings.
- 2.1 Where pipes, scuppers, electric cables, etc., are carried through watertight bulkheads, arrangements shall be made to ensure the watertight integrity of the bulkheads.
- 2.2 Valves not forming part of a piping system shall not be permitted in watertight bulkheads.
- 2.3 Lead or other heat sensitive materials shall not be used in systems which penetrate watertight bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.
- 3 No doors, manholes, or access openings are permitted in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space, except as provided in paragraph 9.1 and in regulation 14.
- 4 Subject to paragraph 10, not more than one door, apart from the doors to shaft tunnels, may be fitted in each watertight bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion. Where two or more shafts are fitted, the tunnels shall be connected by an intercommunicating passage. There shall be only one door between the machinery space and the tunnel spaces where two shafts are fitted and only two doors where there are more than two shafts. All these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable. The hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery.
- 5.1 Watertight doors, except as provided in paragraph 9.1 or regulation 14, shall be power-operated sliding doors complying with the requirements of paragraph 7 capable of being closed simultaneously from the central operating console at the navigation bridge in not more than 60 s with the ship in the upright position.
- 5.2 The means of operation whether by power or by hand of any power-operated sliding watertight door shall be capable of closing the door with the ship listed to 15° either way. Consideration shall also be given to the forces which may act on either side of the door as may be experienced when water is flowing through the opening applying a static head equivalent to a water height of at least 1 m above the sill on the centreline of the door.
- 5.3 Watertight door controls, including hydraulic piping and electric cables, shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimize the likelihood of them being involved in any damage which the ship may sustain. The positioning of watertight doors and their controls shall be such that if the ship sustains damage within one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught, the operation of the watertight doors clear of the damaged portion of the ship is not impaired.

6 All power-operated sliding watertight doors shall be provided with means of indication which will show at all remote operating positions whether the doors are open or closed. Remote operating positions shall only be at the navigation bridge as required by paragraph 7.1.5 and at the location where hand operation above the bulkhead deck is required by paragraph 7.1.4.

7.1 Each power-operated sliding watertight door:

- .1 shall have a vertical or horizontal motion;
- .2 shall, subject to paragraph 10, be normally limited to a maximum clear opening width of 1.2 m. The Administration may permit larger doors only to the extent considered necessary for the effective operation of the ship provided that other safety measures, including the following, are taken into consideration:
 - .2.1 special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages;
 - .2.2 the door shall be located inboard the damage zone B/5;
- .3 shall be fitted with the necessary equipment to open and close the door using electric power, hydraulic power, or any other form of power that is acceptable to the Administration;
- .4 shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an accessible position above the bulkhead deck with an all round crank motion or some other movement providing the same degree of safety acceptable to the Administration. Direction of rotation or other movement is to be clearly indicated at all operating positions. The time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 s with the ship in the upright position;
- .5 shall be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console at the navigation bridge;
- .6 shall be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever the door is closed remotely by power and which shall sound for at least 5 s but no more than 10 s before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote hand operation it is sufficient for the audible alarm to sound only when the door is moving. Additionally, in passenger areas and areas of high ambient noise the Administration may require the audible alarm to be supplemented by an intermittent visual signal at the door; and
- .7 shall have an approximately uniform rate of closure under power. The closure time, from the time the door begins to move to the time it reaches the completely closed position, shall in no case be less than 20 s or more than 40 s with the ship in the upright position.

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

7.3 Power-operated sliding watertight doors shall have either:

- .1 a centralized hydraulic system with two independent power sources each consisting of a motor and pump capable of simultaneously closing all doors. In addition, there shall be for the whole installation hydraulic accumulators of sufficient capacity to operate all the doors at least three times, i.e. closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. The power operating system shall be designed to minimize the possibility of having a single failure in the hydraulic piping adversely affect the operation of more than one door. The hydraulic system shall be provided with a low-level alarm for hydraulic fluid reservoirs serving the power-operated system and a low gas pressure alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators. These alarms are to be audible and visual and shall be situated on the central operating console at the navigation bridge; or
- .2 an independent hydraulic system for each door with each power source consisting of a motor and pump capable of opening and closing the door. In addition, there shall be a hydraulic accumulator of sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. A low gas pressure group alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators shall be provided at the central operating console on the navigation bridge. Loss of stored energy indication at each local operating position shall also be provided; or
- .3 an independent electrical system and motor for each door with each power source consisting of a motor capable of opening and closing the door. The power source shall be capable of being automatically supplied by the transitional source of emergency electrical power as required by regulation 42.4.2 - in the event of failure of either the main or emergency source of electrical power and with sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°.

For the systems specified in 7.3.1, 7.3.2 and 7.3.3, provision should be made as follows: Power systems for power-operated watertight sliding doors shall be separate from any other power system. A single failure in the electric or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.

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

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

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

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

7.8 A single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening. Availability of the power supply should be continuously monitored at a point in the electrical circuit as near as practicable to each of the motors required by paragraph 7.3. Loss of any such power supply should activate an audible and visual alarm at the central operating console at the navigation bridge.

8.1 The central operating console at the navigation bridge shall have a "master mode" switch with two modes of control: a "local control" mode which shall allow any door to be locally opened and locally closed after use without automatic closure, and a "doors closed" mode which shall automatically close any door that is open. The "doors closed" mode shall automatically close any door that is open. The "doors closed" mode shall permit doors to be opened locally and shall automatically re-close the doors upon release of the local control mechanism. The "master mode" switch shall normally be in the "local control" mode. The "doors closed" mode shall only be used in an emergency or for testing purposes. Special consideration shall be given to the reliability of the "master mode" switch.

8.2 The central operating console at the navigation bridge shall be provided with a diagram showing the location of each door, with visual indicators to show whether each door is open or closed. A red light shall indicate a door is fully open and a green light shall indicate a door is fully closed. When the door is closed remotely the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door.

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

* Refer to the following IEC publication 529, 1976:

- .1 electrical motors, associated circuits and control components; protected to IPX 7 standard;
- .2 door position indicators and associated circuit components; protected to IPX 8 standard; and
- .3 door movement warning signals; protected to IPX 6 standard.

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

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

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

10 Portable plates on bulkheads shall not be permitted except in machinery spaces. The Administration may permit not more than one power-operated sliding watertight door in each watertight bulkhead larger than those specified in paragraph 7.1.2 to be substituted for these portable plates, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of paragraph 7.1.4 regarding complete closure by hand-operated gear in 90 s.

11.1 Where trunkways or tunnels for access from crew accommodation to the stokehold, 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.

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

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

Regulation 13-1

Openings in watertight bulkheads and internal decks in cargo ships

1 The number of openings in watertight subdivisions is to be kept to a minimum compatible with the design and proper working of the ship. Where penetrations of watertight bulkheads and internal decks are necessary for access, piping, ventilation, electrical cables, etc., arrangements are to be made to maintain the watertight integrity. The Administration may permit relaxation in the watertightness of openings above the freeboard deck, provided that it is demonstrated that any progressive flooding can be easily controlled and that the safety of the ship is not impaired.

2 Doors provided to ensure the watertight integrity of internal openings which are used while at sea are to be sliding watertight doors capable of being remotely closed from the bridge and are also to be operable locally from each side of the bulkhead. Indicators are to be provided

at the control position showing whether the doors are open or closed, and an audible alarm is to be provided at the door closure. The power, control and indicators are to be operable in the event of main power failure. Particular attention is to be paid to minimizing the effect of control system failure. Each power-operated sliding watertight door shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from both sides.

3 Access doors and access hatch covers normally closed at sea, intended to ensure the watertight integrity of internal openings, shall be provided with means of indication locally and on the bridge showing whether these doors or hatch covers are open or closed. A notice is to be affixed to each such door or hatch cover to the effect that it is not to be left open.

4 Watertight doors or ramps of satisfactory construction may be fitted to internally subdivide large cargo spaces, provided that the Administration is satisfied that such doors or ramps are essential. These doors or ramps may be hinged, rolling or sliding doors or ramps, but shall not be remotely controlled.* Should any of the doors or ramps be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening.

5 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of internal openings shall be provided with a notice which is to be affixed to each such closing appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 14

Passenger ships carrying goods vehicles and accompanying personnel

1 This regulation applies to passenger ships designed or adapted for the carriage of goods vehicles and accompanying personnel.

2 If in such a ship the total number of passengers which include personnel accompanying vehicles does not exceed $12 + A_d/25$, where A_d = total deck area (square metres) of spaces available for the stowage of goods vehicles and where the clear height at the stowage position and at the entrance to such spaces is not less than 4 m, the provisions of regulations 13.9.1 and 13.9.2 in respect of watertight doors apply except that the doors may be fitted at any level in watertight bulkheads dividing cargo spaces. Additionally, indicators are required on the navigation bridge to show automatically when each door is closed and all door fastenings are secured.

3 The ship may not be certified for a higher number of passengers than assumed in paragraph 2 if a watertight door has been fitted in accordance with this regulation.

* Refer to MSC/Circ.651, Interpretations of regulations of part B-1 of SOLAS chapter II-1.

Regulation 15

Openings in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships

1 The number of openings in the shell plating shall be reduced to the minimum compatible with the design and proper working of the ship.

2 The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the Administration.

3.1 Subject to the requirements of the International Convention on Load Lines in force, no sidescuttle shall be fitted in such a position that its sill is below a line drawn parallel to the bulkhead deck at side and having its lowest point 2.5% of the breadth of the ship above the deepest subdivision draught, or 500 mm, whichever is the greater.

3.2 All sidescuttles the sills of which are below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, as permitted by paragraph 3.1, shall be of such construction as will effectively prevent any person opening them without the consent of the master of the ship.

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 other than that for steerage passengers, 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 or coal.

5.2 Sidescuttles may, however, be fitted in spaces appropriated alternatively to the carriage of cargo or passengers, but they shall be of such construction as will effectively prevent any person opening them or their deadlights without the consent of the master.

6 Automatic ventilating sidescuttles shall not be fitted in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships without the special sanction of the Administration.

7 The number of scuppers, sanitary discharges and other similar openings in the shell plating shall be reduced to the minimum either by making each discharge serve for as many as possible of the sanitary and other pipes, or in any other satisfactory manner.

8.1 All inlets and discharges in the shell plating shall be fitted with efficient and accessible arrangements for preventing the accidental admission of water into the ship.

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 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 shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed.

8.2.2 The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

8.3 Machinery space, main and auxiliary sea inlets and discharges in connection with the operation of machinery shall be fitted with readily accessible valves between the pipes and the shell plating or between the pipes and fabricated boxes attached to the shell plating. In manned machinery spaces the valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

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 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.

8.5 All shell fittings and valves required by this regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this regulation refers shall be of steel or other equivalent material to the satisfaction of the Administration.

9 Gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be watertight and in no case be so fitted as to have their lowest point below the deepest subdivision draught.

10.1 The inboard opening of each ash-chute, rubbish-chute, etc., shall be fitted with an efficient cover.

10.2 If the inboard opening is situated below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the cover shall be watertight, and in addition an automatic non-return valve shall be fitted in the chute in an easily accessible position above the deepest subdivision draught.

Regulation 15-1

External openings in cargo ships

- 1 All external openings leading to compartments assumed intact in the damage analysis, which are below the final damage waterline, are required to be watertight.
- 2 External openings required to be watertight in accordance with paragraph 1 shall, except for cargo hatch covers, be fitted with indicators on the bridge.
- 3 Openings in the shell plating below the deck limiting the vertical extent of damage shall be fitted with a device that prevents unauthorized opening if they are accessible during the voyage.
- 4 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of external openings shall be provided with a notice affixed to each appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 16

Construction and initial tests of watertight doors, sidescuttles, etc.

- 1 In all ships:
 - .1 the design, materials and construction of all watertight doors, 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;
 - .2 such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety; and
 - .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 In passenger ships and cargo ships watertight doors shall be tested by water pressure to a head of water they might sustain in a final or intermediate stage of flooding. Where testing of individual doors is not carried out because of possible damage to insulation or outfitting items, testing of individual doors may be replaced by a prototype pressure test of each type and size of door with a test pressure corresponding at least to the head required for the intended location. The prototype test shall be carried out before the door is fitted. The installation method and procedure for fitting the door on board shall correspond to that of the prototype test. When fitted on board, each door shall be checked for proper seating between the bulkhead, the frame and the door.

Regulation 16-1

Construction and initial tests of watertight decks, trunks, etc.

- 1 Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Administration. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck in passenger ships and up to the freeboard deck in cargo ships.
- 2 Where a ventilation trunk passing through a structure penetrates 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 allowable during intermediate stages of flooding, in accordance with regulation 7-2.
- 3 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.
- 4 After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Regulation 17

Internal watertight integrity of passenger ships above the bulkhead deck

- 1 The Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of watertight bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck between shall be made effectively watertight. Where openings, pipes, scuppers, electric cables etc. are carried through the partial watertight bulkheads or decks within the immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck.*
- 2 All openings in the exposed weather deck shall have coamings of ample height and strength and shall be provided with efficient means for expeditiously closing them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.
- 3 The open end of air pipes terminating within a superstructure shall be at least 1 m above the waterline when the ship heels to an angle of 15°, or the maximum angle of heel during intermediate stages of flooding, as determined by direct calculation, whichever is the greater. Alternatively, air pipes from tanks other than oil tanks may discharge through the side of the superstructure. The provisions of this paragraph are without prejudice to the provisions of the International Convention on Load Lines in force.

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

4 Sidescuttles, gangway, cargo and fuelling ports and other means for closing openings in the shell plating above the bulkhead deck shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest subdivision draught.*

5 Efficient inside deadlights, so arranged that they can be easily and effectively closed and secured watertight, shall be provided for all sidescuttles to spaces below the first deck above the bulkhead deck.

Regulation 17-1

Integrity of the hull and superstructure, damage prevention and control on ro-ro passenger ships

1.1 Subject to the provisions of paragraphs 1.2 and 1.3, all accesses that lead to spaces below the bulkhead deck shall have a lowest point which is not less than 2.5 m above the bulkhead deck.

1.2 Where vehicle ramps are installed to give access to spaces below the bulkhead deck, their openings shall be able to be closed weathertight to prevent ingress of water below, alarmed and indicated to the navigation bridge.

1.3 The Administration may permit the fitting of particular accesses to spaces below the bulkhead deck provided they are necessary for the essential working of the ship, e.g. the movement of machinery and stores, subject to such accesses being made watertight, alarmed and indicated on the navigation bridge.

2 Indicators shall be provided on the navigation bridge for 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 cargo space. The indicator system shall be designed on the fail-safe principle and shall show by visual alarms if the door is not fully closed or if any of the securing arrangements are not in place and fully locked and by audible alarms if such door or closing appliances become open or the securing arrangements become unsecured. The indicator panel on the navigation bridge shall be equipped with a mode selection function "harbour/sea voyage" so arranged that an audible alarm is given on the navigation bridge if the ship leaves harbour with the bow doors, inner doors, stern ramp or any other side shell doors not closed or any closing device not in the correct position. The power supply for the indicator system shall be independent of the power supply for operating and securing the doors.

3 Television surveillance and a water leakage detection system shall be arranged to provide an indication to the navigation bridge and to the engine control station of any leakage through inner and outer bow doors, stern doors or any other shell doors which could lead to flooding of special category spaces or ro-ro cargo spaces.

* Refer to the Recommendation on strength and security and locking arrangements of shell doors on ro-ro passenger ships, adopted by the Organization by resolution A.793(19).

Part B-3
Subdivision load line assignment for passenger ships

Regulation 18

Assigning, marking and recording of subdivision load lines for passenger ships

1 In order that the required degree of subdivision shall be maintained, a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides. A ship intended for alternating modes of operation may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts which the Administration may approve for the alternative service configurations. Each service configuration so approved shall comply with part B-1 of this chapter independently of the results obtained for other modes of operation.

2 The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation P1 for the principal passenger service configuration, and P2, P3, etc., for the alternative configurations. The principal passenger configuration shall be taken as the mode of operation in which the required subdivision index R will have the highest value.

3 The freeboard corresponding to each of these load lines shall be measured at the same position and from the same deck line as the freeboards determined in accordance with the International Convention on Load Lines in force.

4 The freeboard corresponding to each approved subdivision load line and the service configuration, for which it is approved, shall be clearly indicated on the Passenger Ship Safety Certificate.

5 In no case shall any subdivision load line mark be placed above the deepest load line in salt water as determined by the strength of the ship or the International Convention on Load Lines in force.

6 Whatever may be the position of the subdivision load line marks, a ship shall in no case be loaded so as to submerge the load line mark appropriate to the season and locality as determined in accordance with the International Convention on Load Lines in force.

7 A ship shall in no case be so loaded that when it is in salt water the subdivision load line mark appropriate to the particular voyage and service configuration is submerged.

Part B-4
Stability management

Regulation 19
Damage control information

1 There shall be permanently exhibited, or readily available on the navigation bridge, for the guidance of the officer in charge of the ship, plans showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.*

2 Watertight doors in passenger ships permitted to remain open during navigation shall be clearly indicated in the ship's stability information.

3 General precautions to be included shall consist of a listing of equipment, conditions, and operational procedures, considered by the Administration to be necessary to maintain watertight integrity under normal ship operations.

4 Specific precautions to be included shall consist of a listing of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered by the Administration to be vital to the survival of the ship, passengers, and crew.

5 In case of ships to which damage stability requirements of part B-1 apply, damage stability information shall provide the master a simple and easily understandable way of assessing the ship's survivability in all damage cases involving a compartment or group of compartments.**

Regulation 20
Loading of passenger 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 in compliance with stability criteria in relevant regulations. The determination of the ship's stability shall always be made by calculation. The administration may accept the use of an electronic loading and stability computer or equivalent means for this purpose.

2 Water ballast should not in general be carried in tanks intended for oil fuel. In ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the Administration shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the Administration shall be provided for disposing of the oily-water ballast.

3 The provisions of this regulation are without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

* Refer to MSC/Circ.919, Guidelines for damage control plans.

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

Regulation 21

Periodical operation and inspection of watertight doors, etc. in passenger ships

- 1 Drills for the operating of watertight doors, sidescuttles, valves and closing mechanisms of scuppers, ash-shoots and rubbish-shoots shall take place weekly. In ships in which the voyage exceeds one week in duration a complete drill shall be held before leaving port, and others thereafter at least once a week during the voyage.
- 2 All watertight doors, both hinged and power operated, in watertight bulkheads, in use at sea, shall be operated daily.
- 3 The watertight doors and all mechanisms and indicators connected therewith, all valves, the closing of which is necessary to make a compartment watertight, and all valves the operation of which is necessary for damage control cross connections shall be periodically inspected at sea at least once a week.
- 4 A record of all drills and inspections required by this regulation shall be entered in the log book with an explicit record of any defects which may be disclosed.

Regulation 22

Prevention and control of water ingress, etc.

- 1 All watertight doors shall be kept closed during navigation except that they may be opened during navigation as specified in paragraphs 3 and 4. Watertight doors of a width of more than 1.2 m in machinery spaces as permitted by paragraph 10 of regulation 13 may only be opened in the circumstances detailed in that paragraph. Any door which is opened in accordance with this paragraph shall be ready to be immediately closed.
- 2 Watertight doors located below the bulkhead deck having a maximum clear opening width of more than 1.2 m shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the Administration.
- 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.
- 4 Certain watertight doors may be permitted to remain open during navigation only if considered absolutely necessary; that is, being open is determined essential to the safe and effective operation of the ship's machinery or to permit passengers normally unrestricted access throughout the passenger area. Such determination shall be made by the Administration only after careful consideration of the impact on ship operations and survivability. A watertight door permitted to remain thus open shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.
- 5 Portable plates on bulkheads shall always be in place before the ship leaves port, 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 ship leaves port and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.

6 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 of opening such doors in port and of closing them before the ship leaves port shall be entered in the log book.

7 Gangway, cargo and fuelling ports fitted below the bulkhead deck shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

8 The following doors, located above the bulkhead deck, shall be closed and locked before the ship proceeds on any voyage 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 8.1;
- .3 cargo loading doors in the collision bulkhead; and
- .4 ramps forming an alternative closure to those defined in paragraphs 8.1 to 8.3 inclusive.

9 Provided that where a door cannot be opened or closed while the ship is at the berth such a door may be opened or left open while the ship approaches or draws away from the berth, but only so far as may be necessary to enable the door to be immediately operated. In any case, the inner bow door must be kept closed.

10 Notwithstanding the requirements of paragraphs 8.1 and 8.4, 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.

11 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph 8 is implemented.

12 The master shall ensure, before the ship proceeds on any voyage, that an entry in the log book is made of the time of the last closing of the doors specified in paragraph 13 and the time of any opening of particular doors in accordance with paragraph 14.

13 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 ship leaves port. The time of closing and the time of opening (if permissible under these regulations) shall be recorded in such log book as may be prescribed by the Administration.

14 Where in a between-decks, 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 and having its lowest point

1.4 m plus 2.5% of the breadth of the ship above the water when the ship departs from any port, all the sidescuttles in that between-decks shall be closed watertight and locked before the ship leaves port, 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 of opening such sidescuttles in port and of closing and locking them before the ship leaves port shall be entered 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 15 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, and having its lowest point 1.4 m plus 25% of the breadth of the ship above the waterline corresponding to the limiting mean draught, and at which it will therefore be permissible to depart from port without previously closing and locking them and to open them at sea on the responsibility of the master during the voyage to the next port. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.

15 Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the ship leaves port.

16 If cargo is carried in such spaces, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and such closing and locking shall be recorded in such log book as may be prescribed by the Administration.

17 When a rubbish-chute, etc., is not in use both the cover and the valve required by regulation 15.10.2 shall be kept closed and secured.

Regulation 23

Special requirements for ro-ro passenger ships

1 Special category spaces and ro-ro cargo 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 whilst the ship is underway.

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 cargo 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 ship leaves the berth on any voyage 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 ship leaves the berth on any voyage, that an entry in the log book, as required by regulation 22.13, 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 ship leaves the berth 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 when the ship is under way.

Regulation 24

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 while at sea.

2 Notwithstanding the requirements of paragraph 3, the Administration may authorize that particular doors may be opened at the discretion of the master, if necessary for the operation of the ship and provided that the safety of the ship is not impaired.

3 Watertight doors or ramps fitted internally subdivide large cargo spaces shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the log book.

4 The use of access doors and hatch covers intended to ensure the watertight integrity of internal openings shall be authorized by the officer of the watch.”

ANNEX 39**VOLUNTARY GUIDELINES FOR THE
DESIGN, CONSTRUCTION AND EQUIPMENT OF SMALL FISHING VESSELS, 2005****Preface**

1 A meeting of consultants on safety on board fishing vessels, jointly convened in 1974 by the Food and Agriculture Organization of the United Nations (FAO), the International Labour Organization (ILO) and the International Maritime Organization (IMO), for the purpose of finalizing the text of part B of the Code of Safety for Fishermen and Fishing Vessels, which applies to vessels of 24 metres in length and over, recommended that the three Organizations should continue to co-operate with a view to establishing voluntary guidelines for the design, construction and equipment of vessels of less than 24 metres in length.

2 Subsequently the Maritime Safety Committee (MSC) of IMO took note of the aforementioned recommendation and requested its Sub-Committee on Safety of Fishing Vessels to develop such guidelines in co-operation with FAO and ILO.

3 The International Conference on Safety of Fishing Vessels, 1977, recognizing that the 1977 Torremolinos Convention applies only to fishing vessels of 24 metres in length and over and being conscious that the vast majority of fishing vessels throughout the world are of less than 24 metres in length, adopted a resolution recommending that IMO continue to develop safety standards for design, construction and equipment of such fishing vessels with a view to promoting the safety of these vessels and their crews.

4 FAO, ILO and IMO finalized the original text of the Voluntary Guidelines at the twenty-first and twenty-second sessions of the IMO Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF). The Guidelines were approved by the MSC at its forty-first session in October 1979 and by the FAO in November 1979 for circulation to Governments. The ILO Governing Body was informed at its 211th session in November 1979 of the intention to publish this document.

5 It was pointed out, however, that some parts of the Guidelines required further development. These mainly concerned stability criteria, which were considered at that time as being only tentative. Bearing in mind that development of appropriate stability criteria for any type of fishing vessel is a very complex problem, which has not been entirely solved even for larger vessels, the International Conference on Safety of Fishing Vessels, 1977, adopted a resolution recommending that IMO continue studies with the aim of formulating detailed stability standards for fishing vessels.

6 Following the adoption of the Torremolinos Protocol of 1993 relating to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977, the MSC undertook the review of the FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels, Part A and Part B. At the same time, it also decided to review the Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels. In requesting the SLF Sub-Committee to review the Guidelines, the MSC recommended that the concerns expressed in paragraph 5 above, as well as, recent developments in fishing vessel design and fishing operations should be taken into consideration.

7 FAO, ILO and IMO completed the task of reviewing and revising the Voluntary Guidelines and the final text was approved by the MSC at its seventy-ninth session in 2004, by the FAO Committee on Fisheries at its [...] session [date] and the Governing Body of ILO in [...].

8 The purpose of the Voluntary Guidelines is to provide a general guidance on safe practices for the design, construction and equipment of smaller fishing vessels. Nevertheless, discretion should be exercised in using provisions of the Voluntary Guidelines for the purpose of framing national safety requirements when local weather and sea conditions and special operational requirements should be given particular consideration. Furthermore, attention is drawn to Part A of the FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels, 2005.

9 Concerning the procedures for future amendments to the Voluntary Guidelines, the MSC considered that any amendments should be effected as expeditiously as possible. It was agreed that non-controversial amendments should be approved by correspondence, but joint meetings of experts might be necessary for other amendments for which no ready agreement by correspondence could be reached.

10 Recognizing that the majority of items covered by the Voluntary Guidelines are within the scope of IMO and noting the different working procedures within the three Organizations and also that the SLF Sub-Committee holds regular meetings, it was agreed that:

- .1 IMO should act as a focal point for co-ordinating proposed amendments to the Voluntary Guidelines and, in particular the IMO Secretariat should undertake to receive any proposed amendments, to distribute them to the Organizations and to collate their respective comments;
- .2 any future joint FAO/ILO/IMO meeting should be held, whenever possible, in conjunction with a meeting of the SLF Sub-Committee; and
- .3 any proposed amendments should always be subject to the final approval of the appropriate bodies of the three Organizations.

CHAPTER 1

GENERAL PROVISIONS

1.1 Purpose and scope

1.1.1 The purpose of these guidelines is to provide information on the design, construction, and equipment of small fishing vessels with a view to promoting the safety of the vessel and safety and health of the crew. They are not intended as a substitute for national laws and regulations but may serve as a guide to those concerned with framing such national laws and regulations. Each competent authority responsible for the safety of fishing vessels should ensure that the provisions of these guidelines are adapted to its specific requirements, having due regard to the size and type of vessels, their intended service and area of operation.

1.1.2 Unless otherwise stated, the provisions of these guidelines are intended to apply to new decked fishing vessels of 12 m in length and over, but less than 24 m in length. Nevertheless, even where not otherwise stated, the competent authority should as far as reasonable and practical give consideration to the application of these provisions to existing decked fishing vessels.

1.1.3 The provisions of these guidelines do not apply to fishing vessels for sport or recreation or to processing vessels.

1.2 Definitions

For the purpose of these guidelines, unless expressly provided otherwise, the following definitions apply:

1.2.1 *Amidships* means the mid-length of L.

1.2.2 *Approved* means approved by the competent authority.

1.2.3 *Baseline* is the horizontal line intersecting at amidships the keel line.

1.2.4 *Bow height* is defined as the vertical distance at the forward perpendicular between the waterline corresponding to the maximum permissible draught and the designed trim and the top of the exposed deck at side.

1.2.5 *Breadth (B)* is the maximum breadth of the vessel, measured amidships to the moulded line of the frame in a vessel with a metal shell and to the outer surface of the hull in a vessel with a shell of any other material.

1.2.6 *Collision bulkhead* is a watertight bulkhead up to the working deck in the fore part of the vessel as approved by the competent authority.*

1.2.7 *Competent authority* is the Government of the State whose flag the vessel is entitled to fly.

* Refer to regulation I/2(22) of the Protocol.

1.2.8 *Crew* means the skipper and all persons employed or engaged in any capacity on board a vessel on the business of that vessel.

1.2.9 *Decked vessel* is a vessel having a fixed structural deck covering the entire hull above the deepest operating waterline. Where open wells or cockpits are fitted in this deck the vessel is considered a decked vessel if flooding of the well or cockpit will not endanger the vessel.

1.2.10 *Deck erection* is any decked structure on the working deck.

1.2.11 *Deepest operating waterline* is the waterline related to the maximum permissible operating draft.

1.2.12 *Enclosed superstructure* is a superstructure with:

- .1 enclosing bulkheads of efficient construction;
- .2 access openings, if any, in those bulkheads fitted with permanently attached weathertight doors of a strength equivalent to the unpierced structure which can be operated from each side; and
- .3 other openings in sides or ends of the superstructure fitted with efficient weathertight means of closing.

A raised quarter-deck is regarded as a superstructure.

A bridge or poop should not be regarded as enclosed unless access is provided for the crew to reach machinery and other working spaces inside those superstructures by alternative means which are available at all times when bulkhead openings are closed.

1.2.13 *Existing vessel* is a vessel which is not a new vessel.

1.2.14 *Fishing vessel* (hereto referred as vessel) means any vessel used commercially for catching fish, whales, seals, walrus or other living resources of the sea.

1.2.15 *Forward and after perpendiculars* should be taken at the forward and after ends of the length (L). The forward perpendicular should be coincident with the foreside of the stem on the waterline on which the length is measured.

1.2.16 *Freeboard (f)* is the actual minimum freeboard and is the distance from the underside of the working deck at the side to a water-line, measured perpendicularly to the water-line, plus the minimum thickness of decking. When the working deck is stepped, the lowest line of the deck and the continuation of that line parallel to the upper part of the deck should be taken as the working deck.

1.2.17 *Height of a superstructure or other erection* is the least vertical distance measured at side from the top of the deck beams of a superstructure or an erection to the top of the working deck beams.

1.2.18 *Keel line* is the line parallel to the slope of keel passing amidships through:

- .1 the top of the keel or line of intersection of the inside of shell plating with the keel where a bar keel extends above that line of a vessel with a metal shell; or
- .2 the rabbet lower line of the keel of a vessel with a shell of wood or a composite material; or
- .3 the intersection of a fair extension of the outside of the shell contour at the bottom with the centreline of a vessel with a shell of material other than wood and metal.

1.2.19 *Least depth (D)** is the depth measured from the keel line to the top of the working deck beam at side. Where the working deck is stepped and the raised part of the deck extends over the point at which the least depth is to be determined, the least depth should be measured to a line of reference extending from the lower part of the deck along a line parallel with the raised part.

1.2.20 *Length (L)** should be taken as 96% of the total length on a waterline at 85% of the least depth, or as the length from the foreside of the stem to the axis of the rudder stock on that waterline, if that length is greater. In vessels designed with rake of keel the waterline on which this length is measured should be parallel to the designed waterline.

1.2.21 *Machinery spaces of category A* are those spaces which contain internal combustion type machinery used either:

- .1 for main propulsion; or
- .2 for other purposes where such machinery has in the aggregate a total power output of not less than 750 kW,

or which contains any oil-fired boiler oil unit.

1.2.22 *Midship section* is that section of the hull defined by the intersection of the moulded surface of the hull with a vertical plane perpendicular to the waterline and centreline plane passing through amidships.

1.2.23 *New vessel* is a vessel the keel of which is laid, or which is at a similar stage of construction, on or after the date of adoption of the present revision of these guidelines.

1.2.24 *Organization* means the International Maritime Organization.

1.2.25 *Protocol* means the Torremolinos International Convention for the Safety of Fishing Vessels, 1977, as modified by the Torremolinos Protocol of 1993 relating thereto.

1.2.26 *Skipper* means the person having command of a fishing vessel.

* Dimensions are illustrated in Annex I.

1.2.27 *Steel or other equivalent material* means steel or any material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable fire exposure to the standard fires test (e.g. aluminium alloy with appropriate insulation).

1.2.28 *Superstructure deck* is that complete or partial deck forming the top of a deck erection situated at a height of not less than 1.8 m above the working deck. Where this height is less than 1.8 m, the top of such deck erections should be treated in the same way as the working deck.

1.2.29 *Watertight* means capable of preventing the passage of water through the structure in any direction under a head of water for which the surrounding structure is designed.

1.2.30 *Weathertight* means that in any sea conditions water will not penetrate into the vessel.

1.2.31 *Working deck* is generally the lowest complete deck above the deepest operating waterline from which fishing is undertaken. In vessels fitted with two or more complete decks, the competent authority may accept a lower deck as a working deck provided that that deck is situated above the deepest operating waterline.

1.3 Measurements

In these guidelines measurements are given in the metric system using the following abbreviations:

m	-	metre
cm	-	centimetre
mm	-	millimetre
t	-	tonne (1,000 kg)
kg	-	kilogram
mt	-	metre - tonne
° C	-	degree centigrade
s	-	second
N	-	Newton
kW	-	Kilowatt

1.4 Maintenance, upkeep and surveys

1.4.1 The hull, machinery, equipment and radio installations as well as crew accommodation of every vessel should be constructed and installed so as to be capable of being regularly maintained to ensure that they are at all times, in all respects, satisfactory for the vessel's intended service.

1.4.2 Where practicable, the competent authority should arrange for appropriate surveys of a vessel during construction and, at regular intervals after completion, to ensure satisfactory condition of the vessel's hull, machinery, equipment, radio installations equipment and radio installations as well as crew accommodation. An appropriate report of the survey should be entered in the record of the vessel.

1.4.3 After any survey has been completed no change should be made in the structural arrangements, machinery, equipment, and radio installations as well as crew accommodation etc., covered by the survey, without the approval of the competent authority.

1.4.4 Documentation relating to the safety of the vessel should cease to be valid upon transfer of the vessel to the flag of another State. New safety documentation should only be issued when the competent authority is fully satisfied that the vessel is in compliance with the requirements of the relevant provisions.

1.5 Equivalentents

Where the present provisions require that a particular fitting, material, appliance or apparatus, or type thereof, should be fitted or carried in a vessel, or that any particular provision should be made, the competent authority may allow any other fitting, material, appliance or apparatus, or type thereof, to be fitted or carried, or any other provision to be made in that vessel, if it is satisfied by trial thereof or otherwise that such fitting, material, appliance or apparatus, or type thereof, or provision, is at least as effective as that required by the present provisions.

CHAPTER 2

CONSTRUCTION, WATERTIGHT INTEGRITY AND EQUIPMENT

2.1 Construction

2.1.1 Strength and construction of hull, superstructures, deckhouses, machinery casings, companionways and any other structures and vessel's equipment should be sufficient to withstand all foreseeable conditions of the intended service and should be to the satisfaction of the competent authority.

2.1.2 The hull of vessels intended for operation in ice should be strengthened in accordance with the anticipated conditions of navigation and area of operation. Wooden vessels, operating from harbours subject to freezing should have appropriate ice protection sheathing.

2.1.3 Bulkheads, closing devices and closures of openings in these bulkheads, as well as methods for their testing, should be in accordance with the requirements of the competent authority. Vessels constructed of material other than wood should be fitted with a collision bulkhead and at least with watertight bulkheads bounding the main machinery space. Such bulkheads should be extended up to the working deck. In vessels constructed of wood such bulkheads, which as far as practicable should be watertight, should also be fitted.

2.1.4 Pipes piercing the collision bulkhead should be fitted with suitable valves operable from above the working deck and the valve chest should be secured at the collision bulkhead inside the forepeak. No door, manhole, ventilation duct or any other opening should be fitted in the collision bulkhead below the working deck.

2.1.5 The forepeak should not be used for carrying fuel oil, except where specially approved by the competent authority.

2.2 Watertight doors

2.2.1 The number of openings in watertight bulkheads, as required by 2.1.3, should be reduced to the minimum compatible with the general arrangement and operational needs of the vessel; openings should be fitted with watertight closing appliances to the satisfaction of the competent authority. Watertight doors should be of an equivalent strength to the adjacent unpierced structure.

2.2.2 Watertight doors may be of the hinged type, and should be capable of being operated locally from each side of the door. A notice should be attached to the door on each side stating that the door should be kept closed at sea.

2.2.3 Sliding watertight doors should be capable of being operated when the vessel is listed up to 15° either way.

2.3 Hull integrity

2.3.1 External openings should be capable of being closed so as to prevent water from entering the vessel. Deck openings which may be open during fishing operations should normally be

arranged near to the vessel's centreline. However, the competent authority may approve different arrangements if satisfied that the safety of the vessel will not be impaired.

2.3.2 Fish flaps on stern trawlers should be power-operated and capable of being controlled from any position which provides an unobstructed view of the operation of the flaps.

2.4 Weathertight doors

2.4.1 All access openings in bulkheads of enclosed superstructures and other outer structures through which water could enter and endanger the vessel, should be fitted with doors permanently attached to the bulkhead, framed and stiffened so that the whole structure is of equivalent strength to the unpierced structure, and weathertight when closed. The means for securing these doors weathertight should consist of gaskets and clamping devices or other equivalent means and should be permanently attached to the bulkhead or to the doors themselves, and should be so arranged that they can be operated from each side of the bulkhead. The competent authority may, without prejudice to the safety of the crew, permit the doors to be opened from one side only for freezer rooms, provided that a suitable alarm device is fitted to prevent persons being trapped in those rooms.

2.4.2 The height above deck of sills in those doorways, in companionways, erections and machinery casings which give direct access to parts of the deck exposed to the weather and sea should be at least 600 mm on the working deck and at least 300 mm on the superstructure deck. Where operating experience has shown justification and on approval by the competent authority, these heights, except in the doorways giving direct access to machinery spaces, may be reduced to not less than 380 mm and 150 mm, respectively.

2.4.3 Where operating experience has shown justification and on approval of the competent authority, the height above deck of sills in the doorways specified in 2.4.2, except those giving direct access to machinery spaces, may be reduced to not less than 150 mm on superstructure decks and not less than 380 mm on the working deck for vessels 24 m in length, or not less than 150 mm on the working deck for vessels of 12 m in length. For vessels of intermediate length the minimum acceptable reduced height for sills in doorways on the working deck should be obtained by linear interpolation.

2.5 Hatchways closed by wood covers

2.5.1 The height above deck of hatchway coamings on exposed parts of the working deck should be at least 300 mm for vessels of 12 m in length and at least 600 mm for vessels 24 m in length. For vessels of intermediate length the, minimum height should be obtained by linear interpolation. The height above deck of hatchway coamings on exposed parts of the superstructure deck should be at least 300 mm.

2.5.2 Where operating experience has shown justification and on approval of the competent authority the height of hatchway coamings, except those which give direct access to machinery spaces may be reduced from the height as specified in 2.5.1 or the coamings may be omitted entirely, provided that efficient watertight hatch covers other than wood are fitted. Such hatchways should be kept as small as practicable, and the covers should be permanently attached by hinges or equivalent means and be capable of being rapidly closed or battened down.

2.5.3 The finished thickness of wood hatchway covers should include an allowance for abrasion due to rough handling. In any case, the finished thickness of these covers should be at

least 4 mm for each 100 mm of unsupported span subject to a minimum of 40 mm and the width of their bearing surfaces should be at least 65 mm.

2.5.4 The use of wooden hatchway covers is generally not recommended in view of the difficulty of rapidly securing their weathertightness. However, where fitted they should be capable of being secured weathertight. Arrangements for securing wood hatchway covers weathertight should be provided to the satisfaction of the competent authority.

2.6 Hatchways closed by covers other than wood

2.6.1 The height above deck of hatchway coamings should be as specified in 2.5.1. Where operating experience has shown justification and on the approval by the competent authority the height of these coamings may be reduced, or the coamings omitted entirely, provided that the safety of vessels is not thereby impaired. In this case, the hatchway openings should be kept as small as practicable and the covers be permanently attached by hinges or equivalent means and be capable of being rapidly closed and battened down, or by equally effective arrangements to the satisfaction of the competent authority.

2.6.2 For the purpose of strength calculations it should be assumed that hatchway covers are subjected to static loads of 10 kN/m^2 or the weight of cargo intended to be, carried on them, whichever is the greater.

2.6.3 Where covers are made of mild steel, the maximum stress calculated according to 2.6.2 and multiplied by 4.25 should not exceed the minimum ultimate strength of the material. Under these loads the deflections should not be more than 0.0028 times the span.

2.6.4 Covers made of materials other than mild steel should be at least of equivalent strength to those made of mild steel and their construction should be of sufficient stiffness to ensure weathertightness under the loads specified in 2.6.2.

2.6.5 Covers should be fitted with clamping devices and gaskets or other equivalent arrangements sufficient to ensure weathertightness to the satisfaction of the competent authority.

2.7 Machinery space openings

2.7.1 Machinery space openings should be framed and enclosed by casings of sufficient strength. External access openings therein should be fitted with doors complying with 2.4 or with hatch covers other than wood complying with 2.6.

2.7.2 Openings other than access openings should be fitted with covers of equivalent strength to the unpierced structure, permanently attached thereto and capable of being closed weathertight.

2.8 Other deck openings

2.8.1 Where it is essential for fishing operations, flush deck scuttles of the screw, bayonet or equivalent type, and manhole covers may be fitted, provided these are capable of being closed watertight and such devices should be permanently attached to the adjacent structure. Having regard to the size and disposition of the openings and the design of the closing devices, metal-to-metal closures may be fitted if the competent authority is satisfied that they are effectively watertight.

2.8.2 An efficient deck erection or companion-way, fitted with weathertight doors or their equivalent, should be provided to protect openings, other than hatchways, machinery space openings, manholes and flush scuttles in the working deck. Companion-ways should be situated as close as practicable to the vessel's centreline.

2.9 Ventilators

2.9.1 The coamings of ventilators should be as high as practicable. On the working deck the height above deck of coamings of ventilators other than machinery space ventilators should be not less than 760 mm and on superstructure decks not less than 450 mm. When the height of such ventilators may interfere with the working of the vessel their coaming heights may be reduced to the satisfaction of the competent authority. The height above deck of machinery space ventilator openings should be to the satisfaction of the competent authority.

2.9.2 Coamings of ventilators should be of equivalent strength to the adjacent structure and capable of being closed weathertight by devices permanently attached to the ventilator or adjacent structure. Where the coaming of any ventilator exceeds 900 mm in height it should be specially supported. Ventilators should be arranged as close to the vessel's centreline as possible and, where practicable, should extend through the top of a deck erection or companion-way.

2.9.3 Closing appliances need not be fitted to ventilators the coamings of which extend more than 2.5 m above the working deck or more than 1 m above a deckhouse top or superstructure deck.

2.10 Air pipes

2.10.1 Where air pipes to tanks and void spaces below deck extend above the working or superstructure decks, the exposed parts of the pipes should be of strength equivalent to the adjacent structures and fitted with appropriate protection and, as far as is practicable, located close to the vessel's centreline and protected from damage by fishing or lifting gear. Openings of pipes should be provided with means of closing, permanently attached to the pipe or adjacent structure, except that where the competent authority is satisfied that they are protected against water trapped on deck, these means of closing may be omitted.

2.10.2 The height of air pipes above deck to the point where water may have access below should be at least 760 mm on the working deck and at least 450 mm on the superstructure deck. The competent authority may accept reduction of the height of an air pipe to avoid interference with the fishing operations.

2.11 Sounding devices

2.11.1 Sounding devices, to the satisfaction of the competent authority, should be fitted:

- .1 to the bilges of those compartments which are not readily accessible at all times during the voyage; and
- .2 to all tanks and cofferdams.

2.11.2 Where sounding pipes are fitted, their upper ends should be extended to a readily accessible position and, where practicable, above the working deck. Their openings should be

provided with permanently attached means of closing. Sounding pipes which are not extended above the working deck should be fitted with automatic self-closing devices.

2.11.3 Sounding arrangements on fuel service tanks should be such that in the event of the tanks being overfilled, spillage through the means of sounding cannot occur.

2.11.4 Fuel tank sounding pipe openings should not be located in crew accommodation.

2.12 Sidescuttles and windows

2.12.1 Sidescuttles to spaces below the working deck and to enclosed spaces on the working deck should be fitted with hinged deadlights capable of being closed watertight.

2.12.2 No sidescuttle should be fitted in such a position that its sill is less than 500 mm above the deepest operating waterline.

2.12.3 Sidescuttles fitted less than 1,000 mm above the deepest operating waterline should be of the fixed type.

2.12.4 Sidescuttles, together with their glasses and deadlights, should be of an approved construction. Those prone to be damaged by fishing gear should be suitably protected.

2.12.5 Skylights leading to spaces below the working deck should be of substantial construction and capable of being closed and secured weathertight, and with provision for adequate means of closing in the event of damage to the inserts. Skylights leading to machinery spaces should be avoided as far as practicable.

2.12.6 Toughened safety glass or suitably permanently transparent material of equivalent strength should be fitted in all wheelhouse windows exposed to the weather. The means of securing windows and the width of the bearing surfaces should be adequate, having regard to the window material used. Openings leading to spaces below deck from a wheelhouse whose windows are not provided with the protection required by 2.12.7 should be fitted with a weathertight closing appliance.

2.12.7 Deadlights or a suitable number of storm shutters should be provided where there is no other method of preventing water from entering the hull through a broken window or sidescuttle.

2.12.8 The competent authority may accept sidescuttles and windows without deadlights in side or aft bulkheads of deck erections located on or above the working deck if satisfied that the safety of the vessel will not be impaired.

2.12.9 The number of openings in the sides of the vessel below the working deck should be the minimum compatible with the design and proper working of the vessel and such openings should be provided with closing arrangements of adequate strength to ensure watertightness and the structural integrity of the surrounding structure.

2.13 Inlets and discharges

2.13.1 Discharges led through the shell either from spaces below the working deck or from within enclosed superstructures or deckhouses on the working deck fitted with doors complying with the requirements of 2.4 should be fitted with means for preventing water from passing

inboard. Normally each separate discharge should have an automatic non-return valve with a positive means of closing it from a readily accessible position. Such a valve is not required if the competent authority considers that the entry of water into the vessel through the opening is not likely to lead to dangerous flooding and that the thickness of the pipe is sufficient. The means for operating the valve with a positive means of closing should be provided with an indicator, showing whether the valve is open or closed. The open inboard end of any discharge system should be above the deepest operating waterline at an angle of heel satisfactory to the competent authority.

2.13.2 In machinery spaces main and auxiliary sea inlets and discharges essential for the operation of machinery should be controlled locally. Controls should be readily accessible and should be provided with indicators showing whether the valves are open or closed.

2.13.3 Fittings attached to the shell and all valves referred to in 2.13 should be of steel, bronze or other ductile material. All pipes between the shell and the valves should be of steel, except that in spaces other than machinery spaces of vessels constructed of material other than steel the competent authority may approve the use of other materials.

2.14 Freeing ports

2.14.1 Where bulwarks on weather parts of the working deck form wells, the minimum freeing port area (A) in m², on each side of the vessel for each well on the working deck should be determined in relation to the length (l) and height of bulwark in this well as follows:

.1 $A = K \cdot l$

where: K = 0.07 for vessels of 24 m in length

K = 0.05 for vessels of 12 m in length

for intermediate lengths the value of K should be obtained by linear interpolation (l need not be taken as greater than 70% of the length of a vessel).

.2 Where the bulwark is more than 1.2 m in average height, the required area in .1 should be increased by 0.004 m² per metre of length of well for each 100 mm difference in height.

.3 Where the bulwark is less than 900 mm in average height, the required area may be decreased by 0.004 m² per metre of length of well for each 100 mm difference in height.

2.14.2 The freeing port area calculated according to 2.14.1 should be increased where the competent authority considers that the vessel's sheer is not sufficient to ensure rapid and effective freeing of the deck of water.

2.14.3 Subject to the approval of the competent authority the minimum freeing port area for each well on the superstructure deck should be not less than one half the area (A) given in 2.14.1 except that where the superstructure deck forms a working deck for fishing operations the minimum area each side should be not less than 75% of the area (A).

2.14.4 Freeing ports should be so arranged along the length of bulwarks as to provide the most rapid and effective freeing of the deck from water. Lower edges of freeing ports should be as

near the deck as practicable. Two thirds of the total freeing port area per side should be provided in the half of the well nearest the lower point of the sheer curve, and some freeing port area should be placed as near the ends of the well as practicable.

2.14.5 Poundboards and means for stowage and working the fishing gear should be arranged so that the effectiveness of the freeing ports will not be impaired or water trapped on deck and prevented from easily reaching the freeing ports. Poundboards should be so constructed that they can be locked in position when in use and will not hamper the discharge of shipped water.

2.14.6 Freeing ports over 300 mm in depth should be fitted with bars spaced not more than 230 mm nor less than 150 mm apart or provided with other suitable protective arrangements. Freeing port covers, if fitted, should be of approved construction. It should not be possible to lock freeing ports, but they may be fitted with external top-hinged flaps/shutter and internal gratings. Such arrangements may, however, not lead to a considerable reduction of the effective freeing port area. Any shutter or external rubber flaps in freeing ports should be fastened with hinges in the upper edge. The shutter should fit freely so that they cannot get stuck. The hinges should be made of materials that are not susceptible to corrosion. There should not be any arrangements for the locking of freeing port shutters.

2.14.7 In vessels intended to operate in areas subject to icing, covers and protective arrangements from freeing ports should be capable of being easily removed to restrict ice accumulation. The size of opening and means provided for removal of these protective arrangements should be to the satisfaction of the competent authority.

2.14.8 Where wells or cockpits are fitted in the working deck or superstructure deck with their bottoms above the deepest operating waterline, efficient non-return means of drainage overboard should be provided. Where bottoms of such wells or cockpits are below the deepest operating waterline, drainage to the bilges should be provided. Alternatively, the drainage of the wells could be by pumps to the satisfaction of the competent authority.

2.15 Anchor and mooring equipment

Anchor equipment designed for quick and safe operation should be provided which should consist of anchoring equipment, anchor chains or wire ropes, stoppers and a windlass or other arrangements for dropping and hoisting the anchor and for holding the vessel at anchor in all foreseeable service conditions. Vessels should also be provided with adequate mooring equipment for safe mooring in all operating conditions. Anchor and mooring equipment should be to the satisfaction of the competent authority. A recommended practice for anchor and mooring equipment is provided in annex II.

2.16 Working decks within an enclosed superstructure

2.16.1 Such decks should be fitted with an efficient drainage system having an appropriate drainage capacity to dispose of water or fish waste which may occur from deck washing, fish processing or from the sea through openings that may be open during fishing operations, to the satisfaction of the competent authority.

2.16.2 All openings necessary for fishing operations should be provided with means for quick and efficient closures by one person, to the satisfaction of the competent authority.

2.16.3 Where the catch is brought on to such decks for handling and processing, the catch should be placed in a pound, to the satisfaction of the competent authority. An efficient drainage system should be fitted. Adequate protection against inadvertent influx of water to the working deck should be provided.

2.16.4 At least two exits from such decks should be provided.

2.16.5 The clear headroom in the working space should at all points be to the satisfaction of the competent authority.

2.16.6 A fixed ventilation system providing sufficient changes of air per hour should be provided.

2.17 Tanks for fish in refrigerated (RSW) or chilled (CSW) sea water

2.17.1 If RSW- or CSW-tanks or similar tank systems are used, such tanks should be provided with a separate permanently fitted arrangement for the filling and emptying of sea water.

2.17.2 If such tanks are to be used also for carrying dry cargo, the tanks should be arranged with a bilge system and provided with adequate means to avoid ingress of water from the bilge system into the tanks.

CHAPTER 3

STABILITY AND ASSOCIATED SEAWORTHINESS

3.1 General

3.1.1 Vessels should be so designed and constructed that the requirements of this chapter will be satisfied in the operating conditions referred to in 3.7. Calculations of the righting lever curves should be to the satisfaction of the competent authority.*

3.1.2 Wherever practicable, guidance should be provided for an approximate determination of the vessel's stability by means of the rolling period test including values of rolling coefficients particular to the vessel.**

3.2 Stability criteria

3.2.1 The following minimum stability criteria should be met unless the competent authority is satisfied that operating experience justifies departure therefrom:

- .1 The area under the righting lever curve (GZ curve) should not be less than 0.055 m-rad up to 30° angle of heel and not less than 0.090 m-rad up to 40° or the angle of flooding θ_f if this angle is less than 40°. Additionally, the area under the righting lever curve (GZ curve) between the angles of heel of 30° and 40° or between 30° and θ_f , if this angle is less than 40° should not be less than 0.030 m-rad. θ_f is the angle of heel at which openings in the hull, superstructures or deckhouses which cannot rapidly be closed watertight commence to immerse. In applying this criterion, small openings through which progressive flooding cannot take place need not be considered as open;
- .2 the righting lever GZ should be at least 200 mm at an angle of heel equal to or greater than 30°. The righting lever GZ may be reduced to the satisfaction of the competent authority but in no case by more than 2(24-L)%, where L, in metres, is as defined in 1.2.1.6;
- .3 the maximum righting lever GZ_{max} should occur at an angle of heel preferably exceeding 30° but not less than 25°; and
- .4 the initial metacentric height GM₀ should not be less than 350 mm for single deck vessels. In vessels with complete superstructure the metacentric height may be reduced to the satisfaction of the competent authority but in no case should be less than 150 mm.

* Refer to the Calculation of stability curves and the Effect of free surfaces of liquids in tanks contained in paragraphs 3.6 and 3.3 respectively of the Code on Intact Stability adopted by the Organization by resolution A.749(18) as amended and the Code of Practice concerning the Accuracy of Stability Information for Fishing Vessels adopted by the Organization by resolution A.267(VIII).

** Refer to an Approximate determination of vessel's stability by means of rolling period test (for vessels up to 70 m in length) contained in Appendix 7 of Part A of the Code of Safety for Fishermen and Fishing Vessels.

3.2.2 Where arrangements other than bilge keels are provided to limit the angles of roll, the competent authority should be satisfied that the stability criteria given in 3.2.1 are maintained in all operating conditions.

3.2.3 Where ballast is provided to ensure compliance with 3.2.1, its nature and arrangement should be to the satisfaction of the competent authority.

3.2.4 It should be ensured that stability characteristics of the vessel will not produce acceleration forces which could be prejudicial to the safety of the vessel and crew.

3.2.5 For decked vessels for which, by reason of insufficient stability data, 3.2.1 cannot be applied, the following approximate formula for the minimum metacentric height GM_{\min} , in metres, for all operating conditions should be used as the criterion:

$$GM \min = 0.53 + 2B \left[0.075 - 0.37 \left(\frac{f}{B} \right) + 0.82 \left(\frac{f}{B} \right)^2 - 0.014 \left(\frac{B}{D} \right) - 0.032 \left(\frac{l_s}{L} \right) \right]$$

where:

L, B, D and f, in metres, are as defined in 1.2.1.7, 1.2.1.9, 1.2.1.10 and 1.2.1.11; and

l_s is the actual length of enclosed superstructure extending from side to side of the vessel, in metres, as defined in 1.2.1.19.

The formula is applicable for vessels having:

- .1 $\frac{f}{B}$ between 0.02 and 0.20;
- .2 $\frac{l_s}{L}$ smaller than 0.60;
- .3 $\frac{B}{D}$ between 1.75 and 2.15;
- .4 sheer fore and aft at least equal to or exceeding the standard sheer prescribed in Regulation 38(8) of the International Convention on Load Lines, 1966; and
- .5 height of superstructure included in the calculation not less than 1.8 m.

For vessels with parameters outside of the above limits the formula should be applied with special care.

3.2.6 The above formula is not intended as a replacement for the basic criteria given in 3.2.1 and 3.5, but should be used only if circumstances are such that cross-curves of stability, KM curve and subsequent GZ curves are not and cannot be made available for judging a particular vessel's stability.

3.2.7 The calculated value of GM_{min} should be compared with actual GM values of the vessel in all loading conditions. If a rolling test, an inclining experiment based on estimated displacement, or another approximate method of determining the actual GM is used, a safety margin should be added to the calculated GM_{min} .*

3.3 Flooding of fish-holds

The angle of heel at which progressive flooding of fish-holds could occur through hatches which remain open during fishing operations and which cannot rapidly be closed should be at least 20° unless the stability criteria of 3.2.1 can be satisfied with the respective fish-holds partially or completely flooded.

3.4 Particular fishing methods

Vessels engaged in particular fishing methods where additional external forces are imposed on the vessel during fishing operations, should meet the stability criteria of 3.2.1 increased, if necessary, to the satisfaction of the competent authority.

3.5 Severe wind and rolling

For vessels intended for operation in areas where exceptionally adverse weather condition may be experienced, special attention should be given to the capability to withstand the capsizing effects of breaking waves. In order to demonstrate ability to withstand such effects, the competent authority should give consideration to the benefits of enclosed deck erections which may provide an improved range of positive stability to larger angles of heel with openings assumed closed weathertight. A positive range of stability up to an angle of 80° may be used as a criterion. Alternatively, the Severe wind and rolling criterion (weather criterion) for fishing vessels may be used.**

3.6 Water on deck

Vessels should be able to withstand, to the satisfaction of the competent authority, the effect of water on deck, taking account of the seasonal weather conditions, the sea states in which the vessel will operate, the type of vessel and its mode of operation. The Guidance on a method of calculation of the effect of water on deck may be used.***

3.7 Operating conditions

3.7.1 The number and type of operating conditions to be considered should be to the satisfaction of the competent authority and should include the following as appropriate:

* Refer to Appendix 7 of Part A of the Code of Safety for Fishermen and Fishing Vessels.

** Refer to the Severe wind and rolling criterion (weather criterion) for fishing vessels, contained in paragraph 4.2.4 of the Code on Intact Stability, adopted by the Organization by resolution A.749(18) as amended.

*** Refer to the Guidance on a method of calculation of the effect of water on deck, contained in recommendation 1 of attachment 3 to the Final Act of the 1993 Conference.

- .1 departure for the fishing grounds with full fuel, stores, ice, fishing gear, etc.;
- .2 departure from the fishing grounds with full catch;
- .3 arrival at home port with full catch and 10% stores, fuel, etc.; and
- .4 arrival at home port with 10% stores, fuel, etc. and a minimum catch, which should normally be 20% of full catch but may be up to 40% provided the competent authority is satisfied that operating patterns justify such a value.

3.7.2 In addition to the specific operating conditions given in 3.7.1 the competent authority should also be satisfied that the minimum stability criteria given in 3.2 are met under all other actual operating conditions including those which produce the lowest values of the stability parameters contained in these criteria. The competent authority should also be satisfied that those special conditions associated with a change in the vessel's mode or areas of operation which affect the stability considerations of this chapter are taken into account.

3.7.3 Concerning the conditions referred to in 3.7.1, the calculations should include the following:

- .1 allowance for the weight of the wet fishing nets and tackle, etc. on deck;
- .2 allowance for ice accretion, if anticipated, in accordance with 3.8;
- .3 homogeneous distribution of the catch, unless this is inconsistent with practice;
- .4 catch on deck, if anticipated, in operating conditions referred to in 3.7.1.2, 3.7.1.3 and 3.7.2;
- .5 water ballast if carried either in tanks which are especially provided for this purpose or in other tanks also equipped for carrying water ballast; and
- .6 allowance for the free surface effect of liquids and, if applicable, catch carried.

3.8 Ice accretion

3.8.1 For vessels operating in areas where ice accretion is likely to occur the following icing allowance should be made in the stability calculations:*

- .1 30 kg/m² on exposed weather decks and gangways;
- .2 7.5 kg/m² for the projected lateral area of each side of the vessel above the water-plane; and

* For sea areas where ice accretion may occur and modifications of the icing allowance are suggested, refer to the Guidance relating to ice accretion, contained in recommendation 2 of attachment 3 to the Final Act of the 1993 Conference. Refer also to the Icing consideration and the Recommendation for skippers of fishing vessels on ensuring a vessel's endurance in conditions of ice formation contained in appendix 10 in Part A of the Code of Safety for Fishermen and Fishing Vessels.

- .3 the projected lateral area of discontinuous surfaces of rail, spars (except masts) and rigging of vessels having no sails and the projected lateral area of other small objects should be computed by increasing the total projected area of continuous surfaces by 5% and the static moments of this area by 10%.

3.8.2 The height of the centre of gravity of ice accretion should be calculated according to the position of corresponding parts of the decks and gangways and other continuous surfaces on which ice can accumulate.

3.8.3 Vessels intended for operation in areas where ice accretion is known to occur should be:

- .1 designed to minimize the accretion of ice; and
- .2 equipped with such means for removing ice as the competent authority may require.*

3.9 Inclining test

3.9.1 Every vessel should undergo an inclining test upon its completion and the actual displacement and position of the centre of gravity should be determined for the light ship condition.

3.9.2 Where alterations are made to a vessel affecting its light ship condition and the position of the centre of gravity, the vessel should, if the competent authority considers this necessary, be re-inclined and the stability information revised.

3.9.3 The inclining test of an individual vessel may be omitted provided basic stability data are available from the inclining test of a sister ship, and it is demonstrated, to the satisfaction of the competent authority, that reliable stability information for the vessel can be obtained from such basic data.

3.10 Stability information

3.10.1 Suitable stability information, to the satisfaction of the competent authority, should be supplied to enable the skipper to assess with ease and certainty the stability of the vessel under various operating conditions.** Such information should include specific instructions to the skipper warning him of those operating conditions which could adversely affect either the stability or the trim of the vessel.***

* Refer to paragraph 2.4 of appendix 10 in Part A of the Code of Safety for Fishermen and Fishing Vessels on a typical list of equipment and hand tool required for combating ice formation.

** Refer to the Guidance on stability information contained in recommendation 3 of attachment 3 to the Final Act of the 1993 Conference. See also the General provisions against capsizing and information for the master, contained in chapter 2 of the Code on Intact Stability, adopted by the Organization by resolution A.749(18) as amended.

*** Refer to the Code of practice concerning the accuracy of stability information for fishing vessels, adopted by the Organization by resolution A.267(VIII).

3.10.2 The stability information, referred to in 3.10.1, should be kept on board, readily accessible at all times and inspected at the periodical surveys of the vessel to ensure that it has been approved for the actual operating conditions.

3.10.3 Where alterations are made to a vessel affecting its stability, revised stability calculations should be undertaken to the satisfaction of the competent authority. If the competent authority requires that the stability information should be revised, the new information should be supplied to the skipper and the superseded information removed.

3.10.4 Scales indicating the vessel's draught should be permanently marked on both sides of the stem and stern. These scales should be measured perpendicularly from a datum line which will lie along, or be a projection of, the lower extremity of the keel or other appendage. Numbers 0.1 m in the vertical plane should be marked on the scale, the lower edge of each number indicating the draught in metres. Between the numbers lines should be marked, parallel to the datum, at intervals of 0.1 m. The skipper should be provided with information defining the position of the datum line and instructions regarding the use of observed draughts.

3.11 Portable fish-hold divisions

The catch should be properly secured against shifting which could cause dangerous trim or heel of the vessel. The scantlings of portable fish-hold divisions, if fitted, should be to the satisfaction of the competent authority. The scantlings of portable fish-hold divisions, if fitted, should be in accordance with the Recommended practice on portable fish-hold divisions set out in annex IV.

3.12 Bow height

The bow height should be sufficient, to the satisfaction of the competent authority, to prevent the excessive shipping of water and should be determined taking account of the seasonal weather conditions, the sea states in which the vessel will operate, the type of vessel and its mode of operation.

3.13 Maximum permissible operating draught

3.13.1 A maximum permissible operating draught should be to the satisfaction of the competent authority and should be such that, in the associated operating condition, the stability criteria of this chapter and the provisions of chapters 2 and 6, as appropriate, are satisfied.

3.13.2 The maximum permissible operating draught should be marked on each side of the vessel. The location of the maximum permissible operating draught should be indicated in the documentation for the vessel.

CHAPTER 4

MACHINERY AND ELECTRICAL INSTALLATIONS

PART A - GENERAL

4.1 General

4.1.1 Machinery and electrical installations should be designed, constructed and installed in accordance with good engineering practice applying, where applicable, the requirements of the competent authority or rules of recognized classification societies or other equivalent standards as appropriate. Equipment should be so installed, protected and maintained as not to constitute a danger to persons and the vessel.

4.1.2 Machinery spaces should be so designed as to provide safe and free access to all machinery and its controls as well as to any other parts which may require servicing. Such spaces should be adequately ventilated.

4.1.3 Means should be provided whereby the machinery can be brought into operation from dead vessel condition without external aid.

4.1.4 All controls for operating the machinery and equipment, such as measuring devices, pumping systems and arrangements, valves, cocks, air pipes, inlets, sounders, switches, should be permanently marked with appropriate inscriptions clearly showing their purpose. Pipes should preferably be marked by appropriate colours to indicate their purpose. All valves should have indicators showing whether they are open or closed and should have handwheels so marked as to indicate the direction of turning which should generally be clockwise for closing.

4.1.5 Exhaust pipes and other hot surfaces within reach of personnel should be properly insulated or otherwise protected to prevent accidents or burns. Likewise, hot surfaces which could cause ignition should be protected from all possible contacts with combustible materials.

4.1.6 Plastic piping should not be used for any purpose in the machinery spaces where its destruction by fire would present a safety hazard.

4.1.7 Moving external parts of engines and mechanical and electrical equipment should be suitably protected to prevent injury to attendant personnel.

4.1.8 Platforms and gratings in machinery spaces and openings to machinery space bilges should be provided with adequate handrails or handholds and toeboards.

4.1.9 Walking surfaces should be properly fitted and secured in place and should have a non-slip surface.

4.1.10 Machinery space ladders should be fitted with non-slip treads.

4.1.11 Machinery spaces require extensive ventilation and due regard should be given to climatic conditions in the area of intended service and the air requirements of internal combustion engines installed.

4.1.12 Where air cooled internal combustion engines are installed special consideration should be given to the provision of adequate volumes of cooling air and to the removal of hot air from the machinery spaces.

4.1.13 Where water cooled internal combustion engines are installed provision should be made for an emergency means of supplying cooling water. Strainers should be capable of being cleaned without interrupting the flow of cooling water. Where keel coolers are installed, provision should be made to isolate them by fitting valves inside the hull at the inlet and outlet connections.

4.1.14 Tools, spare parts and spare gear required for routine maintenance and simple repairs should be provided for main and auxiliary machinery, mechanical and electrical equipment and installations, and should be securely stowed in an easily accessible space.

4.1.15 Information on operation and maintenance of machinery, usage of fuel and lubricating oils should be provided.

4.1.16 Measuring devices should be so installed as to be readily visible.

PART B - MACHINERY INSTALLATIONS

(See also section 4.1)

4.2 Machinery

4.2.1 Bars used on flywheels to turn machinery over by hand should be so constructed as to facilitate easy withdrawal from the flywheels recess if the engine should recoil. Hand cranks for engines should be designed to be thrown out instantly when the engine starts.

4.2.2 Where a forward power take-off is fitted to an engine for auxiliary drives, the power to be taken off should not exceed the engine manufacturer's limits for forward end drives.

4.2.3 Where a layshaft is driven from the power take-off shaft by either pulley or chain, the shaft should be fitted with a bearing on both sides of the pulley or chain sprocket.

4.2.4 Hydraulic installations for fishing equipment should have a means of disengaging the hydraulic pump from the driving engine.

4.2.5 Belt drives should be arranged with a method of tensioning in order that each belt drive can be adjusted individually.

4.2.6 The main engine instrument panel should, where applicable, have the following gauges:

- .1 engine revolution counter;
- .2 engine lubricating oil pressure gauge;
- .3 engine reverse/reduction gear box oil pressure gauge;
- .4 engine cooling water temperature gauge;

- .5 ammeters for batteries; and
- .6 exhaust temperature gauge (on engines of 250 kW and above).

4.2.7 Audible and visual alarms should be fitted for low lubricating oil pressure and high cooling water temperatures. Taking into consideration the configuration of the vessel and the mode of operation, the competent authority may require the alarms to be visible and heard in the machinery space and in the wheelhouse.

4.2.8 Outboard engines should be capable of being easily and securely fastened to the hull, and be provided with a safety chain or cable.

4.2.9 Where outboard engines are fitted in a well, this should be fitted with a drain pipe of not less than 50 mm in diameter; the well should be long enough to allow for the engine to be tilted up; remote control and fuel hoses should be led into the well through a hole provided with an effective bushing.

4.2.10 Auxiliary engines should be securely mounted in rigid seats and should be fully independent of all other systems.

4.3 Means of going astern

Vessels should have sufficient power for going astern to secure proper control of the vessel in all normal circumstances.

4.4 Air pressure systems

4.4.1 Air intakes for air compressors should be so located that the air is as pure and clean as possible and free from flammable or toxic gases or fumes. Air filters should be fitted. Air discharge pipes of compressors should, where necessary, be insulated to protect personnel from burns.

4.4.2 All discharge pipes from starting air compressors should lead directly to the starting air receivers and all starting pipes from the air receivers to main or auxiliary engines should be entirely separate from the compressor discharge pipe system.

4.4.3 Means to drain oil and water should be fitted to the lowest part of air receivers.

4.5 Arrangements for fuel oil, lubricating oil and other flammable oils

4.5.1 Fuel tanks, their filling systems, valves and associated piping should be carefully installed and be maintained so as to prevent the leakage of fuel or fumes within the hull.

4.5.2 Vents and filling connections of fuel tanks should be located in a safe, open-air position and remote from any ventilation intake. The cross sectional area of vents should be determined having regard to the filling arrangements. Vent openings should be fitted with suitable wire gauze screens or equivalent protective devices.

4.5.3 A valve capable of shutting off the supply to the engine should be mounted on or adjacent to the fuel tank and control of this valve should be accessible from outside the machinery space.

4.5.4 Wherever fuel might escape and come into contact with hot surfaces, suitable guards or screens should be installed.

4.5.5 Fuel storage tanks should be located remote from heated surfaces and should not be situated above stairways and ladders, boilers, hot surfaces and electrical equipment. Tanks and piping should be arranged so as to eliminate in the event of overflow and to minimize in the event of leakage or rupture the possibility that fuel will come into contact with hot surfaces or electrical components which may cause ignition of the fuel.

4.5.6 Safe and efficient means of ascertaining the amount of fuel oil contained in any oil tank should be provided. If sounding pipes are installed, their upper ends should terminate in safe positions and should be fitted with suitable means of closure. Gauges made of glass of substantial thickness and protected with a metal case may be used, provided that automatic closing valves are fitted. Other means of ascertaining the amount of fuel oil contained in any fuel oil tank may be permitted providing their failure or overfilling of the tanks will not permit release of fuel.

4.5.7 Where practicable, fuel oil piping should not be led through accommodation spaces.

4.5.8 Fuel tank sounding pipe openings should not be located in crew accommodation.

4.5.9 Fuel return pipes should be connected to the fuel oil service tank in use or to the suction side of the fuel pump.

4.5.10 Fuel pipes of internal combustion engines should be of steel or other equivalent material and preferably of a jacketed design. All fuel pipes should be adequately secured and protected.

4.5.11 Fuel oil pipes and their valves and fittings should be of steel or other equivalent material, provided that restricted use of flexible pipes may be permitted in positions where the competent authority is satisfied that they are necessary. Such flexible pipes and end attachments should be of adequate strength and should, to the satisfaction of the competent authority, be constructed of approved fire-resistant materials or have fire-resistant coatings. Where necessary, fuel oil and lubricating oil pipelines should be screened or otherwise suitably protected to avoid, as far as practicable, oil spray or oil leakage on heated surfaces or into machinery air intakes. The number of joints in piping systems should be kept to a minimum.

4.5.12 Where the competent authority has permitted the use of a petrol engine which is installed within a closed, decked compartment, such compartment should be ventilated with a mechanical exhaust and a natural supply system. Exhaust ventilation trunks from compartments containing petrol engines or other sources of concentrated petrol fumes should be isolated from other ventilation systems. The mechanical exhaust system should include an intake located as close as practicable to a position beneath the engine it serves or where petrol fumes are most likely to accumulate, and it should be above normal bilge water levels. Mechanical exhaust fans and trunks fitted in accordance with the requirements of this section should be suitable for use in an atmosphere containing petrol fumes.

4.5.13 There should be a permanent notice at each petrol engine starting position requiring:

- .1 that the ventilation system be operated for at least 2 min before an engine is started; and
- .2 that during fuelling all windows and doors are closed and smoking is prohibited.

4.5.14 Petrol tanks should not be integral with the hull structure. An efficient system should be installed to ensure that petrol does not spill into the hull of the vessel when tanks are being filled.*

4.5.15 Portable petrol tanks for outboard motors should be taken ashore for filling.

4.5.16 Petrol filling systems should be effectively bonded or earthed.

4.5.17 Emergency controls should be provided, preferably on deck outside machinery and accommodation spaces, for stopping every fuel pressure pump and every fan supplying air to machinery spaces and for closing all suction from fuel tanks above double bottom. Such controls should be at positions not likely to be cut off in the event of a fire in the machinery spaces.

4.5.18 Where fuel of a flashpoint of less than 60°C (closed cup test) is used, the temperature of the space in which such fuel is stored should not rise to within 10°C below the flashpoint of the fuel.

4.5.19 Lubricating oil tanks, their associated piping and valves should be carefully installed and maintained so as to prevent leakage of lubricating oil within the hull.

4.5.20 Adequate means should be provided for indicating failure of the lubricating oil system.

4.5.21 Where tubular gauge glasses are fitted to lubricating oil tanks they should be of substantial construction, adequately protected and fitted with self-closing arrangements on the tank.

4.5.22 Lubricating oil pipes should be of steel or other equivalent material and should be adequately secured and protected.

4.6 Bilge and ballast systems

4.6.1 Arrangements should be provided for draining any watertight compartment (other than small buoyancy compartments) under all service conditions.

4.6.2 Valves and cocks not forming part of a piping system should not normally be permitted in watertight bulkheads.

4.6.3 Bilge suction should be fitted with suitable strainers.

4.6.4 Bilge and ballast pumping systems should be arranged so as to prevent water passing from the sea or from water ballast spaces into holds or into machinery spaces or from one

* Attention is drawn to the use of aluminum mesh inside petrol tanks to reduce the risk of explosion.

watertight compartment to another. The bilge connection to any pump which draws from the sea or from water ballast spaces should be fitted with either a non-return valve or a cock which cannot be opened simultaneously either to the bilges and to the sea or to the bilges and water ballast spaces. Valves in bilge distribution boxes should be of a non-return type.

4.6.5 At least two bilge pumps should be provided, one of which should be manually operated. A ballast pump or other general service pump of sufficient capacity may be used as a power driven bilge pump. Power bilge pumps should be capable of giving a speed of water of at least 2 m/s through the main bilge pipe which should have an internal diameter of at least:

$$d = 25 + 1.68\sqrt{L(B + D)}$$

where d is the internal diameter in mm, and L, B and D are in metres.

However, the actual internal diameter of the bilge main may be rounded off to the nearest standard size acceptable to the competent authority. The manually operated pump should be fitted outside the machinery space. In no case should the capacity of the bilge pump(s) be less than the capacity of the installed fire pump(s).

4.6.6 The inside diameter of the bilge main and bilge suction pipe directly connected to the pump should be not less than the inside diameter of the bilge pump suction inlet.

4.6.7 Bilges in machinery spaces should be provided with a high level alarm in such a way that the accumulation of liquids is detected at normal angles of trim and heel. The detection system should initiate an audible and visual alarm in the places where continuous watch is maintained.

4.7 Exhaust systems

4.7.1 Exhaust pipes from engines and from heating and cooking appliances should be permanently mounted and lead to the open air through the uppermost deck or canopy or through the hull. Where exhaust pipes pass through the uppermost deck or canopy, they should be of sufficient height to ensure that no exhaust gases can pass back into the vessel. Where an exhaust pipe passes through the hull of the vessel, the hull connection should be watertight and provision be made so that the engine cannot be flooded.

4.7.2 All exhaust pipes should be assembled with the minimum number of bends and of a diameter as specified by the engine manufacturers. All joints should be gastight, the pipes well secured and supported by hangers or brackets and fitted with a section of flexible pipe or a bellows pipe; exhaust pipes should be led clear of all woodwork and other combustible material and where necessary they should be effectively insulated.

4.7.3 Where exhaust pipes pass through a wooden deck or other structures of wood or other combustible material, suitable protection should be provided to the structure to avoid the risk of fire.

4.7.4 Where a wet exhaust system is fitted, water from the engine cooling system should be introduced into the exhaust pipe near to the manifold and a "U" bend or other suitable water trap should be incorporated in the exhaust line to avoid the flow-back of water into the engine.

4.8 Steering gear

4.8.1 The steering arrangements including the rudder and associated fittings should be of adequate strength and capable of steering the vessel at maximum speed and should be so designed and constructed that they are not damaged at maximum astern speed or by manoeuvring during fishing operations.

4.8.2 Where the main steering device is mechanically operated an emergency means of steering should be provided which should be easily accessible.

4.8.3 Where a steering device other than a rudder is fitted, its construction and operation should be adequate and suitable for its intended purpose and should comply with the provisions of 4.3.

4.8.4 Where the steering device is remotely operated, a rudder angle indicator should be provided at the steering position. The rudder angle indicator for power operated steering gear should be independent of the steering gear control system.

4.8.5 The wheelhouse should be so arranged that the person steering the vessel has clear view ahead and that as far as practicable an all-round vision is possible from within the wheelhouse.

4.9 Refrigeration systems for the preservation of the catch

4.9.1 Refrigeration systems should be so designed, constructed, tested and installed as to take account of the safety of the system and also the emission of refrigerants held in quantities or concentrations which are hazardous to human health or to the environment, and should be to the satisfaction of the competent authority.

4.9.2 Refrigerants to be used in refrigeration systems should be to the satisfaction of the competent authority. However, methylchloride or CFCs whose ozone-depleting potential is higher than 5% of CFC-11 should not be used as refrigerants.

4.9.3 If ammonia is to be used as the refrigerant gas, the refrigerating plant should be at least arranged so as to take account of the recommended practice at annex III.

4.9.4 Refrigerating installations should be adequately protected against vibration, shock, expansion, shrinkage, etc. and should be provided with an automatic safety control device to prevent a dangerous rise in temperature and pressure.

4.9.5 Refrigeration systems in which toxic or flammable refrigerants are used should be provided with drainage devices leading to a place where the refrigerant presents no danger to the vessels or to persons on board.

4.9.6 Any space containing refrigerating machinery including condensers and gas tanks utilizing toxic refrigerants should be separated from any adjacent space by gastight bulkheads. Any space containing the refrigerating machinery including condensers and gas tanks should be fitted with a leak detection system having an indicator outside the space adjacent to the entrance and should be provided with an independent ventilation system.

4.9.7 Spaces containing condensers, gas tanks and refrigeration machinery utilizing toxic refrigerants, such as ammonia, should be provided with a water spray system.

4.9.8 When it is not practicable to contain refrigeration machinery in a separate place due to the size of the vessel, the refrigeration system may be installed in the machinery space provided that the quantity of refrigerant used will not cause danger to persons in the machinery space, should all the gas escape, and provided that an alarm is fitted to give warning of a dangerous concentration of gas should any leakage occur in the compartment.

4.9.9 In refrigerating machinery spaces and refrigerating rooms, alarms should be connected to the wheelhouse or control stations or escape exits to prevent persons being trapped. At least one exit from each such space should be capable of being opened from the inside. Where practicable, exits from the spaces containing refrigerating machinery using toxic or flammable gas should not lead directly into any accommodation spaces.

4.9.10 Where any refrigerant harmful to persons is used in a refrigeration system, at least two sets of breathing apparatus should be provided, one of which should be placed in a position not likely to become inaccessible in the event of leakage of refrigerant. Breathing apparatus provided as part of the vessel's fire-fighting equipment may be considered as meeting all or part of this provision provided its location meets both purposes. Where self-contained breathing apparatus is used, spare cylinders should be provided.

4.9.11 Adequate guidance for the safe operation and emergency procedures for the refrigeration system should be provided by suitable notices displayed on board the vessel.

PART C - ELECTRICAL INSTALLATIONS

4.10 Main source of electrical power

Where electrical power constitutes the only means of maintaining auxiliary services essential for the propulsion and safety of the vessel, a main source of electric power should be provided which should, as far practicable, include two generating sets, one of which may be driven by the main engine. The competent authority may accept other arrangements having equivalent electrical capacity.

4.11 Emergency source of electrical power

4.11.1 A self-contained emergency source of electrical power should be located outside the machinery spaces above the main deck. It should be so arranged as to ensure that it would function in the event of fire or other causes of failure of the main electrical installations.

4.11.2 The emergency source of electrical power, which may be either a generator or an accumulator battery, should be capable, having regard to starting current and the transitory nature of certain loads, of serving simultaneously, for a period of at least three hours:

- .1 a VHF radio installation or an MF radio installation or a ship-earth station or an MF/HF radio installation depending on the sea area for which the vessel is to be equipped;

- .2 internal communication equipment, fire detecting systems and signals, which may be required in an emergency; and
- .3 the navigational lights if solely electrical and the emergency lights:
 - .1 at launching stations and over the side of the vessel;
 - .2 in all alleyways, stairways and exits;
 - .3 in spaces containing machinery or the emergency source of power;
 - .4 in control stations; and
 - .5 in fish handling and fish processing spaces.

4.11.3 The arrangements for the emergency source of electrical power should comply with the following:

- .1 Where the emergency source of electrical power is a generator, it should be provided with an independent fuel supply and with efficient starting arrangements. Unless a second independent means of starting the emergency generator is provided, the single source of stored energy should be protected to preclude its complete depletion by the automatic starting system.
- .2 Where the emergency source of electrical power is an accumulator battery, it should be capable of carrying the emergency load without recharging whilst maintaining the voltage of the battery throughout the discharge period within plus or minus 12% of its nominal voltage. In the event of failure of the main power supply, this accumulator battery should be automatically connected to the emergency switchboard and should immediately supply at least those services specified in 4.11.2. The emergency switchboard should be provided with an auxiliary switch allowing the battery to be connected manually in case of failure of the automatic connection system.

4.11.4 The emergency switchboard should be installed as near as is practicable to the emergency source of power and should be located in accordance with 4.11.1. Where the emergency source of power is a generator, the emergency switchboard should be located in the same place unless the operation of the emergency switchboard would thereby be impaired.

4.11.5 Any accumulator battery should be installed in a well-ventilated space, but not in the space containing the emergency switchboard. An indicator should be mounted in a suitable space on the main switchboard or in the machinery control room to indicate when the battery constituting the emergency source of power is being discharged. The emergency switchboard should be supplied in normal operation from the main switchboard by an inter-connector feeder protected at the main switchboard against overload and short circuit. The arrangement at the emergency switchboard should be such that in the event of a failure of the main power supply an automatic connection of emergency supply would be provided. When the system is arranged for feed back operation, the inter-connector feeder should also be protected at the emergency switchboard against short circuit.

4.11.6 An emergency generator and its prime mover and any accumulator battery should be so arranged as to ensure that they will function at full rated power when the vessel is upright and when rolling up to an angle of 22.5° either way and simultaneously pitching 10° by bow or stern, or is in any combination of angles within those limits.

4.11.7 Battery level indicators should be mounted in a highly visible position on the on the main switchboard or in the machinery control room to facilitate monitoring of the condition of batteries constituting the emergency source of supply as well as any batteries required for the starting of an independent, power driven emergency generator.

4.11.8 The emergency source of electrical power and automatic starting equipment should be so constructed and arranged as to enable adequate testing to be carried out by the crew while the vessel is in operating condition.

4.12 Precautions against shock, fire and other hazards of electrical origin

4.12.1 Electrical equipment and installations should be such that the vessel and all persons on board are protected against electrical hazards.

4.12.2 Cable systems and electrical equipment should be so installed as to avoid or reduce interference with radio operation.

4.12.3 Cables should be capable of carrying the maximum rated current for the circuit. The cross sectional area should be sufficient to ensure that the voltage drop will not exceed 6% of the nominal rating under maximum rated load for the circuit. Electrical wiring should be of marine grade multi-strand tinned copper wire cores with an approved insulated cover.

4.12.4 All electrical cables should be at least of a flame-retardant type and should be so installed as not to impair their original flame-retarding properties. The competent authority may permit the use of special types of cables when necessary for particular applications, such as radio cables, which do not comply with the foregoing.

4.12.5 Electric cables should be supported in such a manner as to avoid chafing or other damage and should not be located close to hot surfaces such as engine exhausts. Except as permitted by the competent authority in exceptional circumstances, all metal sheaths and armour of cables should be electrically continuous and should be earthed.

4.12.6 Where cables are not metal sheathed or armoured and there might be a risk of fire in case of an electrical fault, special precautions should be taken to the satisfaction of the competent authority.

4.12.7 Electrical wiring and electrical equipment installed in fishing vessels should be of marine grade materials only and should conform to the best marine practices of installation and workmanship. Electrical equipment exposed to the weather should be protected from dampness and corrosion as well as mechanical damage.

4.12.8 Lighting fittings should be arranged to prevent temperature rises which could damage the wiring and to prevent surrounding material from becoming excessively hot.

4.12.9 In spaces where flammable mixtures are liable to collect, and in any compartment assigned principally to the containment of an accumulator battery, no electrical equipment should be installed unless the competent authority is satisfied that it is:

- .1 essential for operational purposes;
- .2 of a type which will not ignite the mixture concerned;
- .3 appropriate to the space concerned; and
- .4 appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.

4.12.10 Where a potential explosion risk exists in or near any space, all electrical equipment and fittings installed in those spaces should be either explosion-proof or intrinsically safe to the satisfaction of the competent authority.

4.13 Electrical systems

4.13.1 Direct current installations should be wired as insulated return systems. The hull should not be used to carry current.

4.13.2 Main and emergency switchboards should be so arranged as to give easy access as may be needed to apparatus and equipment, without danger to attendants. The sides and backs and, where necessary, the fronts of switchboards, should be suitably guarded. Exposed "live" parts having voltages to earth exceeding a voltage to be specified by the competent authority should not be installed on the front of such switchboards. There should be non-conducting mats or gratings at the front and rear.

4.13.3 All outgoing circuits from the switchboards should be double pole and open circuit protected. Lighting circuits should be separate from power circuits. Secondary distribution boards should be fitted with double pole switches and open circuit protection whereas final sub-circuits may be fitted with single pole switches.

4.13.4 Main switchboards should be fitted with voltmeters and ammeters for each generator and with earth lamps. The emergency switchboard should also be fitted with a voltmeter, ammeter and earth lamps.

4.13.5 Where electrical power, other than a low voltage supply, constitutes the only means of maintaining auxiliary services essential for the propulsion and the safety of the vessel, the main switchboard should be designed to allow preferential tripping of non-essential services to reduce the risk of overload and premature actuation of the emergency source of supply.

4.13.6 Electric circuits and the current-carrying capacity of each circuit should be permanently indicated, together with the rating or setting of the appropriate overload protective device should be clearly identified on switchboards and where appropriate on distribution boxes.

4.13.7 Each separate circuit should be protected against short circuit as well as against overload to the satisfaction of the competent authority.

4.13.8 Piping conveying liquid should not be fitted above or close to switchboards or other electrical equipment. Where such arrangements are unavoidable, provision should be made to prevent leakage damaging the equipment. The current-carrying capacity of each circuit should be permanently indicated, together with the rating or setting of the appropriate overload protective device.

4.13.9 Where the main source of supply is an accumulator battery system only, the batteries should be suitably housed and compartments used primarily for their storage should be properly constructed and ventilated. However, accumulator batteries should not be housed in crew accommodation spaces unless installed in a hermetically sealed container.

4.13.10 Batteries should be installed with sufficient capacity and in sufficient numbers to carry all anticipated loads during normal operations and with sufficient reserve capacity for emergencies. An efficient means of battery charging should be provided, either from a main engine driven generator or auxiliary driven generator. Battery charging systems should be fitted with voltage surge and reverse current protection.

4.13.11 When the main and/or auxiliary engines are fitted with electric motor starters, the batteries connected to the system for starting should be separate from the batteries used for lighting and general services as well as from the radio batteries. The starter batteries should be capable of starting the engine at least six times without recharging.

4.13.12 The battery powered main source of supply should consist of two individual sets of radio batteries, two sets of lighting and general services batteries and two sets of starting batteries for the main engine (if electric starting is used). The competent authority, taking into consideration the design of the vessel and type of electrical equipment fitted as well as the area of operation, may allow a lesser number of battery banks to be fitted.

4.13.13 Battery banks should be fitted with double pole spark proof isolating switches. The switches should be placed in an accessible position.

4.13.14 There should be an arrangement for continuous charging of the accumulator batteries as and when the main and/or auxiliary machines are running. The system should consist of a battery charging switchboard fitted with voltmeters and ammeters for each system. The arrangement should allow alternate charging/discharging of the battery banks using an arrangement of change-over switches. Where possible, the change-over switch should be of a type that would automatically ensure that when one bank of batteries in a system is selected for discharging, the other bank in the same system would be automatically placed on charge.

4.13.15 Cables between a battery bank and an isolating switch and between the switch and a starter motor should be as short as possible and double insulated.

4.13.16 Individual batteries and banks of batteries should be secured in trays within boxes to avoid movement due to the motion of the vessel. The trays and boxes should be suitably protected against corrosion from acid and alkaline solutions and the boxes should be fitted with a ventilating pipe terminating in a safe place above deck. The boxes should be positioned above the operating load waterline.

4.13.17 Where the main source of supply is an alternating current system, non self-regulating alternators should be provided with automatic voltage regulation.

4.13.18 The competent authority may approve the parallel operation of alternators, if synchronizing and power sharing devices are to be fitted. The system should also be fitted with reverse power protection.

4.13.19 Main and emergency switchboards should be of the dead front to prevent accidental access to live parts. The sides and backs and, where necessary, the fronts of switchboards, should be suitably guarded.

4.13.20 Each section of the switchboard, supplied by an individual alternator, should be fitted with a voltmeter, a frequency meter and an ammeter, switched to allow the current to be measured in each phase. A sub-distribution board fitted in the wheelhouse should be fitted with a voltmeter and a switch to isolate it from the mains. Where fitted, the primary windings of transformers should be protected against short circuits by circuit breakers or fuses capable of withstanding power surges. If transformers are arranged for parallel operation, they should be provided with secondary isolation.

4.13.21 Provision should be made for a shore connection to the main switchboard.

4.13.22 Arrangement for charging accumulator batteries should be to the satisfaction of the competent authority. Marine quality battery chargers powered from the mains may be considered by the competent authority.

4.14 Earthing and bonding

4.14.1 All electrical installations should be bonded to earth and each bonding point should be accessible for maintenance.

4.14.2 The competent authority, taking into consideration the design of the system and the working voltage, may require a system of earth indicator lamps or means of detecting current leakage to be installed.

4.14.3 A copper earth plate of at least 0.2 m² should be fitted to the hull of a vessel, constructed of a material other than steel, or equivalent, at a point where it will always be submerged under all conditions of heel. Inside the hull, the earth plate should be connected to a copper bar or rod, of at least 64 mm², the length being appropriate to the number of bonding points.

4.14.4 Exposed permanently fixed metal parts of electrical machines or equipment which are not intended to be “live”, but which are liable under fault conditions to become “live” should be earthed (grounded) unless:

- .1 they are supplied at a voltage not exceeding 55 V direct current or 55 V, root mean square, between conductors; auto-transformers should not be used for the purpose of achieving this alternative current voltage; or
- .2 they are supplied at a voltage not exceeding 250 V by safety isolating transformers supplying one consuming device only; or
- .3 they are constructed taking into account the principle of double insulation.

4.14.5 All exposed metal parts of equipment that do not carry current should be bonded to the earth bar. Lightning conductors should be attached directly to the earth plate.

4.14.6 Radar, radio and other navigational equipment that requires to be earthed should have a separate earthing point and the connection should be as short as possible.

4.14.7 Where a flexible, non-conducting coupling, is fitted between the gearbox output shaft and the propeller shafting, the coupling should be bridged by a piece of braided copper conductor.

4.15 Lighting systems

4.15.1 Lighting for machinery spaces, control stations and work spaces should be supplied from at least two separate final sub-circuits and arranged in such a manner that failure of one final sub-circuit should not leave the space in darkness.

4.15.2 Lighting of normally unattended spaces such as fishrooms and net stores should be controlled from outside the space.

4.15.3 An emergency source of power should be made available for a signalling lamp if carried.

4.16 Electric motors

4.16.1 Every electric motor should be provided with a means of starting and stopping so placed that the person controlling the motor can easily operate it.

4.16.2 The circuit supplying the motor should be fitted with short circuit and overload protection.

4.16.3 Where electric motors are fitted to deck machinery, the operating device should automatically return to the stop position when released. Emergency stops should also be located at the control station. The mechanical component of the deck machinery should be fitted with an appropriate fail-safe braking system.

4.16.4 Electric fans and pumps driven by electric motors for the transfer of fuel oil, fuel oil lift pumps and similar fuel oil pumps, should be fitted with a remote control. The remote control should be positioned outside the machinery space concerned, for stopping the motors in the event of a fire in the space in which they are located.

4.17 Lightning conductors

4.17.1 Lightning conductors should be fitted on wooden masts. They should be of continuous copper tape or copper rope having a cross section of not less than 75 mm² and secured to a copper spike of 12 mm diameter projecting at least 150 mm beyond the top of the mast.

4.17.2 In the case of metal hulls, the lower end of the conductor should be earthed to the hull.

4.17.3 In the case of wood or other non-metallic hulls, the lower end of the conductor should be attached to the earth plate. All sharp bends should be avoided and bolted or riveted joints only may be used.

PART D – PERIODICALLY UNATTENDED MACHINERY SPACES

Part D of chapter IV of Part B of the Code of Safety for Fishermen and Fishing Vessels may be used as guidance, particularly in relation to fire protection, fire detection, protection against flooding and alarm systems in general.

CHAPTER 5

FIRE PROTECTION, FIRE DETECTION, FIRE EXTINCTION AND FIRE FIGHTING

5.1 Structure

5.1.1 If steel decks or steel bulkheads in accommodation form the top or side of a fuel oil tank, they should be coated with a non-combustible material of minimum thickness 40 mm. Manholes or other openings to fuel oil tanks should not be positioned in the accommodation.

5.1.2 External bulkheads and vessel's sides, which delimit the accommodation spaces, should be insulated with at least 50 mm insulating material. Bulkheads between accommodation spaces and machinery spaces or cargo spaces should be insulated with a non-combustible material of minimum thickness 40 mm and with density to the satisfaction of the competent authority. In wooden vessels, they can be built of two layers of wood with two layers of felt or similar in between or of 60 mm wood with a lining of insulating plates or alternatively be constructed to "B-15" class standard. The surface of insulation fitted on the internal boundaries of the machinery spaces of category A and in spaces into which oil products may penetrate should be impervious to oil or oil vapours.

5.1.3 All insulation in accommodation spaces and the wheelhouse should be made of non-combustible materials. Combustible insulation fitted in spaces used for the storage or processing of fish should be protected by a tight non-combustible covering.

5.1.4 Where there is a door between the accommodation space and the machinery space, this should be a self-closing door of steel or equivalent. Doors between galley rooms and dining rooms might be permitted, provided they are made of fire-retardant material; the same applies to a serving hatch. Where only electric cooking appliances are used in the galley, the galley and the mess room could be seen as one common room, divided into two appropriate compartments.

5.2 Ventilation systems

5.2.1 With the exception of what may ensue from paragraph 5.3, there should be means for stopping the ventilators and closing the main openings in the ventilation system from a location outside the rooms being served.

5.2.2 Ventilation openings can be permitted in and under the doors in corridor bulkheads, although such openings should not be permitted in and under doors to staircases. The openings should only be positioned in the lower half of a door. Where such an opening is positioned in or under a door, the total net area of the opening(s) should not exceed 0.05 m². If such an opening is cut into a door, it should be provided with a grating of non-combustible material.

5.2.3 Ventilation ducts to machinery spaces or galleys should not normally be conducted through accommodation, service rooms, or control rooms. If the competent authority, however, permits such an arrangement, the ducts should be made of steel or equivalent material and arranged so as to maintain the fire protection of the subdivisions.

5.2.4 Ventilation ducts to accommodation, service rooms, or control rooms should not normally be conducted through machinery spaces of category A or through galleys. If the competent authority, however, permits such an arrangement, the ducts should be made of steel or equivalent material and arranged so as to maintain the fire protection of the subdivisions.

5.2.5 Storerooms, containing appreciable quantities of highly flammable products should be provided with ventilation arrangements, which are separate from other ventilation systems. Ventilation should be arranged at high and low levels and the inlets and outlets of ventilators should be positioned in safe areas. Suitable wire mesh guards to arrest sparks should be fitted over inlet and outlet ventilation openings. Such ventilation systems should not exhaust in close proximity to the inlets of other ventilation systems.

5.2.6 Ventilation systems, which serve machinery spaces, should be independent of systems serving other rooms.

5.3 Heating installations

5.3.1 Where fitted, electric radiators should be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiator should be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element or direct heat from the element should not be accepted by the competent authority.

5.3.2 Heating stoves and other similar appliances should be firmly permanent secured and there should be adequate protection and insulation against fire below and around such appliances and their flues. Uptakes of stoves, which burn solid fuel, should be positioned and executed so as to minimise the possibility of becoming blocked with flammable substances, and they should have adequate means for cleaning. Dampers to limit draught in the boiler flues should, when closed, always leave an adequate area open. Rooms in which furnaces are installed should be provided with ventilators of an adequate area to provide the furnace with the necessary combustion air.

5.3.3 Open flame gas appliances, except cooking stoves and water heaters, should not be permitted. Spaces containing any such stoves or water heaters should have suitable ventilation in order to remove vapours and any gas leaks to a safe place. All pipes conveying gas from tank to stove or water heater should be made of steel or other approved material. Automatic safety gas shut-off devices should be fitted to operate on loss of pressure in the main gas pipe or failure of the pilot flame in any appliance.

5.3.4 Where gaseous fuel is used for domestic purposes, the arrangements, distribution, and storage of the fuel should be to the satisfaction of the competent authority and comply with the provisions of 5.5.5.

5.3.5 Where gas appliances are used for domestic purposes and where such gas supplies are stored, hydrocarbon sensors should be fitted in appropriate locations to give warning of the leakage of gas.

5.4 Miscellaneous items

5.4.1 Exposed surfaces within accommodation spaces, service spaces, control stations, corridor and stairway enclosures and the concealed surfaces behind bulkheads, ceilings, panellings and linings in accommodation spaces, service spaces and control station should have low

flame-spread characteristics, or to be of fire-retardant materials to the satisfaction of the competent authority.*

5.4.2 All exposed surfaces of glass reinforced plastic construction within accommodation and service spaces, control stations, machinery spaces of category A and other machinery spaces of similar fire risk should have the final lay-up layer of approved resin having inherent fire-retardant properties or be coated with an approved fire-retardant paint or be protected by non-combustible materials.

5.4.3 Primary deck coverings within accommodation and service spaces and control stations should be of approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures. This should be determined in accordance with the Fire Test Procedures Code.

5.4.4 In accommodation and service rooms and in control rooms, pipes, which penetrate fire integrated subdivisions should be made of approved material, taking into account the temperatures such subdivisions should be able to withstand. If the competent authority permits pipes carrying oil and flammable liquids to pass through accommodation and service rooms, the pipes should be of approved material, taking account of the fire hazard.

5.4.5 Materials, such as plastic or similar, which are readily rendered ineffective by heat should not be used for overboard scuppers, sanitary discharges and other outlets which are close to the water line and where the failure of the material in the event of fire would give rise to danger of flooding.

5.4.6 Short flexible piping connections may be accepted on sea water lines where the flexible connections are of a material that is not easily rendered ineffective by heat.

5.4.7 Flexible piping connections may be accepted for pipes transporting oil but the length of the connections should be carefully adapted to withstand the effects of vibrations. The connections should be resistant to oil, reinforced and of a material that is not easily rendered ineffective by heat.

5.4.8 All waste containers, with the exception of those, which are used in connection with the treatment of fish, should be made of non-flammable material without openings in the sides or base.

5.4.9 In the event of a fire in a space containing machinery, which operates fuel oil transfer pumps, fuel oil pumps and other similar fuel pumps, it should be possible to stop the machinery from a location outside the machinery space in question.

5.4.10 Drip pans should be fitted, where necessary, to prevent oils leaking into the bilge.

* Refer to the Guidelines on the evaluation of fire properties of materials, adopted by the Organization by resolution A.166(ES.IV) and the Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials, adopted by the Organization by resolution A.653(16).

5.5 Storage of gas cylinders and dangerous materials

5.5.1 Cylinders for compressed, liquid or dissolved gases should be carefully secured and clearly marked, using the prescribed identity colours, with a clear, legible identification of the name and chemical formula of their contents and properly secured to the cylinder.

5.5.2 Cylinders, which contain flammable or other dangerous gases, and empty containers, should be stored, suitably secured, on the open deck, and all valves, pressure regulators and pipes leading from such containers should be protected against damage. Cylinders should be protected against extreme changes in temperature, direct rays of the sun and accumulation of snow. However, the competent authority may permit such containers to be stored in compartments complying with the provisions in 5.5.3 to 5.5.5.

5.5.3 Spaces containing liquid gas and highly flammable liquids such as volatile paints, paraffin, benzole, etc. should have direct access from open decks only. Pressure adjusting devices and relief valves should exhaust within the compartment. Where boundary bulkheads of such compartments adjoin other enclosed spaces, they should be gas tight.

5.5.4 Except as necessary for services within the space, electrical wiring and fittings should not be permitted within compartments used for the storage of highly flammable liquids or liquid gases. Where such electrical fittings are installed, they should be to the satisfaction of the competent authority for use in a flammable atmosphere. Sources of heat should be kept clear of such rooms, and "Smoking prohibited" and "Naked flames prohibited" notices should be affixed in a prominent position.

5.5.5 Separate storage rooms should be provided for each individual type of compressed gas. Rooms, which are used for storage of such gases, should not be used for storage of other flammable substances not for tools or items, which constitute a part of the gas distribution system. However, the competent authority may consider alternative arrangements taking into consideration the size and configuration of the vessel as well as the character, volume and intended use of such compressed gases.

5.6 Means of escape

5.6.1 Stairways and ladders leading to and from all crew rooms and spaces in which members of the crew normally are employed should be so arranged as to provide ready means of escape to the open deck and thence to the survival craft.

5.6.2 In accommodation spaces, there should be two exit possibilities from each large room or group of rooms and the exits should be positioned as possible from each other.

5.6.3 Exceptionally the competent authority may grant exemption from one of the exits and means of escape taking account of the location of the room and the number of persons who will normally be accommodated in the room and the configuration of the vessel.

5.6.4 Below the weather deck, the main exit should be a stairway, and the second exit can be considered as an emergency exit. Above weather decks, the exits should be stairways or through doors to the open deck or a combination thereof.

5.6.5 Two means of escape should be provided from every machinery space of category A which should be as widely separated as possible. Vertical escapes should be by means of steel ladders. Where the size or configuration of the machinery spaces make it impracticable one of these means of escape may be omitted. In such cases special consideration should be given to the remaining exit.

5.7 Automatic fire alarm and fire detection systems

5.7.1 In fishing vessels, between 15 m and 24 m in length, which are of flammable construction, or where in other respects considerable quantities of flammable materials are used in the fitting out of accommodation, service rooms and control rooms, it should be carefully considered, whether an automatic fire detection and alarm system should be installed in these rooms, taking into account the size of the rooms, lay-out and location in relation to control rooms, and, where relevant, the flame propagation properties of the installed furniture.

5.7.2 Machinery spaces containing propelling machinery should be provided with suitable alarm and fire detection systems.

5.8 Fire pumps – number, capacity and location

5.8.1 Fishing vessels should be provided with at least one mechanically-driven fire pump. Depending on the service area, the competent authority may however require an emergency fire pump.

5.8.2 Sanitary, ballast and general service pumps might be approved as fire pumps, provided that they are mechanically driven and not normally used for pumping oil and that, if they are occasionally used for pumping oil, they have suitable switching devices such that the pumps cannot, even accidentally, be activated to suck from tanks, which may be used for substances other than ballast water, and/or from the vessel's bilge system and simultaneously provide pressure to the vessel's fire hydrant. Such arrangements based on blanking off certain pipelines by using blind flanges should not be approved.

5.8.3 Where pumps that are not dedicated fire pumps are authorized for use as a fire pump as provided for in paragraph 5.8.2, their use should not reduce the capability to pump bilges at any time.

5.8.4 When the pumps are used as fire pumps, they should only be able to supply the fire hydrant if only one is required or the fire main.

5.8.5 Where two or more pumps can be used as fire pumps they should be capable of operating in parallel provided that each can deliver the capacity set out in paragraph 5.8.8.

5.8.6 Where the requirements to the maximum permissible suction height can be complied with, the emergency pump may be portable provided that it is driven by a diesel-engine with independent fuel oil supply and the necessary reserve fuel oil. The portable emergency fire pump should be tested at least every month, and the necessary tools for start, suction, connection of hoses, etc. should be positioned close to the pump. Pumps that require priming should be provided with a funnel and shutoff valve.

5.8.7 The capacity (Q) of a fire pump should be at least in accordance with the calculation method below, however, in no case less than 16m³/h.

$$Q = \left(0.15 \sqrt{L(B + D)} + 2.25\right)^2 \text{ m}^3/\text{h}$$

where L, B and D are in metres.

The capacity for a fire-extinguishing pump need not exceed 30 m³/h.

5.8.8 Main fire pumps should be able to maintain a pressure of at least 0.25 N/mm² at the fire plugs when the two fire plugs farthest away from the pump are both in operation and each fitted with a single hose length with a 12 mm spraying nozzle.

5.8.9 Where fixed or portable power operated emergency fire pumps are delivering the maximum quantity of water through the jet required by 5.10.1, the pressure maintained at any hydrant should be to the satisfaction of the competent authority.

5.8.10 The engine for diesel-driven emergency pumps should have a service tank with sufficient fuel oil for at least 3 h operation at full load, and there should be reserves for a further 15 h operation outside the machinery space.

5.8.11 Power to electrically driven emergency pumps should be supplied from an energy source that is independent of installations in the main machinery space and such arrangements should be to the satisfaction of the competent authority.

5.8.12 Fire pumps, including emergency fire pumps, should not be positioned or stored forward of the forepeak bulkhead or its extension.

5.8.13 The sea-valves of fire pumps and other necessary valves should be located so that a fire in any other place than in the space where the pump is located will not prevent the use of the pump.

5.8.14 The pump's total suction height should not exceed 4.5 m (suction height plus pipe resistance) under all conditions of heel and trim, which the vessel may be assumed to meet with during navigation.

5.8.15 All permanently installed fire pumps should be provided with a check valve and a non-return valve on the discharge side.

5.8.16 If the fire pumps are capable of developing a pressure in excess of the maximum permitted working pressure of the pipelines, fire hydrant or fire hoses or render flexible hoses uncontrollable, should be provided with safety valves to prevent harmful overpressure.

5.9 Fire mains

5.9.1 Where more than one hydrant is required to provide the number of jets required by 5.10.1, a fire main should be provided.

5.9.2 The maximum pressure at a fire hydrant should not exceed the pressure at which a fire hose can be effectively handled by one crew member.

5.9.3 Fire mains should be made of steel or other equivalent material, which does not easily render it ineffective under the effect of heat.

5.9.4 The fire mains should be laid so as to minimise the risk of mechanical damage to the pipes.

5.9.5 Where there is a risk of frost damage, measures should be taken to avoid such damage.

5.9.6 It should be possible to close off the fire main from a machinery space and from an easily accessible position outside that machinery space.

5.10 Fire hydrants, fire hoses and nozzles

5.10.1 Fire hydrants should be positioned such that they allow easy and rapid connection of fire hoses and such that at least one water jet can be directed towards any part of the vessel, which is normally accessible during navigation.

5.10.2 The water jet required in 5.10.1 should come from a single length fire hose.

5.10.3 In addition to the requirement of 5.10.1, machinery spaces should normally be equipped with at least one fire hydrant, complete with fire hose and combination nozzle (spray/jet). This fire hydrant should be positioned outside the space and close to the entrance.

5.10.4 There should be one fire hose for each prescribed fire hydrant. In addition, at least one extra fire hose should be available.

5.10.5 The length of individual fire hoses should not exceed 20 m.

5.10.6 Fire hoses should be of approved material. Each fire hose should be provided with couplings and a dual purpose nozzle.

5.10.7 With the exception of cases where fire hoses are permanently connected to the main fire hydrant, the couplings on fire hoses and nozzles should be completely interchangeable.

5.10.8 The nozzles prescribed in 5.10.6 should match the performance standard of the fire pumps installed, but should not, in any case, have a diameter of less than 12 mm.

5.11 Fire extinguishers*

5.11.1 Fire extinguishers should be of approved types. The capacity of required portable fluid extinguishers should be not more than 13.5 l and not less than 9 l. Other extinguishers should not be in excess of the equivalent portability of the 13.5 l fluid extinguisher and should not be less than the fire-extinguishing equivalent of a 9 l fluid extinguisher. The competent authority should determine the equivalents of fire extinguishers.

* Refer to the Improved guidelines for marine portable fire extinguishers, adopted by the Organization by resolution A.951(23).

5.11.2 Spare charges should be provided to the satisfaction of the competent authority.

5.11.3 Fire extinguishers containing an extinguishing medium, which, in the opinion of the competent authority, either by itself or under expected conditions of use, gives off toxic gases in such quantities as to endanger persons should not be permitted.

5.11.4 Fire extinguishers should be periodically examined and subjected to such tests as the competent authority may require.

5.11.5 Normally, one of the portable fire extinguishers intended for use in any space should be stowed near an entrance to that space.

5.12 Portable fire extinguishers

5.12.1 A sufficient number of approved portable fire extinguishers should be provided in control stations and accommodation and service spaces to ensure that at least one extinguisher of a suitable type is readily available for use in any part of such spaces. A total number of extinguishers in these spaces should be to the satisfaction of the competent authority.

5.12.2 Spare charges should be provided to the satisfaction of the competent authority.

5.13 Fire-extinguishing installations in machinery spaces

5.13.1 Vessels should be provided with suitable installations and equipment for the detection and fighting of fire.

5.13.2 Spaces containing main propelling machinery, internal combustion machinery with a total power output of 750 kW and more, oil-fired boilers, including central heating boilers, incinerators and fuel oil aggregates, should be provided with one of the following fixed fire-extinguishing systems, to the satisfaction of the competent authority:

- .1 a pressure water-spraying installation that may be supplied from a manually-operated pump or another means of pressurizing the system;
- .2 a fire-smothering gas installation; and
- .3 a fire-extinguishing installation using high expansion foam.

5.13.3 New installations of halogenated hydrocarbon systems used, as fire-extinguishing media should be prohibited on new and existing vessels.

5.13.4 Where the engine and boiler rooms are not entirely separated from each other or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms should be considered as one compartment.

5.13.5 Installations listed in 5.13.2 should be controlled from readily accessible positions outside such spaces not likely to be cut off by a fire in the protected space. Arrangements should be made to ensure the supply of power and water necessary for the operation of the system in the event of fire in the protected space.

5.13.6 Vessels which are mainly or completely built of wood or glass-fibre reinforced polyester and equipped with oil-fired boilers or internal combustion engines which, in terms of the machinery space, are covered with such material, should be equipped with one of the extinguishing systems referred to in 5.13.2.

5.14 Ready availability of fire-extinguishing appliances

Fire-extinguishing appliances should be kept in good order and continuously available for immediate use at all times when the vessel is in service.

5.15 Equivalence

Where in this chapter any special type of appliance, apparatus, extinguishing medium or arrangement is specified, any other type of appliance, etc. may be allowed provided that the competent authority is satisfied that it is not less effective.

CHAPTER 6

PROTECTION OF THE CREW

6.1 General protective measures

6.1.1 The surfaces of decks and of flooring in working spaces on board, such as machinery spaces, galleys, fish handling and deck equipment operating areas, and deck areas at the foot and head of ladders, should be specially designed and treated to minimize the possibility of personnel slipping.

6.1.2 An adequate system of lifelines should be provided and it should be complete with the necessary, wires, ropes, shackles, eye bolts and cleats.

6.1.3 For vessels being operated single handed, permanently fixed means should be provided to allow the operator to climb on board after an accidental fall overboard.

6.1.4 On single-handed vessels the competent authority should require an arrangement which is to ensure that if the operator falls overboard the engine will stop. Such an arrangement should not constitute a danger to the operator.

6.2 Deck openings

6.2.1 Hinged covers of hatchways, manholes and other openings should be protected against accidental closing.

6.2.2 Dimensions of access hatches should not be less than 600 mm by 500 mm or 500 mm diameter.

6.2.3 Having regard to the operation of the vessel, suitable protection should be provided, where practicable, in positions where there is a danger of personnel falling through deck openings.

6.2.4 Where practicable, handholds should be provided above the level of the deck over escape openings.

6.2.5 External hatches and doors should be closed when the vessel is at sea. All openings occasionally required to be kept open during fishing and which may lead to flooding should be closed immediately if such danger of filling occurs with subsequent loss of buoyancy and stability.

6.3 Bulwarks, rails and guards

6.3.1 Efficient bulwarks or guard rails should be fitted on all exposed parts of the working deck and on superstructure and deck erection decks. The height above deck of any fixed bulwark should be at least 600 mm for vessels of 12 m in length and at least 1 m for vessels of 24 m in length. For vessels of intermediate length the minimum height should be determined by linear interpolation. In every such vessel where the fixed bulwark is less than 1 m, guard rails supported by adequate portable stanchions or similar means should be fitted up to the prescribed

height of 1 m, provided that where this would interfere with the fishing operations of the vessel, alternative arrangements may be accepted by the competent authority.

6.3.2 Clearance below the lowest course of guard rails should not exceed 230 mm. Other courses should not be more than 250 mm apart, and the distance between stanchions, should not be more than 1.5 m. In a vessel with rounded gunwales, guard rail supports should be placed on the flat of the deck. Rails should be free from sharp edges and corners and should be of adequate strength.

6.3.3 Satisfactory means in the form of guard rails, lifelines, gangways or underdeck passages, etc. should be provided for the protection of the crew in getting to and from their quarters, machinery spaces and other working spaces. Storm rails should be fitted on the outside of all deckhouses and casings.

6.3.4 Where practical, having due regard to the need to prevent the retention of water on deck, bulwark heights may be reduced below the minimum prescribed in 6.3.1 to the satisfaction of the competent authority.

6.3.5 Where the height of a bulwark or guard rail is less than 1 m for the purpose of the fishing operation as provided for in 6.3.1, or where the effective height has been reduced through the fitting of a net or gear platform at deck level, additional provisions for the safety of the crew working in the area should be to the satisfaction of the competent authority.

6.3.6 Where a net roller is normally incorporated in the structure of a bulwark within the minimum height prescribed for the bulwark, or mounted between stanchions of a guard rail, provision should be made to protect the area when the roller is not in place.

6.3.7 Where part of a bulwark or guard rail has to be removed for the purpose of the fishing operation, protection for the crew should be provided at the opening.

6.4 Stairways and ladders

6.4.1 Stairways and ladders should be provided for safe working at sea and in port. They should be of adequate size and strength. Means of access to holds, 'tween-decks, bunkers and similar parts of a vessel should consist of fixed ladders or stairs. Treads of stairways should be flat and specially prepared to minimize slipping.

6.4.2 Fixed vertical ladders should be so situated as to be protected from damage and should be so fitted as to provide clearance of 150 mm behind. The rungs of steel vertical ladders should be made of square section steel bars with the sharp edge upwards. Where ladders are constructed with stringers, the rungs should pass through the stringers. Handholds should be provided where rungs or stringers are not suitable for this purpose.

6.4.3 Stairways of more than 1 m in height should have handrails or hand grips on both sides.

6.4.4 Emergency escape ladders should normally be fixed, but if they are portable, they should be stowed adjacent to the escape area and when required, they should be secured in place without the use of tools or mechanical aids.

6.4.5 Ladders in machinery spaces should preferably be at least 450 mm wide.

6.5 Accommodation ladders and gangways

6.5.1 Means should be provided, where practicable, to ensure sufficiently safe and convenient access to the vessel where facilities are not provided in the port. Such means should be of reliable material, safe construction and adequate strength.

6.5.2 Accommodation ladders should be provided with hooks or other suitable fastenings for adequate support and securing against displacement or slipping and be able to be adjusted to the height of the landing place.

6.6 Galleys

6.6.1 Galleys should be provided with guard rails and hand rails.

6.6.2 Cooking stoves should be fitted with guards to retain cooking utensils.

6.6.3 Where food processing equipment is installed, dangerous parts should be fitted with permanent safety guards.

6.7 Deck machinery, tackle and lifting gear

General

6.7.1 All elements of a fishing gear system, including warping heads, winches, warps, wires, tackle, nets, etc., should be designed, arranged and installed to provide safe and convenient operation. In so far as is possible, such components should be of a suitable strength so that, in the event of an overload strain, the failure will occur on the designated weak link in the system. All crew members should be made aware of the designated weak link in the system.

6.7.2 Warp guards should be fitted where practicable between warp lead rollers.

6.7.3 Sheaves and rollers should be guarded where practicable.

6.7.4 Chains or other suitable devices should be provided for “stoppering off”.

6.7.5 Wires and warps provided should be of adequate strength for the anticipated loads.

6.7.6 Where practicable, provision should be made to stop trawl boards swinging inboard, such as the fitting of a portable prevention bar at the gallows aperture or other equally effective means.

6.7.7 Lifting and running parts of the fishing gear should be of adequate strength for the anticipated loads.

6.7.8 Provision should be made for the stowage of bulky netting to allow for drainage and to prevent lateral movement. The stowage area should be of adequate dimensions to keep the centre of gravity of the stowed net to a minimum and to allow for the crew to work in safety when flaking down nets.

6.7.9 Moving parts of winches line and net hauling equipment and of warp and chain leads which may present a hazard should be as far as practicable adequately guarded and fenced.

6.7.10 Controls of winches, line and net hauling equipment, should be so placed that winch operators have ample room for their unimpeded operation and have as unobstructed a view as possible of the working area. Where possible, control handles should be arranged to return to the stop position when released and be provided, where necessary, with a suitable locking device in the stop/neutral position, to prevent accidental movements or displacement or unauthorized use. In general, winches and hauling equipment for fishing gear should be fitted with safety devices designed to prevent accidents.

6.7.11 The arrangement of the safety devices should also ensure that an emergency stop would be activated if a person is pulled towards a winch or other hauling equipment.

6.7.12 Quick release devices should preferably be fitted in the case of beam trawling and in purse seining that can be activated in an emergency from the wheelhouse and at the main control station if not in the wheelhouse.

6.7.13 The design and construction of winches, line and net hauling equipment should be such that the maximum effort necessary for operating handwheels, handles, crank handles, levers, etc. should not exceed 160 N and in the case of pedals not exceed 320 N.

Winches

6.7.14 The design of winch systems should ensure that when power is supplied to the winch, the control valves and levers, would always be in the stop/neutral position.

6.7.15 Winches should be provided with means to prevent overhoisting and to prevent the accidental release of a load if power supply fails. Where practicable, winches with wire storage drums should be fitted to avoid the need to use warping heads.

6.7.16 Winches should be equipped with brakes capable of effectively arresting and holding the safe working load. Brakes should be proof-tested before installation with a static load suitably in excess of the maximum safe working load to the satisfaction of the competent authority. Brakes should be provided with simple and easily accessible means of adjustment. Every winch drum, which could be uncoupled from the drive, should be furnished with a separate brake independent of the brake connected with the drive.

6.7.17 Where manually-operated "guiding on" gear is installed, the operating wheels should be without open spokes or protrusions that could cause injury to the operator and should be capable of being disengaged when the warps are paying out. Preferably the "guiding on" gear should be capable of being disengaged when the warps are paying out.

6.7.18 Where practicable, winches should be reversible.

6.7.19 Winch barrels should be provided with means for fastening wire ends, for instance clamps, shackles or other equally effective method which should be so designed as to prevent kinking of the wires.

6.7.20 Where a fishing winch is provided with local and remote controls, these should be so arranged as to prevent simultaneous operation. The operator should have a clear view of the winch and adjacent area from either position. An emergency cut-off should be provided at the winch and at the remote station as well as in the wheelhouse.

6.7.21 Where a fishing winch is controlled from the wheelhouse, an emergency control switch at the winch should be provided. Where a second control at the winch is required by the competent authority, the arrangement should be such as to make simultaneous control from both control positions impossible, as well as to show which control position is in operation. Where necessary, emergency switches for winches should be provided remote from the winch to protect fishermen working in places which are dangerous for operation of warps and trawl boards. Where a fishing winch is controlled from the bridge, the arrangements should be such that the operator has a direct or televised clear view of the winch and adjacent area.

Line and net hauling equipment

6.7.22 Line and net hauling equipment should be fitted with devices to ensure that the designated safe working load is not exceeded. Such devices should be tested to the satisfaction of the competent authority.

6.7.23 Where line and net hauling equipment is intended to be blocked or braked in the stop position, the arrangements should be tested to the satisfaction of the competent authority.

6.7.24 Where line and net hauling equipment is controlled from the wheelhouse or from a position remote from the equipment, means should be provided at the equipment to stop hauling and/or shooting in an emergency. In like manner, when the main controls are at the equipment, means should be provided in the wheelhouse to stop it in an emergency.

6.7.25 The arrangement of the safety devices should also ensure that an emergency stop would be activated if a person is pulled towards a line or net hauling equipment.

Lifting gear

6.7.26 Cranes should be well constructed of sound material and the design should conform with national standards that may be appropriate. They should be tested to the satisfaction of the competent authority and the crane should be marked with the designated maximum safe working load. In the case of a crane fitted with an extendable jib, the safe working load at various radii should be clearly marked as close as practical to the operating controls.

6.7.27 In general, cranes adapted to carry net hauling equipment should be so designed that in the fail safe condition, the hanging point of the jib should not be too high or extend so far beyond the bulwark that retrieval of fishing gear or equipment would endanger the crew.

6.7.28 The braking or blocking arrangements of a crane should be tested to at least 1.5 times the designated safe working load to the satisfaction of the competent authority.

6.7.29 Lifting and hoisting appliances, as well as derricks and similar equipment including all parts of the working gear thereof, whether fixed or movable, and all plant should be of good construction, reliable material, adequate strength and free from patent defect. They should be adequately and suitably anchored, supported or suspended having regard to the purpose for which they are used and should be marked with the safe working load. They should have easy access for maintenance. Guards should be provided to prevent any undesirable movement of lifted or hoisted parts, such as codend or fishing gear, which could present danger to the crew.

6.7.30 Lifting and hoisting appliances, as well as derricks, should be protected from overhoisting.

6.7.31 The competent authority should ensure that lifting and hoisting appliances, as well as derricks, should be tested at least every two years and the results entered in the record of the vessel.

6.7.32 No such appliance of a kind referred to in 6.7.27 nor any part or working gear thereof, should be taken into use for the first time or after it has undergone any substantial repair unless it has been tested and the result entered in the record of the vessel.

6.8 Lighting in working spaces and areas

6.8.1 All companion-ways, doors or other means of access should be illuminated on both sides of the opening to facilitate safe passage.

6.8.2 All passageways and working spaces and areas should be provided with artificial lighting to the satisfaction of the competent authority. Particular attention should be paid to Rule 20(b) of the International Regulations for Preventing Collisions at Sea, 1972.

6.8.3 Glare, dazzle or sudden contrasts of illumination should be eliminated to the extent possible taking into consideration the need for effective lighting for the safety of the crew on the working deck.

6.8.4 Provision should be made for some form of emergency lighting, which is independent of the normal supply.

6.8.5 Portable watertight lights should be provided as necessary and fitted with heavy-duty cables, bulb guards and lanyards. Such lights for use in spaces, which may contain explosive gases, should be either explosive proof or otherwise intrinsically safe to the satisfaction of the competent authority.

6.8.6 Where necessary to prevent danger, electric lamps should be protected by guards.

6.8.7 In order to avoid the stroboscopic effect of fluorescent lighting, double tube lamps should be used to illuminate working spaces with revolving machinery.

6.9 Ventilation in working and storage spaces

6.9.1 Ventilation in working and storage spaces should be in accordance with the provisions of 5.2.

6.9.2 Consideration should be given to providing ventilation for the protection of personnel entering fish holds and other spaces.

6.9.3 Where necessary to safeguard personnel, work places and storage spaces should be provided with an adequate system of heating and/or cooling.

6.10 Dangerous areas

6.10.1 Dangerous spaces or entrances thereto should be properly illuminated and marked and have warning signs prominently posted. Retro-reflective and fluorescent materials may be used to increase the conspicuousness. A notice should also be posted if a first aid procedure is appropriate.

6.10.2 A notice should be posted below radar and radio aerials warning that no work should be undertaken in the vicinity without authorization. A notice should also be posted at the operating controls of radar and radio equipment warning the operator that the equipment should not be started unless it is clear that no one is working near the aerials.

6.10.3 A working area, designated by the skipper as dangerous or requiring extra care, should be brought to the attention of the crew at regular briefing sessions on safety and to each new crew member on joining a vessel.

6.11 Fish processing equipment

6.11.1 Arrangement of fish processing equipment should ensure free access for inspection, operation and sanitary treatment of the equipment. Working areas in way of processing equipment should be not less than 750 mm wide.

6.11.2 Materials used to insulate fish processing equipment, including piping, should be non-combustible, durable and stable under conditions of vibration and should not have an external surface temperature harmful to personnel on contact. The insulation should be securely fastened.

6.11.3 Machinery and installations operating under pressure should comply with requirements of the competent authority.

6.11.4 Machinery and other installations from which vapour, gas, dust or other harmful substance may readily escape or be emitted during operation should be fitted with exhaust devices. Suction ends of these devices should be located as near as possible to the sources of vapour, gas, dust or other harmful substance and the piping should be so arranged that discharged products will not constitute a hazard to personnel.

6.11.5 Where conveyors are working in one line, emergency switches should be provided at intervals of not more than 3 m for stopping all conveyors working in the line. Where the length of a conveyor or series of conveyors is 10 m or more, sound or light signals should be provided for giving warning when the conveyor system starts.

6.11.6 Dampers, cocks, valves and other stopping devices should be positioned so that they are readily accessible and safe for operation.

6.11.7 Machinery and equipment in working spaces should be fitted on strong and rigid foundations securely connected to the vessel's structure.

6.11.8 Moving parts of machinery and other equipment or installations, as well as gear wheels, which may present a hazard, should be adequately guarded.

6.11.9 Machinery and installations which require routine servicing at a height of more than 2 m should be equipped with platforms of 600 mm in width and guarded with rails not less than 1 m in height.

6.11.10 Fish processing equipment operating with water should be provided with effective drainage systems, having regard to their extra susceptibility to clogging.

6.11.11 Adequate drainage should be provided to prevent the accumulation of water in enclosed spaces as a consequence of fish handling or fish processing.

6.11.12 Loading and unloading devices for fish processing machinery and equipment should be arranged at a safe and convenient height for operation.

6.11.13 Steam or vapour outlets from machinery and equipment such as liver boilers, should be arranged as high as possible. Outlet pipes should be at least 50 mm in diameter and lead into open air. Vapour from outlets should not obscure visibility.

6.11.14 Filling openings of machinery and other equipment, such as liver or fish oil boilers, should be within easy reach of personnel. Such openings should be fitted with lids with suitable means of closing so as to prevent steam, hot water or vapour escaping into the working space. The lids should also be counterbalanced or provided with other safe means of securing the lid in the open position.

6.12 Medicine chest, radio-medical services and hospital accommodation

6.12.1 First aid equipment and instructions as required by the competent authorities should be provided in all fishing vessels. International standards relating to first aid at sea laid down in the International Medical Guide for Ships, prepared by the International Labour Organization, the International Maritime Organization and the World Health Organization, may serve as a guide. In addition, in recent years regional guidelines have also been developed.*

6.12.2 Fishing vessels should carry an appropriate medical guide or instructions. The medical guide or instructions, should be illustrated, should explain how the medical supplies are to be used and should be designed to enable persons other than a doctor to care for the sick or injured on board both with and, if necessary, without medical advice by radio or satellite communication.

6.12.3 The medicine chest should contain equipment and medical supplies suitable for the expected service of the vessel (e.g., unlimited trips; trips of less than a certain distance from the nearest port with adequate medical equipment; service in harbours and very close to shore).

6.12.4 The competent authority should establish requirements for the periodic replacement of medicines to ensure they are not outdated and appropriate to any changes in the operational requirements of the vessel (e.g., change in geographic location).

6.12.5 Appropriate instructions and equipment should be provided to enable appropriate fishing vessel personnel to consult effectively with radio-medical services ashore.

* Refer to EU Council Directive 92/29/EEC on the minimum safety and health requirements for improved medical treatment on board vessels.

6.12.6 Appropriate hospital accommodation should be provided in accordance with international instruments.

6.12.7 Instructions and equipment necessary for safe medical evacuation by vessel, helicopter or other means should be carried on board.

6.12.8 Generally, all instructions should be in a language understood by the crew. Where possible, illustrations should be used to facilitate ease of understanding and communication.

6.13 Miscellaneous

6.13.1 Protective clothing and safety working equipment such as gloves, goggles, ear protectors, respirators, safety helmets, special footwear, and/or other apparel, oilskins, explosive gas and oxygen sufficiency indicators, etc. should be provided as appropriate to prevent injury or illness to personnel. The protective clothing and in particular oilskins, should have a highly visible colour, be reflectorized, and fit as closely to the body as possible. The protective clothing for crew members working on deck should be capable of supporting the wearer in the water in the event of being washed overboard. A buoyancy garment or a self-inflating working lifejacket could be used for this purpose.

6.13.2 All reasonable steps should be taken to minimize harmful noise and vibration.

6.13.3 A portable gas detector should be carried on board all fishing vessels which carry fish in bulk in their holds to enable the crew to ascertain whether it is safe to enter the fish-holds. A portable gas detector to test for leakage of refrigerant, should also be carried in a fishing vessel fitted with refrigeration machinery.

6.13.4 The skipper should ensure that the crew are made aware of the health hazards in connection with the carriage of fish in bulk and should advise the crew concerning safe working practices in this regard.

6.13.5 Effective lightning conductors should be fitted to all wooden masts or topmasts. In vessels built of steel, it is sufficient to fit spikes on steel masts. In vessels constructed of non-conductive material the lightning conductors should be connected by suitable conductors to a copper plate fixed to the vessel's hull well below the waterline.

6.13.6 The competent authority should ensure that fishing vessels that carry cargo and/or fishing equipment on deck and/or atop deckhouses, carry on board clear instructions in relation to:

- .1 the provisions in the stability booklet covering conditions of loading at various freeboards;
- .2 permitted loading conditions relative to weather conditions;
- .3 ensuring that cargo/fishing gear is not stowed in a manner that would obscure view from the bridge or obscure navigation lights and signals; and
- .4 ensuring that access to, and the operation of, essential equipment and machinery is not impeded.

CHAPTER 7

LIFE-SAVING APPLIANCES AND ARRANGEMENTS

PART A - GENERAL

7.1 Definitions

7.1.1 Float-free launching is that method of launching a survival craft whereby the craft is automatically released from a sinking vessel and is ready for use.

7.1.2 Free-fall launching is that method of launching a survival craft whereby the craft with its complement of persons and equipment on board is released and allowed to fall into the sea without any restraining apparatus.

7.1.3 Inflatable appliance is an appliance which depends upon non-rigid, gas-filled chambers for buoyancy and which is normally kept uninflated until ready for use.

7.1.4 Inflated appliance is an appliance which depends upon non-rigid, gas-filled chamber for buoyancy and which is kept inflated and ready for use at all times.

7.1.5 Launching appliance or arrangements is a means of transferring a survival craft or rescue boat from its stowed position safely to water.

7.1.6 Novel life-saving appliance or arrangements is a life-saving appliance or arrangement which embodies new features not fully covered by the provisions of this chapter but which provides an equal or higher standard of safety.

7.1.7 Rescue boat is a boat designed to rescue persons in distress and to marshal survival craft.

7.1.8 Retro-reflective material is a material which reflects in the opposite direction a beam of light directed on it.

7.1.9 Survival craft is a craft capable of sustaining the lives of persons in distress from the time of abandoning the vessel.

7.2 Evaluation, testing and approval of life-saving appliances and arrangements*

7.2.1 Except as provided in 7.2.6, life-saving appliances and arrangements to which this chapter refers should be approved by the competent authority.

7.2.2 Before giving approval to life-saving appliances and arrangements, the competent authority should ensure that such life-saving appliances and arrangements:

* Refer to the Revised recommendations on the testing of life-saving appliances, adopted by the Organization by resolution MSC.81(70), as revised, and the Code of practice for the evaluation, testing and acceptance of prototype novel life-saving appliances and arrangements, adopted by the Organization by resolution A.520(13).

- .1 are tested to confirm that they comply with the guidelines given in this chapter and with the recommendations of the Organization; or
- .2 have successfully undergone, to the satisfaction of the competent authority, tests which are substantially equivalent to those specified in the recommendations of the Organization.

7.2.3 Before giving approval to novel life-saving appliances or arrangements, the competent authority should ensure that such appliances or arrangements:

- .1 provide safety standards at least equivalent to the guidelines given in this chapter and the applicable provisions of the Protocol and have been evaluated and tested in accordance with the recommendations of the Organization; or
- .2 have successfully undergone, to the satisfaction of the competent authority, evaluation and tests which are substantially equivalent to those recommendations given in IMO resolutions on testing of life-saving appliances and arrangements.

7.2.4 Procedures adopted by the competent authority for approval should also include the conditions whereby approval would continue or would be withdrawn.

7.2.5 Part C of chapter VII of the Protocol should be used as guidance for the requirements for life-saving appliances.

7.2.6 Life-saving appliances referred to in this chapter for which specifications are not included in applicable provisions of the Protocol should be to the satisfaction of the competent authority.

7.3 Production tests

The competent authority should require proof that life-saving appliances have been subjected to such production tests as are necessary to ensure that the life-saving appliances are manufactured to the same standard as the approved prototype.

Part B – VESSEL REQUIREMENTS

7.4 Number and types of survival craft

7.4.1 Survival craft should comply with the applicable provisions of the Protocol. Alternatively, the competent authority may permit vessels to carry other types of approved survival craft, taking into account the vessel's navigational and operational condition.

7.4.2 The competent authority, taking into account the vessel's navigational area, conditions of operation and size of the vessel, may permit vessels to carry other types of survival craft of a type and number to the satisfaction of the competent authority. Such survival craft may be of rigid or semi-rigid construction or of a type that is permanently inflated and of strong abrasion resistant construction with subdivided buoyancy.

7.4.3 Vessels of 17 m in length and over should be provided with survival craft of sufficient aggregate capacity to accommodate at least 200% of the total number of persons on board.

A sufficient number of these survival craft to accommodate at least the total number of persons on board should be capable of being launched from each side of the vessel.

7.4.4 The competent authority, taking into account the vessel's navigational area, conditions of operation and size of the vessel, may allow the vessel to be fitted with survival craft of sufficient aggregate capacity to accommodate at least the total number of persons on board.

7.4.5 A vessel less than 17 m in length should carry survival craft of an aggregate capacity capable of accommodating all of the persons on board. The competent authority, taking into account the vessel's navigation area and conditions of navigation may require the vessel to be provided with additional survival craft.

7.4.6 Every vessel should carry adequate means of recovering persons from the water.

7.5 Availability and stowage of survival craft

7.5.1 Survival craft should:

- .1 be readily available in case of emergency;
- .2 be capable of being launched safely and rapidly under the conditions required by the applicable provisions of the Protocol;
- .3 be so stowed that:
 - .1 the marshalling of persons at the embarkation deck is not impeded;
 - .2 their prompt handling is not impeded;
 - .3 embarkation can be effected rapidly and in good order; and
 - .4 the operation of any other survival craft is not interfered with.

7.5.2 Survival craft and launching appliances should be in working order and available for immediate use before the vessel leaves port and kept so at all times when at sea.

7.5.3.1 Survival craft should be stowed to the satisfaction of the competent authority.

7.5.3.2 Every lifeboat should be attached to a separate set of davits or approved launching appliance.

7.5.3.3 Survival craft should be positioned as close to accommodation and service spaces as possible, stowed in suitable positions to ensure safe launching, with particular regard to clearance from the propeller.

7.5.3.4 Lifeboats for lowering down the vessel's side should be stowed with regard to steeply overhanging portions of the hull, so ensuring, as far as practicable, that they can be launched down the straight side of the vessel. If positioned forward, they should be stowed abaft the collision bulkhead in a sheltered position and in this respect the competent authority should give special consideration to the strength of the davits.

7.5.3.5 Liferafts should be so stowed as to be readily available in case of emergency in such a manner as to permit them to float free from their stowage and break free from the vessel in the event of its sinking. However, davit-launched liferafts need not float free.

7.5.3.6 Lashings, if used, should be fitted with an automatic release system of an approved type.

7.5.3.7 The competent authority, if satisfied that the constructional features of the vessel and the method of fishing operation may render it unreasonable and impractical to apply particular provisions of this paragraph, may accept relaxation from such provisions, provided that the vessel is fitted with alternative launching and recovering arrangements adequate for the service for which it is intended.

7.5.4 All survival craft should be marked with the same registration or other identification marks as used for the vessel as referred to in 7.15.1.

7.6 Embarkation into survival craft

Suitable arrangements should be made for embarkation into the survival craft which should include:

- .1 at least one ladder, or other approved means, on each side of the vessel to afford access to the survival craft when waterborne, except where the competent authority is satisfied that the distance from the point of embarkation to the waterborne survival craft is such that a ladder is unnecessary;
- .2 means for illuminating the stowage position of survival craft and their launching appliances during preparation for and the process of launching, and also for illuminating the water into which the survival craft are launched until the process of launching is completed, the power for which to be supplied from the emergency source required by 4.11;
- .3 arrangements for warning all persons on board that the vessel is about to be abandoned; and
- .4 means for preventing any discharge of water into the survival craft.

7.7 Lifejackets

7.7.1 For every person on board, a lifejacket of an approved type should be carried. Lifejackets should comply with the provisions of the Recommendations for testing lifejackets, reproduced at annex V.

7.7.2 Lifejackets should be so placed as to be readily accessible and their position should be plainly indicated.

7.8 Immersion suits and thermal protective aids

7.8.1 For vessels operating in areas where low water or air temperature can be expected, an approved immersion suit of an appropriate size should be provided for every person on board.

7.8.2 Where the competent authority considers that water or air temperatures in the area of operations of the vessel warrant immersion suits with inherent insulation, these suits should be provided for every person on board.

7.8.3 Immersion suits should be placed as to be readily accessible and their position should be clearly indicated.

7.9 Lifebuoys

7.9.1 Vessels less than 17 m in length should be provided with at least two lifebuoys one of which should be attached to a buoyant line of not less than 30 m in length.

7.9.2 Vessels of 17 m in length and over should be provided with at least three lifebuoys.

7.9.3 On every vessel, at least one of the lifebuoys should be provided with self-igniting lights.

7.9.4 At least one of the lifebuoys provided with self-igniting lights in accordance with 7.9.3 should be provided with self-activating smoke signals.

7.9.5 Where three lifebuoys are required, at least one lifebuoy on each side of the vessel should be fitted with a buoyant lifeline of not less than 30 m in length. At least one lifebuoy should not be fitted with a buoyant line. Such lifebuoys, fitted with buoyant lines, should not have self-igniting lights.

7.9.6 All lifebuoys should be so placed as to be readily accessible to the persons on board and should always be capable of being rapidly cast loose and should not be permanently secured in any way.

7.9.7 All lifebuoys should be in a bright contrasting colour to the sea and marked with the same registration or other identification marks as used for the vessel as referred to in 7.15.1.

7.10 Distress signals

7.10.1 Every vessel should be provided, to the satisfaction of the competent authority, with means of making effective distress signals by day and by night, including at least four rocket parachute flares.

7.10.2 Distress signals should be of an approved type. They should be so placed as to be readily accessible and their position should be plainly indicated.

7.11 Radio life-saving appliances

7.11.1 Vessels should be equipped with suitable communications equipment having regard to the area of operation and the vessel's intended service.

7.11.2 Where two-way VHF radiotelephone apparatus is required by the competent authority, such apparatus should conform to performance standards not inferior to those adopted by the competent authority, having regard to those adopted by the Organization.

7.11.3 If a fixed two-way VHF radiotelephone apparatus is fitted in a survival craft it should conform to performance standards not inferior to those adopted by the competent authority, having regard to those adopted by the Organization.

7.12 Radar transponders*

At least one radar transponder should be carried on every vessel. Such radar transponders should conform to performance standards not inferior to those adopted by the competent authority, having regard to those adopted by the Organization. It should be stowed in such a location that it can be rapidly placed in any survival craft.

7.13 Retro-reflective materials on life-saving appliances

All survival craft, rescue boats, lifejackets, immersion suits and lifebuoys should be fitted with retro-reflective material in accordance with the recommendations of the Organization.

7.14 Operational readiness, maintenance and inspections

Operational readiness

7.14.1 Before the vessel leaves port and at all times during the voyage, all life-saving appliances should be in working order and ready for immediate use.

Maintenance

7.14.2 Instructions for on-board maintenance of life-saving appliances should be carried on board.

Maintenance of falls

7.14.3 Falls used in launching should be turned end for end at intervals of not more than 30 months and be renewed when necessary due to deterioration of the falls or at intervals of not more than five years, whichever is the earlier.

Spares and repair equipment

7.14.4 Spares and repair equipment should be provided for life-saving appliances and their components which are subject to excessive wear or consumption and need to be replaced regularly.

Weekly inspection

7.14.5 The following tests and inspections should be carried out weekly:

- .1 all survival craft and launching appliances should be visually inspected to ensure that they are ready for use;

* Refer to the Performance standards for survival craft radar transponders for use in search and rescue operations, adopted by the Organization by resolution A.802(19).

- .2 all engines in lifeboats should be run ahead and astern for a total period of not less than 3 min, provided the ambient temperature is above the minimum temperature required for starting the engine; and
- .3 the general emergency alarm system should be tested.

Monthly inspections

7.14.6 Inspection of the life-saving appliances, including lifeboat equipment, should be carried out monthly, using a checklist to ensure that they are complete and in good order. A report of the inspection should be entered in the log book.

Servicing of inflatable liferafts, inflatable lifejackets

7.14.7 Every inflatable liferaft and inflatable lifejacket should be serviced:

- .1 at intervals not exceeding 12 months. However, in cases where it appears proper and reasonable, the competent authority may extend this period to 17 months;
- .2 at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

Periodic servicing of hydrostatic release units

7.14.8 Hydrostatic release units should be serviced:

- .1 at intervals not exceeding 12 months. However, in cases where it appears proper and reasonable, the competent authority may extend this period to 17 months; and
- .2 at a servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

7.14.9 In cases of vessels where the nature of fishing operations may cause difficulty for compliance with the provisions of 7.14.7 and 7.14.8, the competent authority may allow the extension of the service intervals to 24 months, provided that the competent authority is satisfied that such appliances are so manufactured and arranged that they will remain in satisfactory condition until the next period of servicing.

7.14.10 Hydrostatic release units of disposable design should be replaced at or before the expiry date. Nevertheless, the competent authority should inspect the release units during statutory inspections of other life-saving equipment and if found defective they should be replaced, not serviced.

7.15 Miscellaneous

7.15.1 To facilitate aerial rescue operations, wheelhouse tops or other prominent horizontal surfaces should be painted in a highly visible colour and should bear the vessel's registration or other identification marks in letters and/or numerals in contrasting colours to the background.

Similar marks on the sides of the wheelhouse would also facilitate search and identification by high-speed aircraft.*

7.15.2 The skipper should ensure that the crew is adequately trained in the use and inspection of life-saving appliances and that regular inspection of the equipment is carried out.

PART C – LIFE-SAVING APPLIANCES REQUIREMENTS

Part C of chapter VII of Part B of the Code of Safety for Fishermen and Fishing Vessels, may be used as guidance for the requirements for life-saving appliances.

* Marking of fishing vessels and fishing gear for identification should be in accordance with uniform and internationally recognizable vessel and gear marking systems, such as the Food and Agriculture Organization of the United Nations Standard Specifications for the Marking and Identification of Fishing Vessels.

CHAPTER 8

EMERGENCY PROCEDURES, MUSTERS AND DRILLS

8.1 General emergency alarm system, muster list and emergency instructions

8.1.1 The general emergency alarm system should be capable of sounding the general alarm signal consisting of seven or more short blasts followed by one long blast on the vessel's whistle or siren and additionally on an electrically operated bell or klaxon or other equivalent warning system which should be powered from the vessel's main supply and the emergency source of electrical power required by 4.11. As an alternative, an appropriate manual system should be used on vessels of a length less than 17 m.

8.1.2 All vessels should be provided with clear instructions for each crew member which should be followed in case of emergency.

8.1.3 The muster list should be posted up in several parts of the vessel and, in particular, in the wheelhouse, the engine room and in the crew accommodation and should include the information specified in the following paragraphs.

8.1.4 The muster list should specify details of the general alarm signal prescribed by 8.1.1 and also the action to be taken by the crew when this alarm is sounded. The muster list should also specify how the order to abandon ship will be given.

8.1.5 The muster list should show the duties assigned to the different members of the crew including:

- .1 closing of watertight doors, fire doors, valves, scuppers, overboard shoots, sidescuttles, skylights, portholes and other similar openings in the vessel;
- .2 equipping the survival craft and other life-saving appliances;
- .3 preparation and launching of survival craft;
- .4 general preparation of other life-saving appliances;
- .5 use of communication equipment; and
- .6 manning of fire parties assigned to deal with fires.

8.1.6 The competent authority may permit relaxation of the requirements of 8.1.5 if satisfied that, due to the small number of crew members, no muster list is necessary.

8.1.7 The muster list should specify which of the crew members are assigned to ensure that the life-saving and fire appliances are maintained in good condition and are ready for immediate use.

8.1.8 The muster list should specify substitutes for key persons who may become disabled, taking into account that different emergencies may call for different actions.

8.1.9 The muster list should be prepared before the vessel proceeds to sea. After the muster list has been prepared, if any change takes place in the crew which necessitates an alteration in the muster list, the skipper should either revise the list or prepare a new list.

8.2 Abandon ship training and drills

Practice musters and drills

8.2.1 Each member of the crew should participate in at least one abandon ship drill and one fire drill every month. However, the competent authority may modify this requirement, provided that at least one abandon ship and one fire drill is held at least every three months. The drills of the crew should take place within 24 hours of the vessel leaving a port if more than 25% of the crew have not participated in abandon ship and fire drills on board that particular vessel in the previous muster. The competent authority may accept other arrangements that are at least equivalent for those classes of vessel for which this is impracticable.

8.2.2 The provisions of 8.2.2 to 8.2.10 in Part B of the Code of Safety for Fishermen and Fishing Vessels may be used as guidance when determining how to practice musters and drills.

On-board training and instructions

8.2.3 On-board training in the use of the vessel's life-saving appliances, including survival craft equipment, should be given as soon as possible but not later than 2 weeks after a crew member joins the vessel. However, if the crew member is on a regularly scheduled rotating assignment to the vessel, such training should be given not later than 2 weeks after the time of first joining the vessel.

8.2.4 Instructions in the use of the vessel's life-saving appliances and in survival at sea should be given at the same intervals as the drills. Individual instruction may cover different parts of the vessel's life-saving system, but all the vessel's life-saving equipment and appliances should be covered within any period of 2 months. Each member of the crew should be given instructions which should include but not necessarily be limited to:

- .1 operation and use of the vessel's inflatable liferafts, including precautions concerning nailed shoes and other sharp objects;
- .2 problems of hypothermia, first-aid treatment for hypothermia and other appropriate first-aid procedures; and
- .3 special instructions necessary for use of the vessel's life-saving appliances in severe weather and severe sea conditions.

Records

8.2.5 The date when musters are held, details of abandon ship drills and fire drills, drills of other life-saving appliances and on-board training should be recorded, to the satisfaction of the competent authority, in a log book.

Training manual

8.2.6 A training manual should be provided. The training manual, which may comprise several volumes, should contain instructions and information, in easily understood terms illustrated wherever possible, on the life-saving appliances provided on the vessel and on the best methods of survival. Any part of such information may be provided in the form of audio-visual aids in lieu of the manual. The provisions of 8.2.15 in Part B of the Code of Safety for Fishermen and Fishing Vessels may be used as guidance when determining the content of the training manual.

8.3 Training in emergency procedures

Crews should be adequately trained, to the satisfaction of the competent authority, in their duties in the event of emergencies. The provisions of 8.3 in Part B of the Code of Safety for Fishermen and Fishing Vessels and the joint FAO/ILO/IMO Document for guidance on training and certification of fishing vessel personnel, as amended, may be used as guidance when determining items to be included in such training.

CHAPTER 9

RADIOCOMMUNICATIONS

PART A – GENERAL

9.1 Application

9.1.1 This chapter should apply to new and existing fishing vessels.

9.1.2 No provision in this chapter should prevent the use by any vessel, survival craft or person in distress of any means at its disposal to attract attention, make known its position and obtain help.

9.1.3 For the purpose of this chapter, the following terms should have the meanings defined below.

9.1.3.1 *Bridge-to-bridge communications* means safety communications between vessels from the position from which the vessels are normally navigated.

9.1.3.2 *Continuous watch* means that the radio watch concerned shall not be interrupted other than for brief intervals when the vessel's receiving capability is impaired or blocked by its own communications or when the facilities are under periodical maintenance or checks.

9.1.3.3 *Digital selective calling (DSC)* means a technique using digital codes which enables a radio station to establish contact with, and transfer information to, another station or group of stations, and complying with the relevant recommendations of the International Radio Consultative Committee (CCIR).

9.1.3.4 *Direct-printing telegraphy* means automated telegraphy techniques which comply with the relevant recommendations of the CCIR.

9.1.3.5 *General radiocommunications* means operational and public correspondence traffic, other than distress, urgency and safety messages, conducted by radio.

9.1.3.6 *Inmarsat* means the Organization established by the Convention on the International Maritime Satellite Organization adopted on 3 September 1976.

9.1.3.7 *International NAVTEX service* means the co-ordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language.*

9.1.3.8 *Locating* means the finding of ships, vessels, aircraft, units or persons in distress.

9.1.3.9 *Maritime safety information* means navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to vessels.

* Refer to the NAVTEX *Manual* approved by the Organization (publication IMO-951E).

9.1.3.10 *Polar orbiting satellite service* means a service which is based on polar orbiting satellites which receive and relay distress alerts from satellite emergency position-indicating radio beacons (satellite EPIRBs) and which provides their position.

9.1.3.11 *Radio Regulations* means the Radio Regulations annexed to, or regarded as being annexed to, the most recent International Telecommunication Convention which is in force at any time.

9.1.3.12 *Sea area A1* means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Party.*

9.1.3.13 *Sea area A2* means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Party.*

9.1.3.14 *Sea area A3* means an area, excluding sea areas A1 and A2, within the coverage of an Inmarsat geostationary satellite in which continuous alerting is available.

9.1.3.15 *Sea area A4* means an area outside sea areas A1, A2 and A3.

All other terms and abbreviations which are used in this chapter and which are defined in the Radio Regulations should have the meanings as defined in those Regulations.

9.2 Exemptions

9.2.1 It is highly desirable not to deviate from the requirements of this chapter; nevertheless the competent authority may grant partial or conditional exemptions to individual vessels from the requirements of 9.5 to 9.9, provided:

- .1 such vessels comply with the functional requirements of 9.3; and
- .2 the competent authority has taken into account the effect such exemption may have upon the general efficiency of the service for the safety of all ships and vessels.

9.2.2 An exemption may be permitted under paragraph 9.2.1 only:

- .1 if the conditions affecting safety are such as to render the full application of 9.5 to 9.9 unreasonable or unnecessary; or
- .2 in exceptional circumstances, for a single voyage outside the sea area or sea areas for which the vessel is equipped.

9.2.3 The competent authority may exempt vessels operating always together in pair or in groups from being fully equipped in accordance with the requirements, provided that:

- .1 the vessel in command fully complies with the requirements of the actual sea area;

* Refer to the Provision of Radio Services for the Global Maritime Distress and Safety System (GMDSS) adopted by the Organization by resolution A.704(17).

- .2 the other vessels in pair or in groups carry radio equipment sufficient for short distance distress alert and radiocommunications with the vessel in command, to the satisfaction of the competent authority. Vessels “operating in a pair or group” is defined as two or more vessels operating collaboratively within a 100 nautical miles of each other except for extremely brief periods; and
- .3 this exemption does not apply to EPIRB carriage requirements.

9.3 Functional requirements

Every vessel, while at sea, should be capable:

- .1 except as provided in 9.6.1.1 and 9.8.1.4.3, of transmitting ship-to-shore distress alerts by at least two separate and independent means, each using a different radiocommunication service;
- .2 of receiving shore-to-ship distress alerts;
- .3 of transmitting and receiving ship-to-ship distress alerts;
- .4 of transmitting and receiving search and rescue co-ordinating communications;
- .5 of transmitting and receiving on-scene communications;
- .6 of transmitting and, as required by regulation X/3(6) of the Protocol, receiving signals for locating;
- .7 of transmitting and receiving maritime safety information;
- .8 of transmitting and receiving general radiocommunications to and from shore-based radio systems or networks subject to 9.13.7; and
- .9 of transmitting and receiving bridge-to-bridge communications.

PART B - SHIP REQUIREMENTS

9.4 Radio installations

9.4.1 Every vessel should be provided with radio installations capable of complying with the functional requirements prescribed by 9.3 throughout its intended voyage and, unless relaxed under 9.2, complying with the requirements of 9.5 and, as appropriate for the sea area or areas through which it will pass during its intended voyage, the requirements of either 9.5, 9.6, 9.7 or 9.8.

9.4.2 Every radio installation should:

- .1 be so located that no harmful interference of mechanical, electrical or other origin affects its proper use, and so as to ensure electromagnetic compatibility and avoidance of harmful interaction with other equipment and systems;

- .2 be so located as to ensure the greatest possible degree of safety and operational availability;
- .3 be protected against harmful effects of water, extremes of temperature and other adverse environmental conditions;
- .4 be provided with reliable, permanently arranged electrical lighting, independent of the main and emergency sources of electrical power, for the adequate illumination of the radio controls for operating the radio installation; and
- .5 be clearly marked with the call sign, the ship station identity and other codes as applicable for the use of the radio installation. This includes the Maritime Mobile Service Identities (MMSI).

9.4.3 Control of the VHF radiotelephone channels, required for navigational safety, should be immediately available on the navigation bridge convenient to the conning position and, where necessary, facilities should be available to permit radiocommunications from the wings of the navigation bridge. Portable VHF equipment may be used to meet the latter provision.

9.5 Radio equipment - General

9.5.1 Every vessel should be provided with:

- .1 a VHF radio installation capable of transmitting and receiving:
 - .1 DSC on the frequency 156.525 MHz (channel 70). It should be possible to initiate the transmission of distress alerts on channel 70 from the position from which the vessel is normally navigated; and
 - .2 radiotelephony on the frequencies 156.300 MHz (channel 6), 156.650 MHz (channel 13) and 156.800 MHz (channel 16);
- .2 a VHF DSC watch receiver which may be separate from, or combined with, that required by 9.5.1.1.1;
- .3 a radar transponder capable of operating in the 9 GHz band, which:
 - .1 should be so stowed that it can be easily utilized; and
 - .2 may be one of those required by 7.12 for a survival craft;
- .4 a receiver capable of receiving international NAVTEX service broadcasts if the ship is engaged on voyages in any area in which an international NAVTEX service is provided. However, if a NAVTEX service is not established in the actual area the competent authority may permit vessels to receive navigational warnings and safety messages by other means of reception, to the satisfaction of the competent authority;
- .5 a radio facility for reception of maritime safety information by the Inmarsat enhanced group calling system if the vessel is engaged on voyages in any area of

Inmarsat coverage but in which a NAVTEX or an alternative service is not provided. However, vessels engaged exclusively on 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 exempted from this requirement;

- .6 a satellite emergency position-indicating radio beacon (satellite EPIRB) which should be:
 - .1 capable of transmitting a distress alert either through the polar orbiting satellite service operating in the 406 MHz band or, if the vessel is engaged only on voyages within Inmarsat coverage, through the Inmarsat geostationary satellite service operating in the 1.6 GHz band;
 - .2 installed in an easily accessible position;
 - .3 ready to be manually released and capable of being carried by one person into a survival craft;
 - .4 capable of floating free if the vessel sinks and of being automatically activated when afloat; and
 - .5 capable of being activated manually.

9.6 Radio equipment - Sea area A1 or sea areas within the coverage of a VHF coast station (without DSC) operating on a 24 hours a day, 7 days a week basis

9.6.1 In addition to meeting the requirements of 9.5, every vessel engaged on voyages exclusively in sea area A1 should be provided with a radio installation capable of initiating the transmission of ship-to-shore distress alerts from the position from which the vessel is normally navigated, operating either:

- .1 on VHF using DSC; this requirement may be fulfilled by the EPIRB prescribed by 9.6.3, either by installing the EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated; or
- .2 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by 9.5.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated; or
- .3 if the vessel is engaged on voyages within coverage of MF coast stations equipped with DSC, on MF using DSC; or
- .4 on HF using DSC; or
- .5 through the Inmarsat geostationary satellite service; this requirement may be fulfilled by:
 - .1 an Inmarsat ship-earth station; or

- .2 the satellite EPIRB, required by 9.5.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated.

9.6.2 The VHF radio installation, required by 9.5.1.1, should also be capable of transmitting and receiving general radiocommunications using radiotelephony.

9.6.3 Vessels engaged on voyages exclusively in sea area A1 may carry, in lieu of the satellite EPIRB required by 9.5.1.6, an EPIRB which should be:

- .1 capable of transmitting a distress alert using DSC on VHF channel 70 and providing for locating by means of a radar transponder operating in the 9 GHz band;
- .2 installed in an easily accessible position;
- .3 ready to be manually released and capable of being carried by one person into a survival craft;
- .4 capable of floating free if the vessel sinks and being automatically activated when afloat; and
- .5 capable of being activated manually.

9.7 Radio equipment - Sea areas A1 and A2 or sea areas within the coverage of an MF coast station (without DSC) providing a continuous watch on 2182 kHz as well as a continuously operating VHF station

9.7.1 In addition to meeting the requirements of 9.5 and 9.6, every vessel engaged on voyages beyond sea area A1, but remaining within sea area A2, should be provided with:

- .1 an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies:
 - .1 2,187.5 kHz using DSC; and
 - .2 2,182 kHz using radiotelephony;
- .2 a radio installation capable of maintaining a continuous DSC watch on the frequency 2,187.5 kHz which may be separate from or combined with, that required by 9.7.1.1; and
- .3 means of initiating the transmission of ship-to-shore distress alerts by a radio service other than MF operating either:
 - .1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by 9.5.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated; or
 - .2 on HF using DSC; or

- .3 through the Inmarsat geostationary satellite service; this requirement may be fulfilled by an Inmarsat ship-earth station, or by the satellite EPIRB, required by 9.5.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated.

9.7.2 It should be possible to initiate transmission of distress alerts by the radio installations specified in 9.7.1.1 and 9.7.1.3 from the position from which the vessel is normally navigated.

9.7.3 The vessel should, in addition, be capable of transmitting and receiving general radiocommunications using radiotelephony or direct-printing telegraphy by either:

- .1 a radio installation operating on working frequencies in the bands between 1,605 kHz and 4,000 kHz or between 4,000 kHz and 27,500 kHz. This requirement may be fulfilled by the addition of this capability in the equipment required by 9.7.1.1; or
- .2 an Inmarsat ship-earth station.

9.7.4 If the vessel is operating exclusively within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is not available, but is providing a continuous watch on 2182 kHz, the vessel need not to be equipped with the DSC functions mentioned above in paragraphs 9.5.1.1, 9.5.1.2, 9.7.1.1 to 9.7.1.3.

9.8 Radio equipment - Sea areas A1, A2 and A3

9.8.1 In addition to meeting the requirements of 9.5, 9.6 and 9.7, every vessel engaged on voyages beyond sea areas A1 and A2, but remaining within sea area A3, should, if it does not comply with the requirements of 9.8.2, be provided with:

- .1 an Inmarsat ship-earth station capable of:
 - .1 transmitting and receiving distress and safety communications using either radiotelephony or direct-printing telegraphy;
 - .2 initiating and receiving distress priority calls;
 - .3 maintaining watch for shore-to-ship distress alerts, including those directed to specifically defined geographical areas;
 - .4 transmitting and receiving general radiocommunications, using either radiotelephony or direct-printing telegraphy; and
- .2 an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies:
 - .1 2,187.5 kHz using DSC; and
 - .2 2,182 kHz using radiotelephony, and

- .3 a radio installation capable of maintaining a continuous DSC watch on the frequency 2,187.5 kHz which may be separate from or combined with that required by 9.8.1.2.1; and
- .4 means of initiating the transmission of ship-to-shore distress alerts by a radio service operating either:
 - .1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by 9.5.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated; or
 - .2 on HF using DSC; or
 - .3 through the Inmarsat geostationary satellite service, by an additional ship-earth station or by the satellite EPIRB required by 9.5.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated.

9.8.2 In addition to meeting the requirements of 9.5, 9.6, and 9.7, every vessel engaged on voyages beyond sea areas A1 and A2, but remaining within sea area A3, should, if it does not comply with the requirements of 9.8.1, be provided with:

- .1 an MF/HF radio installation capable of transmitting and receiving, for distress and safety purposes, on all distress and safety frequencies in the bands between 1,609 kHz and 4,000 kHz and between 4,000 kHz and 27,500 kHz:
 - .1 using DSC; and
 - .2 using radiotelephony;
- .2 equipment capable of maintaining DSC watch on 2,187.5 kHz, 8,414.5 kHz and on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz; at any time, it should be possible to select any of these DSC distress and safety frequencies. This equipment may be separate from, or combined with, the equipment required by 9.8.2.1; and
- .3 means of initiating the transmission of ship-to-shore distress alerts by a radiocommunication service other than HF operating either:
 - .1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by 9.5.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated; or
 - .2 through the Inmarsat geostationary satellite service; this requirement may be fulfilled by an Inmarsat ship-earth station or the satellite EPIRB, required by 9.5.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the vessel is normally navigated.

9.8.3 It should be possible to initiate transmission of distress alerts by the radio installations specified in 9.8.1.1, 9.8.1.2, 9.8.1.4, 9.8.2.1 and 9.8.2.3 from the position from which the vessel is normally navigated.

9.9 Additional note on relaxation - Sea area A3

9.9.1 Notwithstanding the provisions of 9.5, the competent authority may permit exemption of the provisions of 9.5.1.1 and 9.5.1.2 in areas where such shore-based services are not available.

9.10 Watches

9.10.1 Every vessel, while at sea, should maintain either a continuous watch:

- .1 on VHF DSC channel 70, if the vessel, in accordance with the requirements of 9.5.1.2, is fitted with a VHF radio installation;
- .2 on the distress and safety DSC frequency 2,187.5 kHz, if the vessel, in accordance with the requirements of 9.7.1.2 or 9.8.1.3, is fitted with an MF radio installation;
- .3 on the distress and safety DSC frequencies 2,187.5 kHz and 8,414.5 kHz and also on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz, appropriate to the time of day and the geographical position of the vessel, if the vessel, in accordance with the requirements of 9.8.2.2, is fitted with an MF/HF radio installation. This watch may be kept by means of a scanning receiver;
- .4 for satellite shore-to-ship distress alerts, if the vessel, in accordance with the requirements of 9.8.1.1, is fitted with an Inmarsat ship-earth station; or
- .5 on the radiotelephone distress frequency 2,182 kHz if the vessel is operating within the radiotelephone coverage of an MF coast station in which continuous DSC alerting is not available or is not fitted with the MF DSC functions in paragraphs 9.7.1.1 and 9.7.1.2. This watch should be kept at the position from which the vessel is normally navigated.

9.10.2 Every vessel, while at sea, should maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the area in which the vessel is navigating.

9.10.3 Every vessel, while at sea, should maintain, when practicable, a continuous listening watch on VHF channel 16.

9.11 Sources of energy

9.11.1 There should be available at all times, while the vessel is at sea, a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a reserve source or sources of energy for the radio installations.

9.11.2 A reserve source or sources of energy should be provided on every vessel, to the satisfaction of the competent authority, to supply radio installations, for the purpose of conducting distress and safety radiocommunications, in the event of failure of the vessel's main

and emergency source of electrical power. The reserve source of energy should be capable of simultaneously operating:

- .1 the VHF radio installation in sea area A1;
- .2 the VHF radio installation and the MF or MF/HF installation in sea area A2;
- .3 the VHF radio installation and the MF or MF/HF installation or the Inmarsat station in sea area A3; and
- .4 for a period of at least 3 h.

The reserve source of energy need not supply independent HF and MF radio installation at the same time.

9.11.3 The reserve source or sources of energy should be independent of the propelling power of the vessel and the vessel's electrical system.

9.11.4 The reserve source or sources of energy may be used to supply the electrical lighting required by 9.4.2.4.

9.11.5 Where a reserve source of energy consists of a rechargeable accumulator battery or batteries:

- .1 a means of automatically charging such batteries should be provided which should be capable of recharging them to minimum capacity requirements within 10 h; and
- .2 the capacity of the battery or batteries should be checked using an appropriate method, at intervals not exceeding 12 months.

9.12 Performance standards

All equipment to which this chapter applies should be of a type approved by the competent authority. Such equipment, except for the domestic radio installation and its ancillary equipment, should conform to appropriate performance standards approved by the competent authority, having regard to those adopted by the Organization.

9.13 Maintenance requirements

9.13.1 Equipment should be so designed that the main units can be replaced readily, without elaborate re-calibration or readjustment.

9.13.2 Where applicable, equipment should be so constructed and installed that it is readily accessible for inspection and onboard maintenance purposes.

9.13.3 Adequate information should be provided to enable the equipment to be properly operated and maintained taking into account the recommendations of the Organization.

9.13.4 Adequate tools and spares should be provided to enable the equipment to be maintained.

9.13.5 The competent authority should ensure that radio equipment required by this chapter is maintained to provide the availability of the functional requirements specified in 9.3 and to meet the recommended performance standards of such equipment.

9.13.6 On vessels engaged on voyages in sea area A3, the availability should be ensured by using such methods as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, or a combination of these, as may be approved by the competent authority.

9.13.7 While all reasonable steps should be taken to maintain the equipment in efficient working order to ensure compliance with all the functional requirements specified in 9.3, malfunction of the equipment for providing the general radiocommunications required by 9.3.8 should not be considered as making a vessel unseaworthy or as a reason for delaying the vessel in ports where repair facilities are not readily available, provided the vessel is capable of performing all distress and safety functions.

9.13.8 Satellite EPIRBs should be tested at intervals not exceeding 12 months for all aspects of operational efficiency with particular emphasis on frequency stability, signal strength and coding. However, in cases where it appears proper and reasonable, the Administration may extend this period to 17 months. The test may be conducted on board the vessel or at an approved testing or servicing station.

9.14 Radio personnel

Every vessel should carry personnel qualified for distress and safety radiocommunications purposes to the satisfaction of the competent authority any one of whom should be designated to have primary responsibility for radiocommunications during distress incidents. The personnel should be holders of certificates specified in the Radio Regulation as appropriate. Alternatively, national certificates based on the same requirements as the Radio Regulation, but taking account of particular local circumstances, may be issued.

9.15 Radio records

A record should be kept, to the satisfaction of the competent authority and as required by the Radio Regulations, of all incidents connected with the radiocommunication service which appear to be of importance to safety of life at sea.

9.16 Position-updating

All two-way communication equipment carried on board a vessel to which this chapter applies which is capable of automatically including the vessel's position in the distress alert should be automatically provided with this information from an internal or external navigation receiver, if either is installed. If such a receiver is not installed, the vessel's position and the time at which the position was determined should be manually updated at intervals not exceeding four hours, while the vessel is underway, so that it is always ready for transmission by the equipment.

CHAPTER 10

SHIPBORNE NAVIGATIONAL EQUIPMENT AND ARRANGEMENTS

10.1 Shipborne navigational equipment*

10.1.1 Vessels should be fitted with a standard magnetic compass, except as provided in paragraph 10.1.2. The magnetic compass should be properly adjusted and its table or curve of residual deviations should be available at all times.

10.1.2 The competent authority, if it considers it unreasonable or unnecessary to require a standard magnetic compass, may exempt individual vessels or classes of vessels from these requirements, if the nature of the voyage, the vessel's proximity to land or the type of vessel does not warrant a standard compass, provided that a suitable steering compass is in all cases carried.

10.1.3 It should be possible to read the compass by day and by night from the steering position. Magnetic compasses should be provided with means for adjustment; securing devices for compasses and compensators should be made of nonmagnetic materials. Compasses should be sited as near the fore-and-aft line of the vessels as practicable, with the lubber line, as accurately as possible, parallel with the fore-and-aft line.

10.1.4 In vessels equipped with an auto-pilot system actuated by a magnetic sensor, which does not indicate the vessel's heading, suitable means should be provided to show this information.

10.1.5 Consideration should be given to fitting vessels with radar. In vessels, where radar is fitted, the installation should be capable of operating in the 9 GHz frequency band.

10.1.6 Vessels should be provided with suitable means to the satisfaction of the competent authority for determining the depth of water under the vessel. Where fish-finding devices are fitted, they could be used for that purpose.

10.1.7 If practicable, every vessel should be equipped with radar reflector meeting the internationally accepted performance standards for such devices, unless the vessel is built of steel.

10.1.8 All equipment fitted in compliance with this section should be to the satisfaction of the competent authority.

10.2 Nautical instruments and publications

10.2.1 Suitable nautical instruments, adequate and up-to-date charts, sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage, to the satisfaction of the competent authority, should be carried on board.

* Refer to the Recommendation on the Carriage of Electronic Position-Fixing Equipment adopted by the Organization by resolution A.156(ES.IV) and the World-Wide Radionavigation System adopted by the Organization by resolution A.953(23).

10.2.2 An electronic chart display and information system (ECDIS) may be accepted as meeting the chart carriage requirements of 10.2.1.

10.2.3 Back-up arrangements should be provided to meet the functional requirements of 10.2.2, if this function is partly or fully fulfilled by electronic means.*

10.3 Signalling equipment

10.3.1 Attention is drawn to the need to provide the equipment to comply in every respect with the requirements of the International Regulations for Preventing Collisions at Sea 1972, as amended.

10.3.2 Lights, shapes and flags should be provided to indicate that the vessel is engaged in any specific operation for which such signals are used.

10.3.3 All vessels which are required to carry radio installations should carry the table of life-saving signals contained in the International Code of Signals as far as practicable.

10.4 Navigating bridge visibility

Vessels should meet the following requirements:

- .1 The view of the sea surface from the conning position should extend from right ahead to 22.5° abaft the beam on either side of the vessel. Blind sectors caused by any obstruction outside the wheelhouse should be kept as small as possible.
- .2 From each side of the wheelhouse, the horizontal field of vision should extend over an arc of at least 225°, that is from at least 45° on the opposite bow through right ahead and then from right ahead to right astern through 180° on the same side of the vessel.

* An appropriate folio of paper nautical charts may be used as a back-up arrangement for ECDIS. Other back-up arrangements for ECDIS are acceptable (see appendix 6 to resolution A.817(19), as amended).

CHAPTER 11

CREW ACCOMMODATION

11.1 General

11.1.1 Before the construction of a fishing vessel, and before the crew accommodation of an existing fishing vessels is substantially altered or reconstructed, detailed plans of, and information concerning, the accommodation should be submitted to the competent authority, or an entity authorized by the competent authority, for approval.

11.1.2 Location, structure and arrangement of crew accommodation spaces and means of access thereto should be such as to ensure adequate security, protection against weather and sea and insulate from heat and cold, condensation, undue noise, vibration or effluvia from other spaces. In particular, the insulation material to be applied to bulkheads and deckheads of machinery spaces adjacent to crew accommodation should be of a type approved by the competent authority. Sleeping rooms should be placed aft the collision bulkhead and, to the extent possible, not below the working deck.

11.1.3 Where practical, noise measurements may be taken by the competent authority on completion of construction of a new vessel. Similar measurements may also be taken following a refit or major alterations to an existing vessel if it is considered that noise levels might have been influenced.*

11.1.4 Bulkheads and decks between accommodation spaces and fish-holds, machinery spaces, fuel tanks, galleys, engine, deck and other store rooms, drying rooms, communal wash-places or water closets should be so constructed as to prevent the infiltration of fumes and odours. Direct openings into sleeping rooms from such places should be avoided whenever reasonable or practicable.

11.1.5 Where passageways are provided in crew accommodation these should be as wide as possible, but the clear width should not be less than 700 mm. Where doors open outwards into a passageway, there should be sufficient space to pass the door when it is open at a right angle to the passageway.

11.1.6 Accommodation spaces should be adequately insulated to prevent loss of heat, condensation or overheating.

11.1.7 In the choice of materials used for construction of accommodation spaces, account should be taken of properties potentially harmful to the health of personnel or likely to harbour vermin and mould. Surfaces, including decks, of accommodation and furnishings should be of a kind easily kept clean and hygienic, as well impervious to damp. Bulkhead and deckhead surfaces, if painted, should be light in colour and the paint specification should be to the approval of the competent authority. Other surface coverings, such as lime wash, should not be used.

* Where practical, taking into account the size and type of the vessel, resolution A.468(XII) may be used as a point of reference.

11.1.8 Where appropriate, access to ordinary exits and emergency exits should be marked with direction indicators. Exits should be marked in a conspicuous manner above or beside the door.

11.1.9 Where the deck covering is of composition material, the connection to the side of the vessel, bulkheads and partitions should be rounded to avoid crevices.

11.1.10 All practical measures should be taken to protect crew accommodation and furnishings against the admission of insects and other pests.

11.1.11 Overhead exposed decks over crew accommodation should be sheathed with wood or equivalent insulation.

11.1.12 The electrical switchboard should be so arranged that when the shore power connection is made, power would be available for crew accommodation lighting, ventilation systems and, where applicable, heating and cooking facilities.

11.2 Lighting, heating and ventilation

11.2.1 All crew accommodation spaces should be adequately lighted, as far as possible, by natural lighting. Such spaces should also be equipped with adequate artificial light. Artificial light should be in accordance with accepted standards of visual comfort in living spaces. The minimum standards for natural lighting in crew accommodation should be such as to permit a person with normal vision to read an ordinary newspaper on a clear day.

11.2.2 If there are no two independent sources of electricity for lighting, additional lighting should be provided by properly constructed lamps or lighting apparatus for emergency use.

11.2.3 Methods of lighting should not endanger the health or safety of the crew or the safety of the vessel.

11.2.4 Adequate heating facilities in crew accommodation spaces should be provided as required by climatic conditions. Heating facilities should be capable of maintaining a satisfactory air temperature in crew accommodation under normal conditions of service of a fishing vessel. The accommodation should be capable of being heated sufficiently to maintain a minimum temperature of +22°C in all day rooms at an outside temperature of -15°C.

11.2.5 Facilities for heating should be designed so as not to endanger health or safety of the crew or safety of the vessel.

11.2.6 Heating by means of open fires should be prohibited.

11.2.7 Accommodation spaces should be adequately ventilated at all times when the crew is expected to remain on board. Ventilation systems should be capable of control so as to maintain the air in a satisfactory condition and to ensure a sufficiency of air movement in all conditions of weather and climate. The ventilation of galleys and sanitary spaces should be to the open air and, unless fitted with a mechanical ventilation system, be independent from that for other crew accommodation.

11.2.8 Accommodation spaces of vessels regularly engaged on voyages in the tropics and under similar conditions, except in deckhouses with satisfactory natural ventilation, should be equipped with mechanical ventilation and, if necessary, with additional electric fans or air conditioning, in particular, mess rooms and sleeping quarters.

11.2.9 Drying rooms or lockers for working clothes and oilskin lockers should have adequate ventilation that is separate from other spaces. The exhaust from such spaces should be well clear of the air intakes of the ventilation systems for other spaces.

11.3 Sleeping rooms

11.3.1 Sleeping rooms should be so planned and equipped as to ensure reasonable comfort for the occupants and to facilitate tidiness. The clear headroom should, whenever possible, be not less than 2 m. There should be no access to the accommodation from the fish room.

11.3.2 Wherever reasonable and practical, the floor area of sleeping rooms per person accommodated therein, excluding space occupied by berths and lockers, should not be less than 0.75 m².

11.3.3 Each member of the crew should be provided with an individual berth, the inside dimensions of which should, wherever practicable, be 1.9 m by 680 mm.

11.3.4 Berths should, wherever possible, not be placed side by side in such a way that access to one berth can be obtained only over another. Berths should not normally be arranged in tiers of more than two. The lower berth in a double tier should be not less than 300 mm above the deck; the upper berth should be placed approximately midway between the bottom of the lower berth and the lower side of the deck head beams.

11.3.5 Where the upper berth in a tier overlaps a lower berth, the underside of the upper berth should be fitted with a dust proof bottom of wood, canvas or other material.

11.3.6 If tubular frames are used for the construction of berths, they should be completely sealed and without perforations that would give access to vermin.

11.3.7 Suitable bedding should be provided for the crew. Mattresses should not be of a type that is liable to develop toxic fumes in cases of fire nor of a type that will attract pests or insects. Mattresses should be provided with a cover of fire retardant material.

11.3.8 Whenever reasonable and practicable, having regard to the size, type or intended service of the vessel, the furnishings of sleeping rooms should include both a fitted cupboard preferably with an integral lock and a drawer for each occupant. A table or desk, adequate seating, a mirror, cabinet for toilet requisites, a book rack and coat hooks should also be provided. Where fitted, tables or desks of the pull-out type should be to the approval by the competent authority.

11.3.9 The maximum number of persons to be accommodated in any sleeping room should be clearly and indelibly marked in the room where it can be conveniently seen.

11.4 Mess rooms

11.4.1 Wherever reasonable and practicable, mess room accommodation separate from sleeping quarters should be provided.

11.4.2 The mess room should be as close as practicable to the galley.

11.4.3 The dimensions and equipment of each mess room should be sufficient for the number of persons likely to use it at any one time.

11.4.4 The furnishings of mess rooms should include tables and approved seats sufficient for the number of persons likely to use them at any one time. The tops of tables and seats should be free of sharp edges and should be of damp resisting material without cracks and easily kept clean.

11.4.5 Where pantries are not accessible from mess rooms, adequate lockers for mess utensils and proper facilities for washing should be provided.

11.4.6 Mess rooms should be planned, furnished and equipped to provide appropriate facilities for recreation.

11.5 Sanitary facilities

11.5.1 Sufficient sanitary facilities, including wash-basins, shower-baths and water-closets, should be provided to the satisfaction of the competent authority, having due regard to the intended service of the vessel. Wherever practicable, such facilities should be provided as follows:

- .1 one shower-bath for every eight persons or less;
- .2 one water-closet or suitable alternative for every eight person or less;
- .3 one wash-basin for every six persons or less; and
- .4 cold fresh water and hot fresh water or means of heating fresh water should be available in all wash spaces.

11.5.2 Soil and waste discharge pipes should not pass through fresh water or drinking water tanks or, where practicable, provision stores. Neither should they, where practicable, pass overhead in mess rooms or sleeping accommodation. Such pipes should be fitted with anti-syphon closures.

11.5.3 In general, water-closets should be situated convenient to, but separate from, sleeping rooms, mess rooms and wash-rooms.

11.5.4 The deck area of wash places should have a covering of durable material, easily cleaned, impervious to damp and properly drained. The deck covering should be carried up the sides of the compartment to a height of not less than 0.2 m and be adequately sealed at all joints to prevent the ingress of water and damp.

11.5.5 The bulkheads should be of steel or other approved material and should be watertight to a height of at least 0.25 m above the deck to allow for effective sealing of the deck covering where it meets the bulkheads.

11.5.6 Facilities for washing and drying clothes should be provided on a scale appropriate to the number of the crew and the duration of intended voyages.

11.5.7 In general, international standards concerning shipboard sanitary facilities contained in the WHO Guide to Ship Sanitation, 1967 as amended may serve as guidance.

11.6 Potable water facilities

Filling, storage and distribution arrangements for potable water should be designed to preclude any possibility of water contamination or overheating. Tanks should be designed to allow internal cleaning.

11.7 Provision stores

Having regard to the intended service of the vessel, store rooms of adequate capacity should be provided which can be kept cool, dry and well ventilated in order to avoid deterioration of the stores. Where possible, refrigerators or other low-temperature storage should be provided, to the satisfaction of the competent authority. Where refrigerating or freezing rooms are fitted, the access doors should be capable of being opened from either side. An alarm system should be arranged from the refrigerating and freezing room to the galley or other appropriate location if such rooms are large enough for personnel to enter them.

11.8 Cooking facilities

11.8.1 Having regard to the intended service of the vessel, satisfactory cooking appliances and equipment should be provided and should, wherever practicable, be fitted in a separate galley.

11.8.2 Galleys should be of adequate dimensions for the purpose and have sufficient storage space and satisfactory drainage.

11.8.3 The galley should be provided with cooking utensils, the necessary number of cupboards, shelves, sinks and dish racks of rustproof material and with satisfactory drainage. Drinking water should be supplied to the galley by means of pipes. Where it is supplied under pressure, the system should be protected against backflow. Where hot water is not supplied to the galley, a water heater should be fitted.

11.8.4 The galley should be fitted with suitable facilities for the preparation of hot drinks for the crew at all times.

11.8.5 Cooking appliances should be fitted with fail-safe devices in the event of failure of the power source or fuel. Supplies of fuel in the form of gas or oil should not be stored in the galley.

ANNEX I

ILLUSTRATION OF TERMS USED IN THE DEFINITIONS

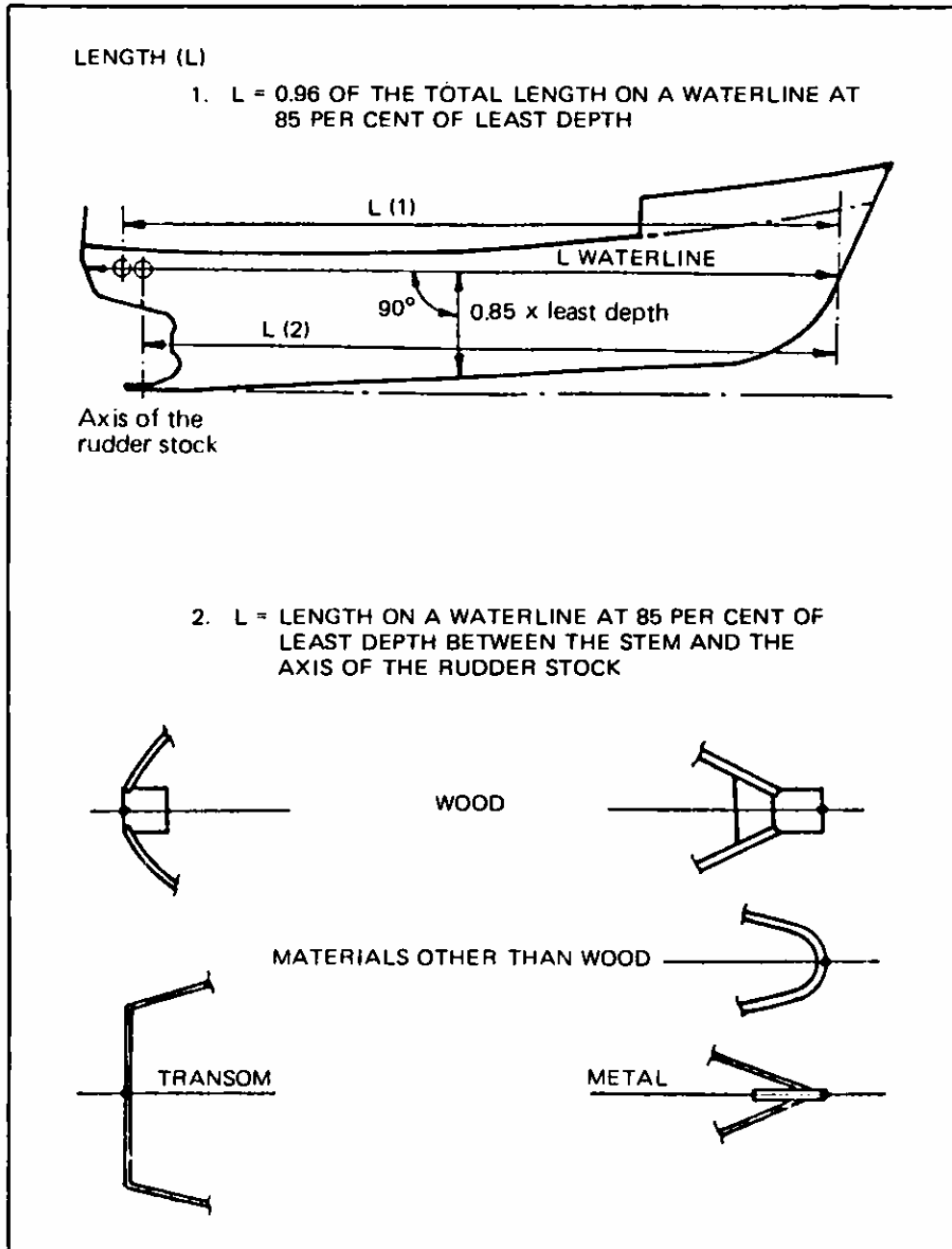


Figure 1

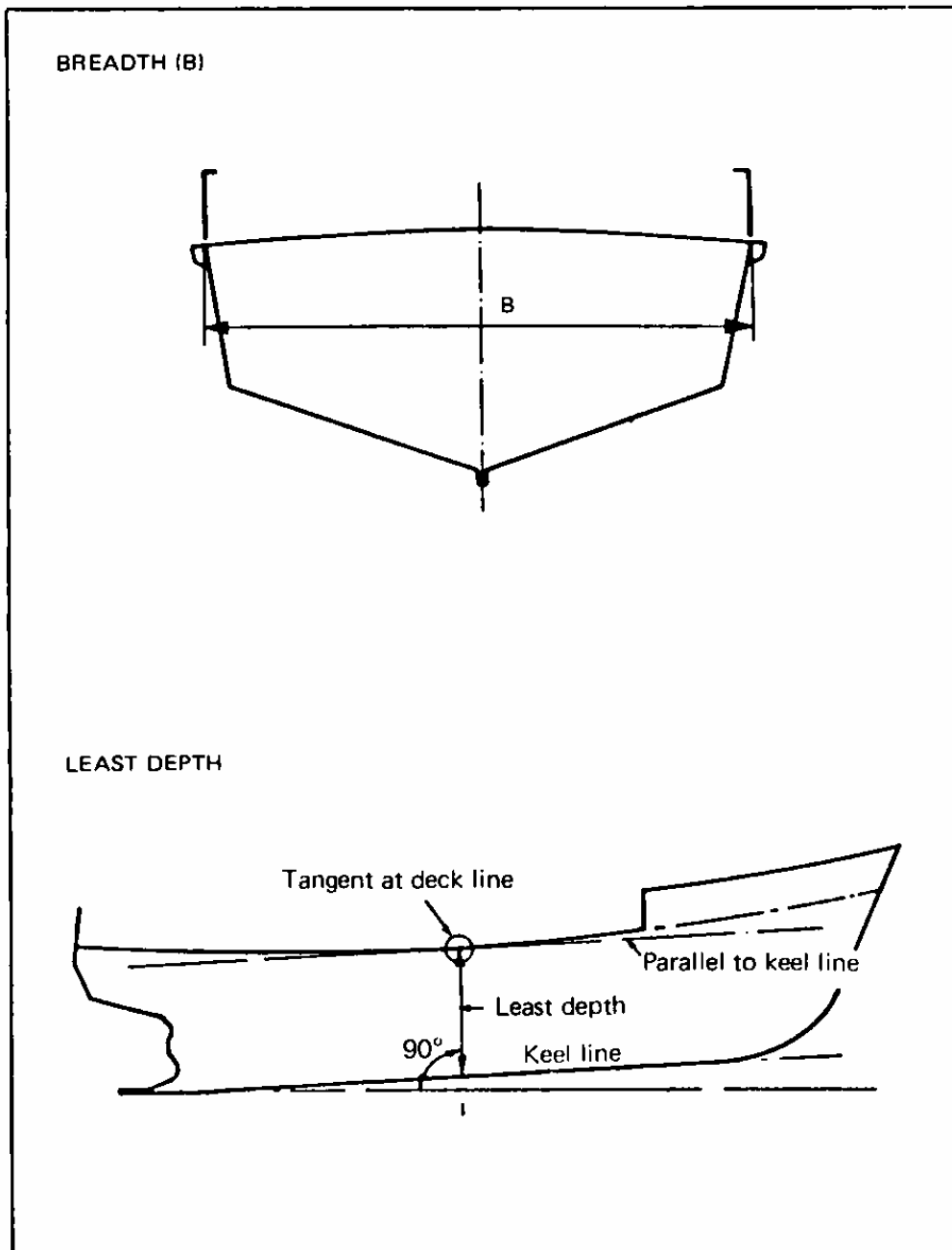


Figure 2

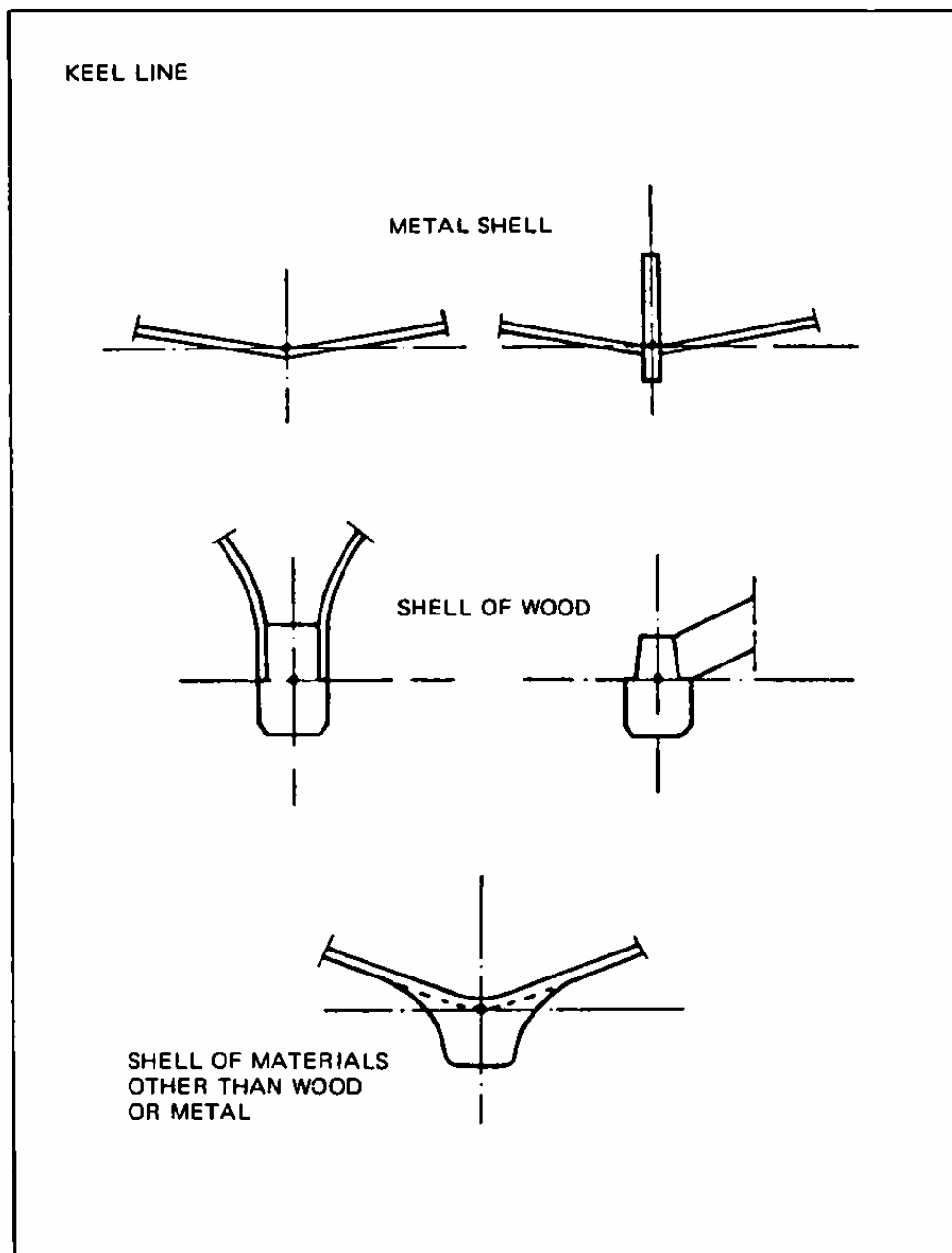


Figure 3

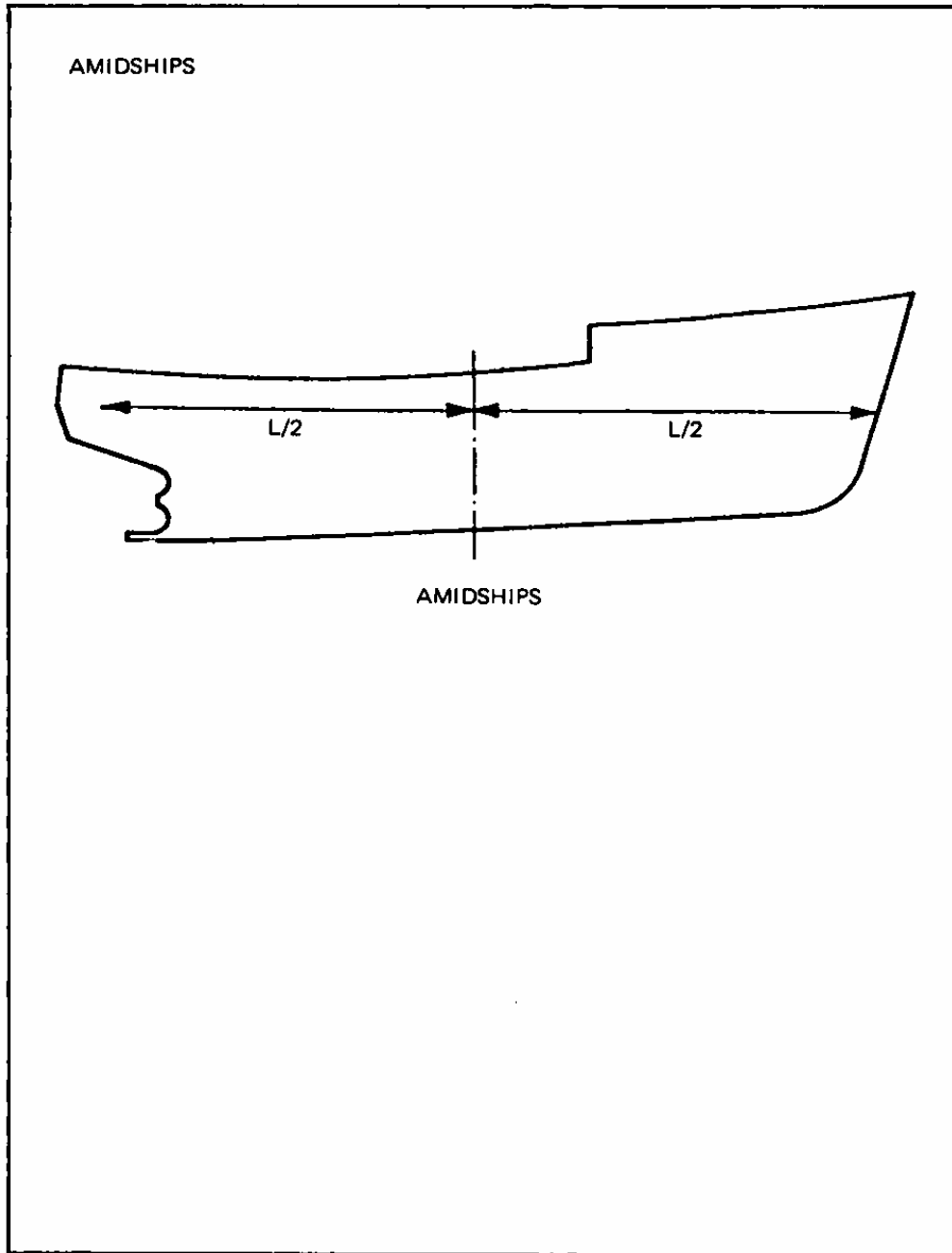


Figure 4

ANNEX II

RECOMMENDED PRACTICE FOR ANCHOR AND MOORING EQUIPMENT

1 The characteristics of anchors, chain, wires, towlines and mooring lines should be determined in accordance with the attached table, based on an equipment number “EN” as follows.

$$EN = \Delta^{\frac{2}{3}} + 2B(a + \sum h_j) + 0.1A$$

where:

- Δ moulded displacement, in tonnes, to the maximum design waterline;
- B breadth, in m, as defined in 1.2.1.9;
- a distance, in m, from the maximum design waterline to the upper edge of the uppermost complete deck at side amidships;
- h_j height, in m, on the centreline of each tier of deckhouses having a breadth greater than B/4. For the lowest tier h_j is to be measured at centreline from the upper deck or from a notional deck line where there is a local discontinuity in the upper deck. When calculating h_j sheer and trim should be ignored;
- A area, in m², in profile view of the hull, within L as defined in 1.2.1.7 and of superstructures and deckhouses above the maximum design waterline having a width greater than B/4. Screens and bulwarks more than 1.5 m in height should be regarded as parts of deckhouses when determining h_j and A.

Anchors and chains

2 Vessels should be fitted with at least two anchors which should be located at the bow. However, vessels of less than 17 m in length may be fitted with only one anchor, provided that the weight of the anchor is at least twice the weight of an anchor as specified in the table to this annex.

3 The weight of each anchor should be in accordance with the table given in this annex.

4 High holding power anchors of a design approved by the competent authority may be used as bower anchors. The weight of each such anchor may be 75% of the table weight given in this annex.

5 The competent authority may require increased anchor equipment for vessels fishing in very rough waters and/or may permit reduction in the equipment for vessels operating in sheltered waters.

6 Anchors with a weight of and above 150 kg should be fitted in hawse pipes, skids or a similar arrangement that is suitable for the quick and safe operation in dropping and hoisting the anchors. If the weight of each of the anchors is below 300 kg, but greater than 150 kg, it may be accepted that only one of the anchors need be fitted in a hawse pipe or skid. Anchors should also be secured in the stowed position by means of a locking or lashing device.

7 In general, anchors should be fitted with anchor chains. The length and dimension of each anchor chain should be in accordance with the table given in this annex.

8 For vessels of 17 m in length and over, the chain of one anchor may be replaced with anchor wire of equal strength, provided a chain meeting the requirements given in the table to this annex is maintained for the second one.

9 For vessels less than 17 m in length, the chain of both anchors may be replaced with anchor wire of equal strength to the chain.

10 Where anchor wires are used as a substitute for anchor chains, their length should be equal to 1.5 times the corresponding tabular length of chain. In addition, a chain of not less than 12.5 m in length and of the same specifications, as set out in the table to this annex, should be provided between anchor and anchor wire.

11 Where the competent authority has authorized the use of trawl warp as anchor wire, it should be satisfied that the arrangement does not reduce the efficiency required for the quick and safe operation in dropping and hoisting the anchors and for holding the vessel at anchor in all foreseeable service conditions. The requirements for a trawl warp should not be less than that required for anchor wire.

Anchor handling

12 Fishing vessels provided with anchors of or above 150 kg should be fitted with a windlass. The windlass should be fitted with a messenger wheel and/or drum for each anchor and means for the release of each messenger wheel or drum.

13 It should not be possible to carry the chains forward to the hawse pipe, skid or similar arrangement without the chain passing over the messenger wheels. When anchor wire is used, it should pass over a roller adjacent to the hawse pipe to avoid chafing.

14 The windlass, its support and its brakes should be capable of absorbing a static tension of at least 45% of the breaking strength of the anchor chain or anchor wire without the occurrence of any lasting deformations and without the brake losing its hold. Furthermore, a chain stopper or wire nipper should be fitted between the windlass and the hawse pipe or similar for each anchor chain or anchor wire capable of holding the vessel while at anchor. If chain stoppers or wire nippers are not fitted, the windlass, its support and its brake should be capable of absorbing a static tension of at least 80% of the breaking strength of the anchor chain or anchor wire. The chain stopper or wire nipper and their supports should be capable of absorbing a static tension of at least 80% of the breaking strength of the anchor chain/wire without the occurrence of any lasting deformations and without the chain stopper or wire nipper losing its hold.

15 If the trawl winch is fitted with messenger wheels, etc. and meets the requirements set out in paragraphs 12, 13 and 14, such a winch may be used as a windlass.

16 Fishing vessels which have been authorized to use trawl warp as anchor wire may use their trawl winch as a windlass, provided the trawl warp can be wound on a drum with a braking device that is independent of the actual trawl warps in use for fishing. Lead blocks and guide rollers should be suitably fitted and arranged to prevent the warps from chafing at the deckhouses, superstructures, deck plating and equipment on deck.

17 If a vessel has lost its anchors and it is not immediately possible to re-acquire them, the competent authority, after having assessed the conditions applying to the vessel, as given in paragraph 5, may permit otter boards/trawl doors with a least the same weight for anchors given in the table to this annex to be used for a limited period of time.

Towing lines

18 Vessels of 17 m of length and over should be provided with at least one tow line with a length and breaking strength in accordance with the table given in this annex. It should be appropriately located so that it is possible to make it ready for use at sea. The tow line may be replaced by one of the fishing vessel's trawl warps if this has at least a similar length and breaking strength. If warp is used, a length of rope of at least 12.5 m, with a minimum breaking strength as given in the table for the tow line, should also be provided and attached to the warp.

Mooring equipment

19 Vessels should be provided with suitable cleats and bollards as well as hawseholes in order to moor the vessel securely. The number of bollards, etc. should be determined in each individual case, dependent on the size and deck arrangement of the vessel. At least one bollard should be fitted forward and at least two abaft of amidships. Cleats and bollards should be of such a size that it is possible to accommodate at least four turns of the mooring lines or tow line below the horns of the cleat or the upper protruding edge of the bollard. The area where cleats and bollards are to be fastened should be securely reinforced.

20 The vessel should be provided with at least three mooring lines, each of a length and breaking strength in accordance with the table given in this annex.

TABLE

Equipment number		Stockless bower anchors		Stud link chain cables for bower anchors			Towline		Mooring lines	
Exceeding	Not exceeding	Number	Weight per anchor (kg)	Total length (m)	Diameter (mm)		Minimum length of each line (m)	Minimum breaking strength (kN)	Minimum length of each line (m)	Minimum breaking strength (kN)
					Mild steel	Special quality steel				
up to	30	2	70	137.5	11	-	-	-	40	25
30	40	2	80	165	11	-	-	-	50	30
40	50	2	100	192.5	11	-	-	-	60	30
50	60	2	120	192.5	12.5	-	180	98	60	34
60	70	2	140	192.5	12.5	-	180	98	80	34
70	80	2	160	220	14	12.5	180	98	100	37
80	90	2	180	220	14	12.5	180	98	100	37
90	100	2	210	220	16	14	180	98	110	39
100	110	2	240	220	16	14	180	98	110	39
110	120	2	270	247.5	17.5	16	180	98	110	44
120	130	2	300	247.5	17.5	16	180	98	110	44
130	140	2	340	275	19	17.5	180	98	120	49
140	150	2	390	275	19	17.5	180	98	120	49
150	175	2	480	275	22	19	180	98	120	54
175	205	2	570	302.5	24	20.5	180	112	120	59
205	240	2	660	302.5	26	22	180	129	120	64
240	280	2	780	330	28	24	180	150	120	69
280	320	2	900	357.5	30	26	180	174	140	74

ANNEX III

RECOMMENDED PRACTICE FOR AMMONIA REFRIGERATION SYSTEMS IN MANNED SPACES

- 1 All electrical equipment on, or adjacent to, the ammonia machinery flat should be explosion proof or of an intrinsically safe type, to the satisfaction of the competent authority.
- 2 Flame producing devices and hot surfaces above 427°C in the machinery space should be located as remotely as practicable from the ammonia machinery flat.
- 3 Ammonia equipment should be surrounded by an efficient water curtain and, in addition, water sprays should be directed at all potential leak sources, e.g. pipe connections and flanges, compressors, etc. The water curtain and sprays should be provided with an adequate supply of water which should be maintained under constant pressure.
- 4 A large capacity ventilation system including mechanical exhaust should be provided for the ammonia machinery flat. The system should not exhaust to another space and should be well clear of ventilator intakes to other spaces. The mechanical exhaust ventilation fan motor should be either fitted exterior to the ammonia flat or should be of an intrinsically safe type, to the satisfaction of the competent authority.
- 5 Coamings should be provided around the ammonia machinery flat.
- 6 Personal safety equipment, including suitable gas masks and protective clothing, should be provided inside and outside the machinery space.
- 7 Remote controls located in the wheelhouse or another suitable place should be provided for the following services:
 - .1 the water curtain and spray systems;
 - .2 the ammonia machinery flat ventilation system; and
 - .3 the main engine.
- 8 Means should be provided for stopping the ammonia compressor prime movers from the wheelhouse or another suitable place.
- 9 Means of escape direct to deck from the ammonia machinery flat should be provided in addition to any other escape which may be required by the competent authority.
- 10 Drainage should be provided from machinery spaces and/or flats leading to a place where water which could be contaminated with refrigerant presents no danger to the vessel or to persons on board.
- 11 Information concerning hazards, precautions and first aid should be clearly displayed at the access to the ammonia machinery space.

Piping systems

12 Joints in steel piping systems should be butt welded wherever practical to reduce the possibility of leaks. Flanged joints should be limited to connections with compressors, vessels, valves, branches for future extensions or where required for maintenance. The number of joints, whether flanged or welded, should be kept to a minimum.

13 If for operational reasons flexible hoses are required, the competent authority should be satisfied that they are suitable for ammonia service. They should be adequately protected against mechanical damage, torsion and stress.

14 To the extent possible, flexible bellows should be avoided. Where flexible bellows are proposed, the competent authority should be satisfied that they are only used within the recommendations of the manufacturer and adequate precautions are taken to avoid excessive vibration, mechanical damage, torsion and stress.

15 All refrigerant piping should be adequately supported and the supports or hangers should be designed to carry the weight of the pipe including contents and, where required, insulation.

16 There should be sufficient clearance around pipelines to allow for any necessary attention to flanges, screwed joints and fittings.

17 Ammonia piping should not be located in lift wells, accommodation spaces, in stairways or at entrances/exits. Pipework should also be arranged so as not to obstruct access ways and inhibit access to the machinery.

18 Special attention should be paid to the clearance around pipes passing through fire resistant bulkheads and deckheads, which should be adequately sealed to maintain the integrity of the bulkhead or deckhead. Pipe ducts and shafts should be isolated from other spaces to resist the spread of fire.

Decommissioning

19 When a refrigeration system is to be decommissioned or taken out of service and dismantled, the procedure should ensure that:

- .1 hazards to the personnel carrying out the process are minimized;
- .2 refrigerant and oil are correctly removed for reclamation or disposal; and
- .3 the system as left does not present any future hazard to personnel or to the environment due to residual content.

ANNEX IV

RECOMMENDED PRACTICE ON PORTABLE FISH-HOLD DIVISIONS*

1 Recognizing the desirability of ensuring the adequate strength of scantlings of portable fish-hold divisions, studies on national practices have been carried out, resulting in the establishment of certain formulae for scantlings, which are recommended to Administrations for their guidance.

2 These formulae represent the average of a wide range of experience covering all types of vessels operating in all sea areas, and in conditions likely to impose the maximum loading on a division. Alternative scantlings might, however, be accepted where experience has shown that these are more appropriate.

3 According to the basic type of construction, the following formulae are recommended for vertical fish-hold divisions:

.1 ***Vertical steel uprights and horizontal wooden boards***

Minimum section modulus of vertical steel uprights

$$Z = 4 \rho sbh^2 \quad (1)$$

Minimum thickness of horizontal wooden boards

$$t = \sqrt{8 \rho sb^2} \quad (2)$$

.2 ***Horizontal steel beams and vertical wooden boards***

Minimum section modulus of horizontal steel beams

$$Z = 4 \rho sHS^2 \quad (3)$$

Minimum thickness of vertical wooden boards

$$t = \sqrt{3.6 \rho sh^2} \quad (4)$$

where:

Z = section modulus, in cm³.

t = thickness of wooden board, in cm.

ρ = density of cargo, in t/m³.

s = maximum transverse distance between any two adjacent longitudinal divisions or line of supports, in m.

h = maximum vertical span of a column taken to be the hold depth, in m.

b = maximum longitudinal distance between any two adjacent transverse divisions or line of supports, in m.

H = vertical span of a division which is supported by a horizontal beam, in m.

S = horizontal distance between adjacent points of support of a horizontal beam, in m.

* Appendix V of the annex of Assembly resolution A.168(ES.IV) incorporating subparagraphs 4(g) and 4(h) adopted by the eighth Assembly.

- 4 In applying the above formulae, the following notes should be observed:
- .1 The formulae are applicable to longitudinal divisions. Where the divisions are athwartships the formulae should be modified by interchanging s and b .
 - .2 The formulae were derived on the assumption that the loads were on one side only of the divisions. When it is known that the divisions will always be loaded on both sides, reduced scantlings may be accepted.
 - .3 If vertical steel uprights are permanent and well connected at both ends with the structure of the ship, reduced scantlings may be accepted depending upon the degree of security provided by the end connections.
 - .4 In the formula for vertical wooden boards, the full depth of the hold is assumed as the unsupported span, where the span is less the thickness may be calculated using the reduced span.
 - .5 The timber used should be of sound durable quality, of a type and grade which has proved satisfactory for fish-hold divisions and the actual finished thicknesses of boards should be those derived from the formulae. The thickness of boards made from good quality hardwood may be reduced by 12.5%.
 - .6 Divisions made of other materials should have strength and stiffness equivalent to those associated with the scantlings recommended for wood and steel, having regard to the comparative mechanical properties of the materials.
 - .7 Channelways in stanchions to take pound boards should have a depth of not less than 4 cm and the width should be equal to the pound board thickness plus 0.5 cm.
 - .8 Each pound board should have a length not less than the distance between the bottom of the respective channelways into which it will engage minus 1 cm.
- If pound boards have shaped ends to allow a rotational manoeuvre for easy housing, the extent of end shaping should not be more than allowed by a radius equal to one half the length of the board with its centre at the mid length and depth of the board.

- 5 Figures 1 and 2 illustrate the application of the formulae.

HORIZONTAL WOOD BOARDS – STEEL UPRIGHTS

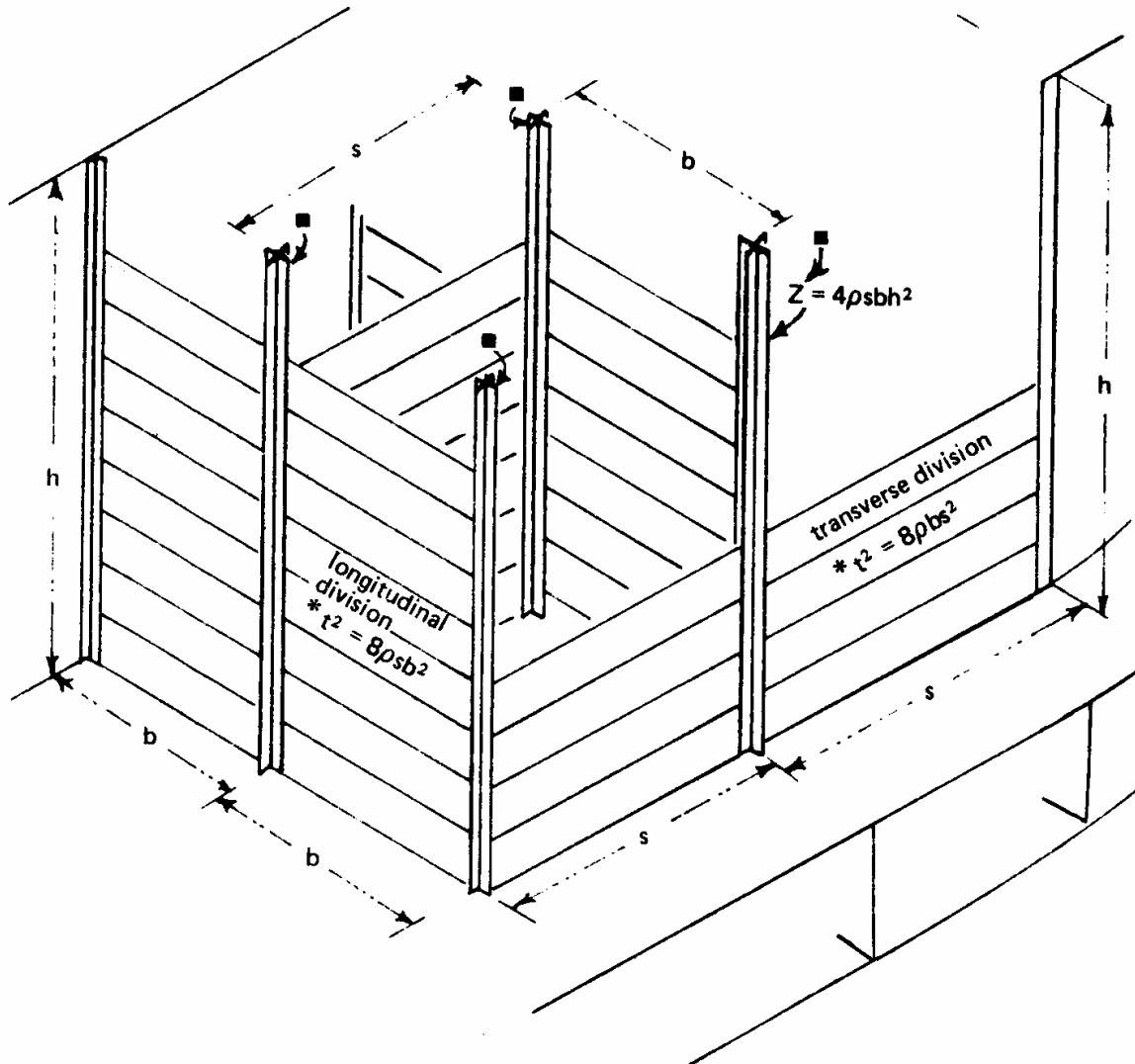


Figure 1

* **Note:** When the longitudinal and transverse divisional boards are interchangeable b will equal s and the thickness by either formula will be the same. If the boards are required to be of equal thickness but varying span the greater thickness should be used for all the boards when the section modulus is kept constant for all the uprights.

VERTICAL WOOD BOARDS – STEEL BEAMS

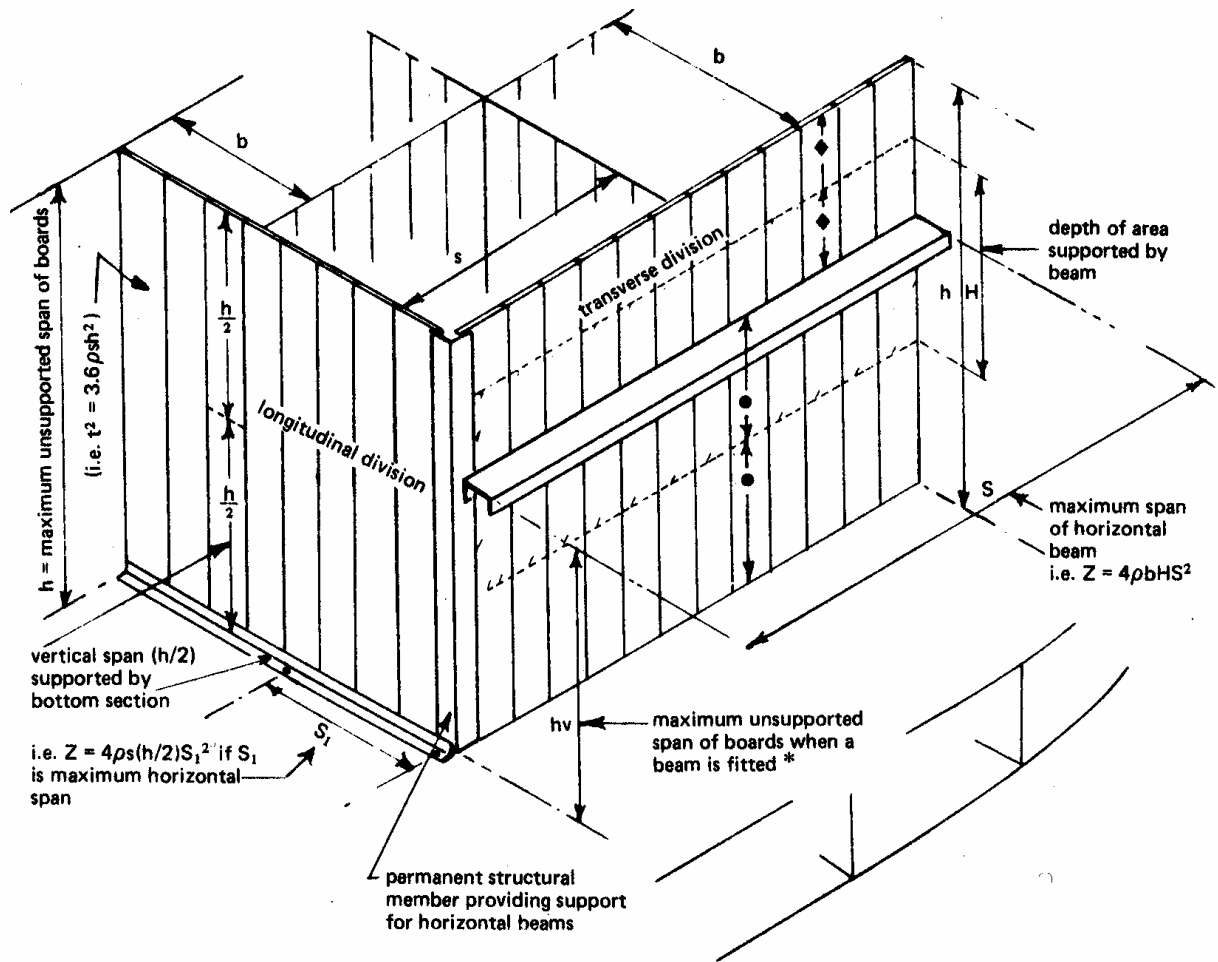


Figure 2

* **Note:** If no beam was fitted, the thickness of the vertical wood planks would be given by $t^2 = 3.6 \rho bh^2$. The beam reduces the maximum span to hv and the thickness is now given by $t_1^2 = 3.6 \rho bhv^2$ or $t_1 = t \left(\frac{hv}{h} \right)$.

ANNEX V

RECOMMENDATION FOR TESTING LIFEJACKETS*

PART 1 - PROTOTYPE TEST FOR LIFE-SAVING APPLIANCES

1 TESTING

1.1 Temperature test

The lifebuoys should be alternately subjected to surrounding temperatures of -30°C and $+65^{\circ}\text{C}$. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable:

- .1 an 8 h cycle at $+65^{\circ}\text{C}$ to be completed in one day;
- .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions until the next day;
- .3 an 8 h cycle at -30°C to be completed the next day; and
- .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions until the next day.

1.2 Test for oil resistance

One of the lifebuoys should be immersed horizontally for a period of 24 h under a 100 mm head of diesel oil at normal room temperature. After this test the lifebuoy should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

1.3 Fire test

The other lifebuoy should be subjected to a fire test. A test pan 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to a depth of 1 cm followed by enough petrol to make a minimum total depth of 4 cm. The petrol should then be ignited and allowed to burn freely for 30 s. The lifebuoy should then be moved through flames in an upright, forward, free-hanging position, with the bottom of the lifebuoy 25 cm above the top edge of the test pan so that the duration of exposure to the flames is 2 s. The lifebuoys should not sustain burning or continue melting after being removed from the flames.

* Refer to the Standardized life-saving appliance evaluation and test report forms (MSC/Circ.980).

2 LIFEJACKETS

2.1 Temperature cycling test

A lifejacket should be subjected to the temperature cycling as prescribed in 1.1 and should then be externally examined. If the buoyancy material has not been subjected to the tests prescribed in 2.7, the lifejacket should also be examined internally. The lifejacket materials should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

2.2 Buoyancy test

The buoyancy of the lifejacket should be measured before and after 24 h complete submersion to just below the surface in fresh water. The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy.

2.3 Fire test

A lifejacket should be subjected to the fire test prescribed in 1.3. The lifejacket should not sustain burning or continue melting after being removed from the flames.

2.4 Test for oil resistance

2.4.1 The lifejacket should be tested for oil resistance as prescribed in 1.2.

2.4.2 If the buoyancy material has not been subjected to the tests prescribed in 2.7, the lifejacket should also be examined internally and the effect determined. The material should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

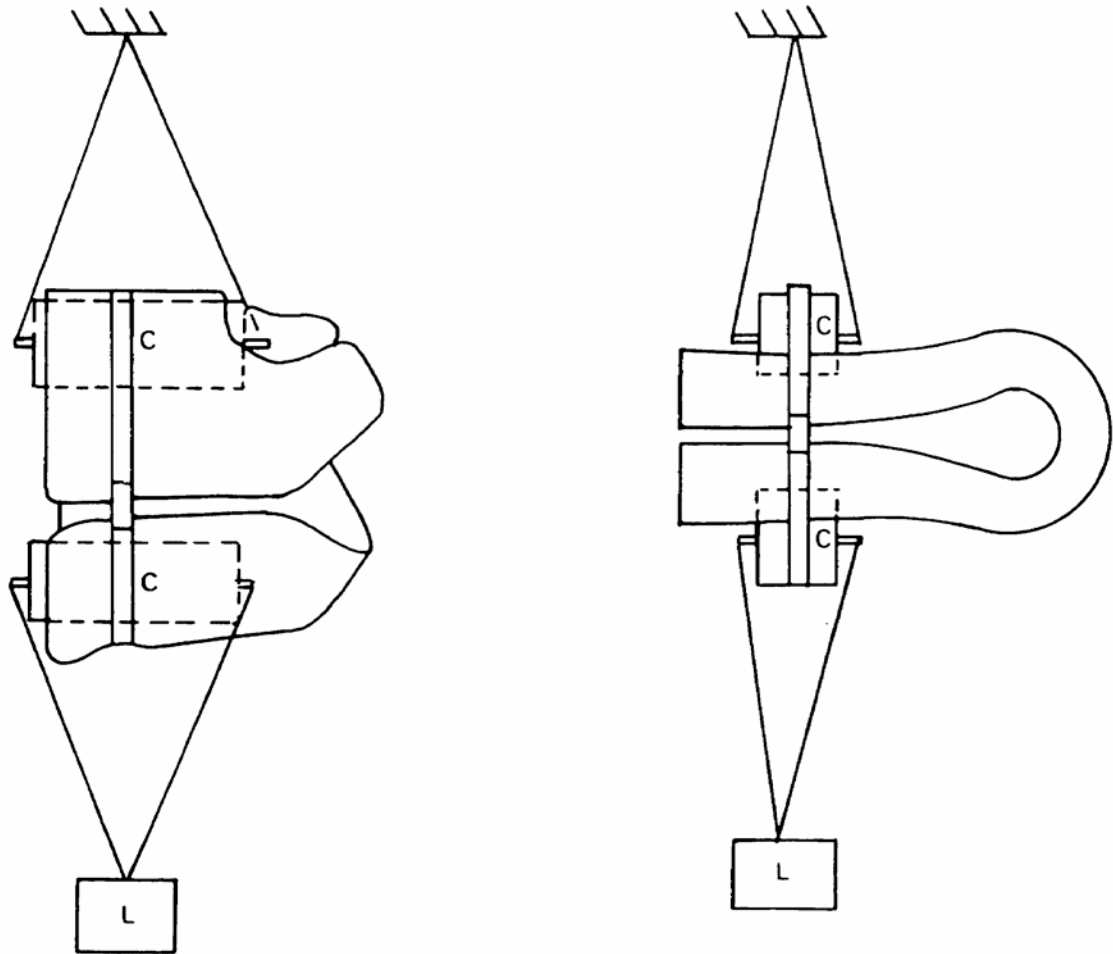
2.5 Tests of materials for cover, tapes and seams

The materials used for the cover, tapes, seams and additional equipment should be tested to the satisfaction of the competent authority to establish that they are rot-proof, colour-fast and resistant to deterioration from exposure to sunlight and that they are not unduly affected by sea water, oil or fungal attack.

2.6 Strength tests

Body or lifting loop strength tests

2.6.1 The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when it is worn by a person. A force of not less than 3,200 N (2,400 N in the case of a child-size lifejacket) should be applied for 30 min to the part of the lifejacket that secures it to the body of the wearer (see figure 1) or to the lifting loop of the lifejacket. The lifejacket should not be damaged as a result of this test.



Vest-type lifejacket

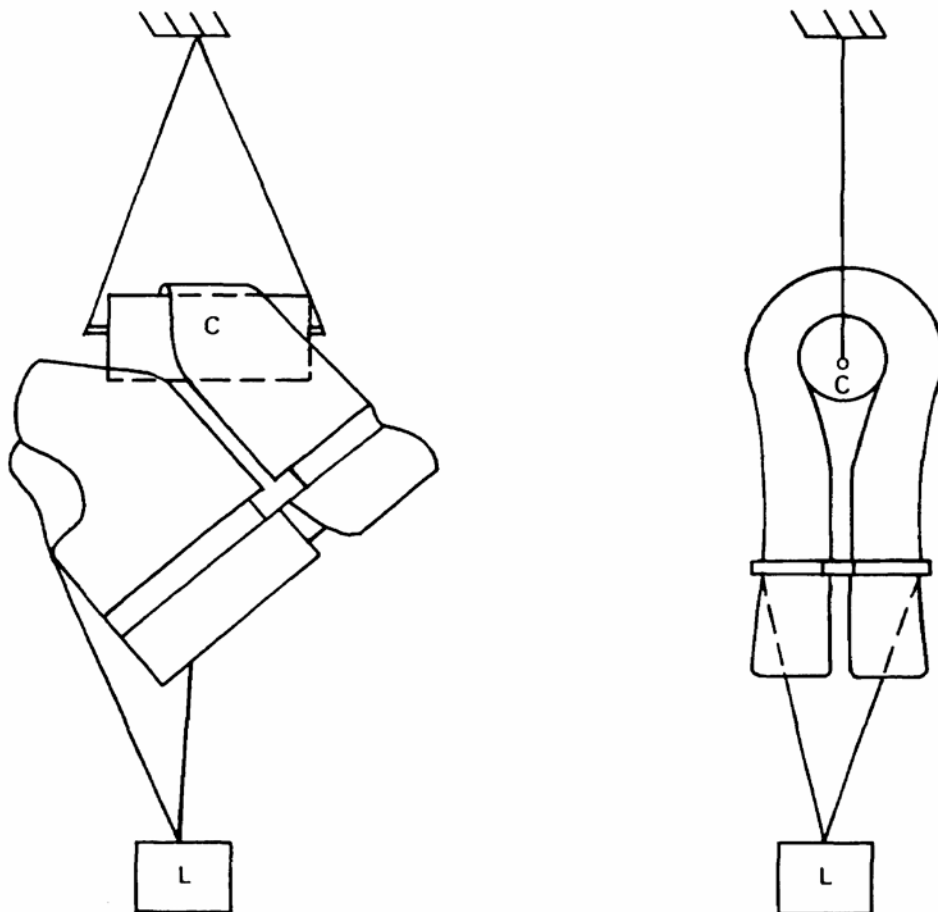
Yoke or over-the-head-type lifejacket

- C - Cylinder
125 mm diameter for adult sizes
50 mm diameter for child sizes
- L - Test load

Figure 1 - Body strength test arrangement for lifejackets

Shoulder strength test

2.6.2 The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when it is worn by a person. A force of not less than 900 N (700 N in the case of a child-size lifejacket) should be applied for 30 min to the shoulder section of the lifejacket (see figure 2). The lifejacket should not be damaged as a result of this test.



Vest-type lifejacket

Yoke or over-the-head-type lifejacket

- C - Cylinder
125 mm diameter for adult sizes
50 mm diameter for child sizes
- L - Test load

Figure 2 - Shoulder strength test arrangement for lifejackets

2.7 Additional tests for lifejacket buoyancy material other than cork or kapok

The following tests should be carried out on eight specimens of lifejacket buoyancy materials other than cork or kapok.

Test for stability under temperature cycling

2.7.1 Six specimens should be alternately subjected for 8 h to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for ten cycles, is acceptable:

- .1 an 8 h cycle at +65°C to be completed in one day;
- .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions until the next day;
- .3 an 8 h cycle at -30°C to be completed the next day; and
- .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions until the next day.

2.7.2 The dimensions of the specimens should be recorded at the end of the 10-cycle period. The specimens should be carefully examined and should not show any sign of external change of structure or of mechanical qualities.

2.7.3 Two of the specimens should be cut open and should not show any sign of internal change of structure.

2.7.4 Four of the specimens should be used for water absorption tests, two of which should be so tested after they have also been subjected to the diesel oil test as prescribed in 1.2.

Tests for water absorption

2.7.5 The tests should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water.

2.7.6 The tests should be carried out:

- .1 on two specimens as supplied;
- .2 on two specimens which have been subjected to the temperature cycling as prescribed in 2.7.1; and
- .3 on two specimens which have been subjected to the temperature cycling as prescribed in 2.7.1 followed by the diesel oil test as prescribed in 2.4.

2.7.7 The specimens should be at least 300 mm square and be of the same thickness as used in the lifejacket. Alternatively, the entire lifejacket may be subjected to the test. The dimensions should be recorded at the beginning and end of these tests.

2.7.8 The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority). The reduction of buoyancy should not exceed 16% for specimens which have been exposed to the diesel oil conditioning and should not exceed 5% for all other specimens. The specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

2.8 Donning test

2.8.1 As lifejackets will be used by uninitiated persons, often in adverse conditions, it is essential that risk of incorrect donning be minimized. Ties and fastenings necessary for proper performance should be few and simple. Lifejackets should readily fit various sizes of adults, both lightly and heavily clad. Lifejackets should be capable of being worn inside-out, or clearly in only one way.

Test subjects

2.8.2 These tests should be carried out with at least six able-bodied persons of the following heights and weights:

Height	Weight
1.4 m - 1.6 m	1 person under 60 kg 1 person over 60 kg
1.6 m - 1.8 m	1 person under 70 kg 1 person over 70 kg
over 1.8 m	1 person under 80 kg 1 person over 80 kg

- .1 at least one and not more than two of the persons should be females with not more than one female in the same height range; and
- .2 for the approval of the lifejackets, the test results obtained from each of the participating subjects should be acceptable except as provided otherwise.

Clothing

2.8.3 Each test subject should be tested wearing normal clothing. The test should be repeated with the test subject wearing heavy-weather clothing.

Test

2.8.4 After demonstration, the test subjects should correctly don lifejackets within a period of 1 min, without assistance.

Assessment

2.8.5 The observer should note:

- .1 ease and speed of donning; and
- .2 proper fit and adjustment.

2.9 Water performance tests

2.9.1 This portion of the test is intended to determine the ability of the lifejacket to assist a helpless person or one in an exhausted or unconscious state and to show that the lifejacket does not unduly restrict movement. All tests should be carried out in fresh water under still conditions.

Test subjects

2.9.2 These tests should be carried out with at least six persons as described in 2.8.2. Only good swimmers should be used, since the ability to relax in the water is rarely otherwise obtained.

Clothing

2.9.3 Subjects should wear only swimming costumes.

Preparation for water performance tests

2.9.4 The test subjects should be made familiar with each of the tests set out below, particularly the requirement regarding relaxing and exhaling in the face-down position. The test subject should don the lifejacket, unassisted, using only the instructions provided by the manufacturer. The observer should note the points prescribed in 2.8.5.

Righting tests

2.9.5 The test subject should swim at least three gentle strokes (breast stroke) and then with minimum headway relax, with the head down and the lungs partially filled, simulating a state of utter exhaustion. The period of time should be recorded starting from the completion of the last stroke until the mouth of the test subject comes clear of the water. The above test should be repeated after the test subject has exhaled. The time should again be ascertained as above. The freeboard from the water surface to the mouth should be recorded with the test subject at rest.

Drop test

2.9.6 Without readjusting the lifejacket, the test subject should jump vertically into the water, feet first, from a height of at least 4.5 m. When jumping into the water, the test subject should be allowed to hold on to the lifejacket during water entry to avoid possible injury. The freeboard to the mouth should be recorded after the test subject comes to rest.

Assessment

2.9.7 After each of the water tests described above, the test subject should come to rest with the mouth clear of the water by at least 120 mm. The average of all subjects' trunk angles should be at least 30° back of vertical, and each individual subject's angle should be at least 20° back of vertical. The average of all subjects' faceplane (head) angles should be at least 40° above horizontal, and each individual subject's angle should be at least 30° above horizontal. In the righting test, the mouth should be clear of the water in not more than 5 s. The lifejacket should not become dislodged or cause harm to the test subject.

2.9.8 When evaluating the results of a test in accordance with 2.9.5, 2.9.7 and 2.9.8, the competent authority may, in exceptional circumstances, disregard the results of a test on a subject if the results show a very slight deviation from the specified criteria, provided the competent authority is satisfied that the deviation can be attributed to the unusual size and stature characteristics of the test subject and the results of tests on other subjects, chosen in accordance with 2.9.2, show the satisfactory performance of the lifejacket.

Swimming and water emergence test

2.9.9 All test subjects, without wearing the lifejacket, should attempt to swim 25 m and board a liferaft or a rigid platform with its surface 300 mm above the water surface. All test subjects who successfully complete this task should perform it again wearing the lifejacket. At least two thirds of the test subjects who can accomplish the task without the lifejacket should also be able to perform it with the lifejacket.

2.10 Children's lifejacket tests

As far as possible, similar tests should be applied for approval of lifejackets suitable for children.

2.10.1 When conducting water performance tests under 2.9, child-size lifejackets should meet the following requirements for their critical flotation stability characteristics. The range of sizes for child-size lifejackets, should be considered based on the test results. Devices should be sized by height or by height and weight.

2.10.2 Test subjects should be selected to fully represent the range of sizes for which the device is to be approved. Devices for smaller children should be tested on children as small as approximately 760 mm tall and 9 kg mass. At least six test subjects should be used for each 380 mm and 16 kg of size range:

- .1 Turning time. Each individual subject should turn face-up in not more than 5 s.
- .2 Freeboard. The combined results for clearance of the mouth above the water for all subjects should average at least 90 mm; each individual subject under 1,270 mm and 23 kg should have at least 50 mm clearance, and each individual subject over 1,270 mm and 23 kg should have at least 75 mm clearance.
- .3 Trunk angle. The average of all subjects' results should be at least 40° back of vertical, and each individual subject's result should be at least 20° back of vertical.

- .4 Faceplane (head) angle. The average of all subjects' results should be at least 35° above horizontal, and each individual subject's result should be at least 20° above horizontal.
- .5 Mobility. Mobility of the subject both in and out of the water should be given consideration in determining the acceptability of a device for approval.

2.11 Tests for inflatable lifejackets

2.11.1 Two inflatable lifejackets should be subjected to the temperature cycling test prescribed in 1.1 in the uninflated condition and should then be externally examined. The inflatable lifejacket materials should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The automatic and manual inflation systems should each be tested immediately after each temperature cycling test as follows:

- .1 after the high temperature cycle (test in 1.1.1), the two inflatable lifejackets taken from a stowage temperature of +65°C, one should be activated using the automatic inflation system by placing it in sea water at a temperature of +30°C and the other should be activated using the manual inflation system; and
- .2 after the low temperature cycle (test in 1.1.3), the two inflatable lifejackets taken from a stowage temperature of -30°C, one should be activated using the automatic inflation system by placing it in sea water at a temperature of -1°C and the other should be activated using the manual inflation system.

2.11.2 The test in 2.8 should be conducted using lifejackets both in the inflated and uninflated conditions.

2.11.3 The tests in 2.9 should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated. The tests with one of the compartments uninflated should be repeated as many times as necessary to perform the test once with each compartment in the uninflated condition.

Tests of materials for inflatable bladders, inflation systems and components

2.11.4 The material used for the inflatable bladder, inflation system and components should be tested to establish that they are rot-proof, colour fast and resistant to deterioration from exposure to sunlight and that they are not duly affected by sea water, oil or fungal attack.

Material tests

2.11.5 Resistance to rot and illumination tested according to AATCC Method 30:1981 and ISO 105-B04:1988 Illumination should take place to Class 4-5.

2.11.6 Following exposure to rot or illumination tests above the tensile strength should be measured using the grab method given in ISO 5082. Minimum tensile strength should be not less than 300 N per 25 mm in the warp and weft direction.

Coated fabrics

2.11.7 Coated fabrics used in the construction of inflatable buoyancy chambers should comply with the following requirements:

- .1 coating adhesion should be tested in accordance with ISO 2411:1991 by dropping the lifejacket from a height of 18 m into the water at 100 mm/min and should be not less than 50 N per 50 mm width;
- .2 coating adhesion should be tested when wet following ageing according to ISO 188 with an exposure of 336 ± 0.5 h in fresh water at $(70.0 \pm 1.0)^\circ\text{C}$, following which the method at ISO 2411:1991 of dropping the lifejacket from a height of 18 m into the water at 100 mm/min and should not be less than 40 N per 50 mm width;
- .3 tear strength should be tested in accordance with ISO 4674:1977 using method A1 and should not be less than 35 N;
- .4 resistance to flex cracking should be tested in accordance with ISO 7854:1984 method A using 9000 flex cycles, there should be no visible cracking or deterioration;
- .5 breaking strength should be tested in accordance with ISO 1421:1977 using the CRE or CRT method, following conditioning for 24 ± 0.5 h at room temperature and should not be less than 200 N per 50 mm width;
- .6 breaking strength should be tested in accordance with ISO 1421:1977 using the CRE or CRT method, following conditioning immersed in fresh water for 24 ± 0.5 h at room temperature and should not be less than 200 N per 50 mm width;
- .7 elongation to break should be tested in accordance with ISO 1421:1977 using the CRE or CRT method following conditioning at room temperature for 24 ± 0.5 h and should not be more than 60%;
- .8 elongation to break should be tested in accordance with ISO 1421:1977 using the CRE or CRT method following conditioning immersed in fresh water at room temperature for 24 ± 0.5 h and should not be more than 60%;
- .9 the resistance to exposure to light when tested in accordance with ISO 105-BO2:1988 and the contrast between the unexposed and exposed samples should not be less than class 5;
- .10 the resistance to wet and dry rubbing when tested in accordance with ISO-105-X12:1995 and should not be less than class 3;
- .11 the resistance to sea water should not be less than class 4 in accordance with ISO-105-EO2:1978 and the change in colour of the specimen should not be less than class 4.

Operating head load test

2.11.8 The operating head load test should be carried out using two lifejackets, one lifejacket to be conditioned at -30°C for 8 h and the other at +65°C for 8 h. After mounting on the mannequin or the test form the lifejackets should be inflated, and a steady force of 220 ± 10 N applied to the operating head as near as possible to the point where it enters the buoyancy chamber. This load should be maintained for 5 min during which the direction and angle in which it is applied should be continuously varied. On completion of the test the lifejacket should remain intact and should hold its pressure for 30 min.

Pressure test

2.11.9 The inflatable buoyancy chambers should be capable of withstanding an internal over pressure at ambient temperature. A lifejacket should be inflated using the manual method of inflation, after inflation the relief valves should be disabled and a fully charged gas cylinder according to the manufacturers recommendation should be fitted to the same inflation device and fired. The lifejacket should remain intact and should hold its pressure for 30 min. The lifejackets should show no signs of damage such as cracking, swelling or changes of mechanical qualities and that there has been no significant damage to the lifejacket inflation component. All fully charged gas cylinders used in this test should be sized according to the markings on lifejacket.

2.11.10 With one buoyancy chamber inflated, the operating head on the opposite buoyancy chamber should be fired manually, using a fully charged gas cylinder according to the manufacturers recommendations. The operation of the relief valves should be noted to ensure that the excess pressure is relieved. The lifejacket should remain intact and should hold its pressure for 30 min. The lifejackets should no signs of damage such as cracking, swelling or changes of mechanical qualities and that there has been no significant damage to the lifejacket inflation component.

2.11.11 Air retention test: One inflation chamber of a lifejacket is filled with air until air escapes from the over-pressure valve or, if the lifejacket does not have an over-pressure valve, until its design pressure, as stated in the plans and specifications, is reached. After 12 h the drop in pressure should not be greater than 10%. This test is then repeated as many times as necessary to test a different chamber until each chamber has been tested in this manner.

Compression test

2.11.12 The inflatable lifejacket packed in the normal manner should be laid on a table. A bag containing 75 kg of sand and having a base of 320 mm diameter should be lowered onto the lifejacket from a height of 150 mm in a time of 1 s. This should be repeated ten times, after which the bag should remain on the jacket for not less than 3 h. The lifejacket should be inflated by immersion into water and should inflate fully; the jacket should be inspected to ensure that no swelling or change of mechanical properties has occurred; and the jacket should be checked for leaks.

Test of metallic components

2.11.13 Metal parts and components of a lifejacket should be corrosion-resistant to sea water and should be tested in accordance with ISO 9227:1990 for a period of 96 h. The metal components should be inspected and should not be significantly affected by corrosion, or affect any other part of the lifejacket and should not impair the performance of the lifejacket.

2.11.14 Metal components should not affect a magnetic compass of a type used in small boats by more than 1°, when placed at a distance of 500 mm from it.

Inadvertent inflation test

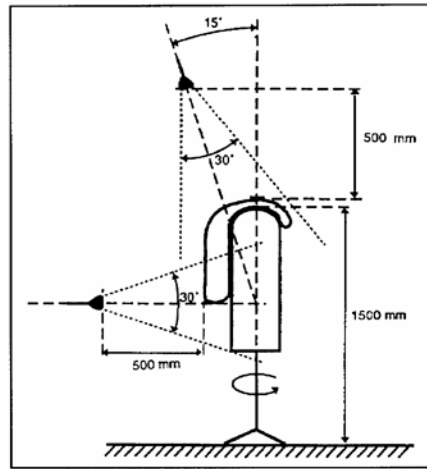
2.11.15 The resistance of an automatic inflation device to inadvertent operation should be assessed by exposing the entire lifejacket to sprays of water for fixed period. The lifejacket should be fitted correctly to a free-standing mannequin of adult size, with a minimum shoulder height of 1,500 mm. The lifejacket should be deployed in the mode in which it is worn ready for use but not deployed as used in the water (i.e. if it is equipped with a cover which is normally worn closed, then the cover should be closed for the test. Two sprays should be installed so as to spray fresh water onto the lifejacket, as shown in the diagram. One should be positioned 500 mm above the highest point of the lifejacket, and at an angle of 15° from the vertical centre line of the mannequin and the bottom line of the lifejacket. The other nozzle should be installed horizontally at a distance of 500 mm from the bottom line of the lifejacket, and points directly at the lifejacket. These nozzles should have a spray cone of 30°, each orifice being 1.5 ± 0.1 mm in diameter, and the total area of the orifice should be 50 ± 5 mm², the orifice being evenly spread over the spray nozzle area.

2.11.16 The air temperature should be 20°C, and water should be supplied to the sprays at a pressure of 0.3 kPa to 0.4 kPa, a flow of 600 l/h, and a temperature of 18°C to 20°C.

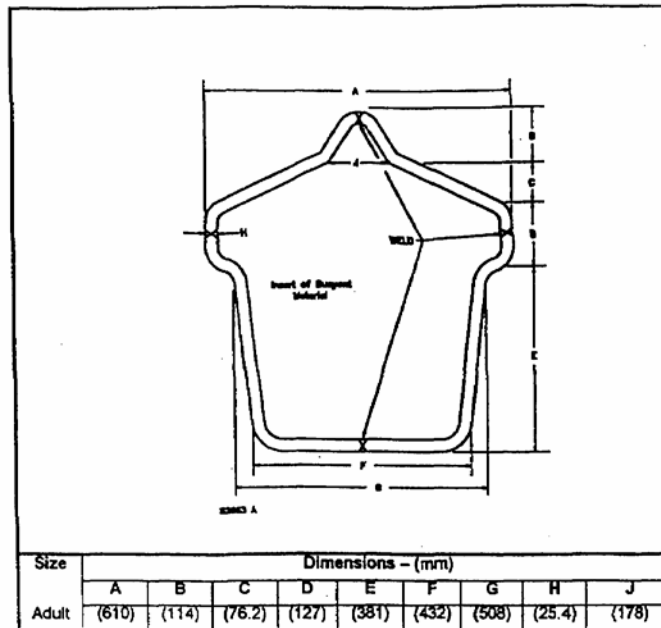
2.11.17 The sprays should be turned on, and the lifejacket exposed to the following series of test to access the ability of the jacket to resist inadvertent inflation:

- .1 5 min with the high spray on the front of the lifejacket;
- .2 5 min with the high spray on the left side of the lifejacket;
- .3 5 min with the high spray on the back of the lifejacket; and
- .4 5 min with the high spray on the right side of the lifejacket.

2.11.18 During exposures specified in 2.11.17.1, 2.11.17.2 and 2.11.17.4 above, the horizontal spray should be applied for 10 periods of 3 s each to the front, left or right sides (but not back) as with the high spray.



Test set-up for test of automatic inflation system



Alternative former

2.11.19 After completing the above test the lifejacket should be removed from the mannequin and immersed in water to verify that the auto-inflation system functions.

PART 2 - PRODUCTION AND INSTALLATION TESTS

1 GENERAL

1.1 Representatives of the competent authority should make random inspection of manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance.

1.2 Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the competent authority and to keep records of any production tests carried out in accordance with the competent authority instructions.

1.3 Where the proper operation of life-saving appliances is dependent on their correct installation in ships, the competent authority should require installation tests to ensure that the appliances have been correctly fitted in a ship.

2 INDIVIDUAL BUOYANCY EQUIPMENT FOR LIFEJACKETS

Production tests

2.1 Manufacturers should be required to carry out a buoyancy test on at least 0.5% of each batch of lifejackets produced, subject to a minimum of one from every batch.

Inspections by the competent authority

2.2 Inspections by a representative of the competent authority should be made at intervals of at least one per 6,000 lifejackets produced, subject to a minimum of one inspection per calendar quarter. When the manufacturer's quality control programme results in lifejackets that are consistently free of defects, the rate of inspection may be reduced to one in every 12,000. At least one lifejacket of each type in production should be selected at random by the inspector and subjected to detailed examination including, if necessary, cutting open. Inspectors should also be satisfied that the flotation tests are being conducted satisfactorily; if this is not the case, a flotation test should be undertaken.

ANNEX VI

ANNOTATED LIST OF PERTINENT PUBLICATIONS

FAO (www.fao.org)

FAO Code of Conduct for Responsible Fisheries

FAO Technical Guidelines for Responsible Fisheries – Fishing Operations

FAO Standard Specifications for the Marking and Identification of Fishing Vessels

FAO Safety at Sea as an Integral Part of Fisheries Management

IMO (www.imo.org)

Document for Guidance on Training and Certification of Fishing Vessel Personnel

The FAO/ILO/IMO Document for Guidance takes into account the conventions and recommendations adopted by the ILO and IMO and the wide practical experience of FAO in the field of training fishing vessel personnel. It covers training and certification of fishing vessel personnel on small and large fishing vessels. It is intended to provide guidance for those developing, establishing or reviewing national training schemes for training and certification programmes for fishing vessel personnel.

Regulations for Prevention of Collisions at Sea (COLREGS)

The 1993 Torremolinos Protocol and Torremolinos International Convention for the Safety of Fishing Vessels (Consolidated edition, 1995)

Code on Intact Stability for All Types of Ships covered by IMO Instruments (resolution A.749(18), as amended)

Code of practice concerning the Accuracy of Stability Information for Fishing Vessels (resolution A.267(VIII))

Recommended Practice on Portable Fish-Hold Divisions (resolution A.168(ES.IV), as amended by resolution A.268(VIII), appendix V)

Fire Test Procedures Code (resolution MSC.61(67))

Fire Safety Systems Code (resolution MSC.98(73))

Recommendation on improved fire test procedures for flammability of bulkheads, ceiling and deck finish materials (resolution A.653(16))

Guidelines for the evaluation of fire hazards properties of materials (resolution A.166(ES.IV))

Improved guidelines for marine portable fire extinguishers (resolution A.951(23))

Graphical symbols for shipboard fire control plans (resolution A.952(23))

Recommendation on fire test procedures for ignitability of primary deck coverings (resolution A.687(17))

Life-Saving Appliances Code (LSA Code) (resolution MSC.48(66))

Revised recommendations on the testing of life-saving appliances (resolution MSC.81(70), as revised)

Code of Practice for the evaluation, testing and acceptance of prototype novel life-saving appliances and arrangements (resolution A.520(13))

Standardized life-saving appliance evaluation and test report forms (MSC/Circ.980)

Recommendation on performance standards for magnetic compasses (resolution A.382(X))

Recommendation on performance standards for gyro-compasses (resolution A.424(XI))

Recommendation on performance standards for radar equipment (resolution MSC.64(67), annex 4)

Performance standards for automatic radar plotting aids (ARPAs) (resolution A.823(19))

Performance standards for survival craft radar transponders for use in search and rescue operations (resolution A.802(19))

Recommendation on performance standards for echo-sounding equipment (resolution A.224(VII), as amended by resolution MSC.74(69), annex 4)

Recommendation on performance standards for devices to indicate speed and distance (resolution A.824(19), as amended by resolution MSC.96(72))

Performance standards for rate-of-turn indicators (resolution A.526(13))

Recommendation on unification performance standards for Navigational Equipment (resolution A.575(14))

Recommendation on methods of measuring noise levels at listening posts (resolution A.343(IX))

Recommendation on performance standards for shipborne global positioning system receiver equipment (resolution A.819(19), as amended by resolution MSC.112(73))

Recommendation on performance standards for shipborne GLONASS receiver equipment (resolution MSC.53(66)), as amended by resolution MSC.113(73))

Recommendation on performance standards for combined GPS/GLONASS receiver equipment (resolution MSC.74(69), annex 1, as amended by resolution MSC.115(73))

Recommendation on the carriage of electronic position-fixing equipment (resolution A.815(19))

Recommendation on performance standards for heading control systems (resolution MSC.64(67), annex 3)

Recommendation on performance standards for shipborne Loran-C and Chayka receivers (resolution A.818(19))

Recommendation on performance standards for shipborne DGPS and DGLONASS maritime radio beacon receiver equipment (resolution MSC.64(67), annex 2, as amended by resolution MSC.114(73))

Recommendation on performance standards for track control systems (resolution MSC.74(69), annex 2)

Recommendation on performance standards for a universal shipborne automatic identification system (AIS) (resolution MSC.74(69), annex 3)

Recommendation on performance standards for radar reflectors (resolution A.384(X), as amended by resolution MSC.164(78))

Recommendation on performance standards for sound reception systems (resolution MSC.86(70), annex 1)

Recommendation on performance standards for voyage data recorders (VDRs) (resolution A.861(20))

Recommendation on performance standards for electronic chart display and information systems (ECDIS) (resolution A.817(19), as amended by resolutions MSC.64(67), annex 5, and MSC.86(70), annex 4)

Recommendation on performance standards for daylight signalling lamps (resolution MSC.95(72))

NAVTEX Manual approved by the Organization (publication IMO-951E)

Provision of Radio Services for the Global Maritime Distress and Safety System (GMDSS) (resolution A.704(17))

Carriage of Radar Operating in the Frequency Band 9,300-9,500 MHz (resolution A.614(15))

Carriage of Inmarsat Enhanced Group Call SafetyNET Receivers under the Global Maritime Distress and Safety System (GMDSS) (resolution A.701(17))

Promulgation of maritime safety information (resolution A.616(15))

Search and rescue homing capability (resolution A.615(15))

Operational standards for radiotelephone alarm signal generators (resolution A.421(XI))

Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (resolution A.525(13))

General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids (resolution A.694(17))

Performance standards for ship-earth stations capable of two-way communications (resolution A.698(17))

Type approval of ship-earth stations (resolution A.570(14))

Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling (resolution A.609(15))

Performance standards for shipborne MF radio installations capable of voice communication and digital selective calling (resolution A.610(15))

Performance standards for shipborne MF/HF radio installations capable of voice communication, narrow band direct-printing and digital selective calling (resolution A.613(15))

Performance standards for Float-Free Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) operating on 406 MHz (resolution A.695(17))

Type approval of Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) operating in the COSPAS-SARSAT System (resolution A.696(17))

Performance standards for survival craft radar transponders for use in search and rescue operations (resolution A.697(17))

Performance standards for Float-Free VHF Emergency Position-Indicating Radio Beacons (resolution A.612(15))

Performance standards for Inmarsat Standard-C ship-earth stations capable of transmitting and receiving direct-printing communications (resolution A.663(16))

Performance standards for enhanced group call equipment (resolution A.664(16))

Performance standards for Float-Free Satellite Emergency Position-Indicating Radio Beacons operating through the geostationary Inmarsat satellite system on 1.6 GHz (resolution A.661(16))

Performance standards for float-free release and activation arrangements for emergency radio equipment (resolution A.662(16))

System performance standards for the promulgation and co-ordination of maritime safety information using high-frequency narrow-band direct-printing (resolution A.699(17))

Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (MSI) by HF (resolution A.700(17))

Pilot transfer arrangements (SOLAS Convention, 1974, as amended, Regulation 23 of Chapter V)

Code on Noise Levels on board Ships (resolution A.468(XII))

WHO (www.who.int/en/org)

International Medical Guide for Ships

The ILO/IMO/WHO International Medical Guide for Ships, published by the World Health Organization, is intended for use by people, with little or no formal medical training, who are responsible for health care on board ships of all kinds.

OTHERS

European Union Council Directive 92/29/EEC on minimum safety and health requirements for improved medical treatment on board vessels

IEC Publication 60079

ANNEX 41**DRAFT AMENDMENTS TO THE GUIDELINES FOR FORMAL SAFETY ASSESSMENT (FSA) FOR USE IN THE IMO RULE-MAKING PROCESS (MSC/CIRC.1023-MEPC/CIRC.392)****3 Methodology**

1 The following new paragraph 3.2.3 is added after the existing paragraph 3.2.2:

"3.2.3 In order to ensure the transparency and traceability throughout the FSA steps, it is necessary to provide, in the report, references which support the analysis and results, methodologies used, uncertainties, assumptions and limitations, if any, in each step of FSA."

10 Presentation of FSA results

2 Existing subparagraph .3 of paragraph 10.1 is replaced by the following:

".3 explain the basis for significant assumptions, limitations, uncertainties, data models and inferences used or relied upon in the assessment recommendations, results of hazard identifications and risk analysis, RCOs and results of Cost Benefit Analysis to be considered in the decision-making process;"

3 The following new paragraph 10.3 is added after the existing paragraph 10.2:

"10.3 To facilitate the communication with IMO in the process of FSA, it is recommended that the name and contact point of the co-ordinator of the FSA should be informed to IMO through the relevant Administration or organization at the commencement or in the process of the FSA."

Appendix 8 – Standard format for reporting an application of formal safety assessment to IMO

4 In the Standard Reporting Format, the following text is added at the end of paragraph 5.1:

"with a clear indication of the name and contact point (e-mail address, telephone number and mailing address) of the co-ordinator of the FSA."

5 In the Standard Reporting Format, subparagraphs .1 and .2 of paragraph 6 are replaced by the following:

".1 method and techniques used to carry out each step of the assessment;

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

6 Under the heading “Annexes”, the following new subparagraph .1 is inserted:

".1 name and contact point (e-mail address, telephone number and mailing address) of the co-ordinator",

and the existing subparagraphs are renumbered accordingly.

ANNEX 42

**AMENDMENT TO RULE 8 OF THE RULES OF PROCEDURE
OF THE MARITIME SAFETY COMMITTEE**

The existing text of Rule 8 is replaced by the following:

“Publicity

Rule 8

The Committee may decide to hold meetings in private or public. In the absence of a decision to hold meetings in public, they shall be held in private. Meetings of subsidiary bodies of the Committee shall be held in private unless the Committee decides otherwise in any particular case.

Notwithstanding the aforesaid, and in accordance with the Guidelines for media access to meetings of Committees and their subsidiary bodies, adopted by the Organization, media may attend meetings of the Committee and its subsidiary bodies unless the Committee decides otherwise. Meetings of working groups and drafting groups established by the Committee and its subsidiary bodies shall be held in private.”

ANNEX 43

WORK PROGRAMMES OF THE SUB-COMMITTEES

SUB-COMMITTEE ON BULK LIQUIDS AND GASES (BLG)

		Target completion date/number of sessions needed for completion	Reference
1	Evaluation of safety and pollution hazards of chemicals and preparation of consequential amendments	Continuous	BLG 1/20, section 3; BLG 8/18, section 6
2	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4; BLG 8/18, section 13
3	Consideration of IACS unified interpretations	Continuous	MSC 76/23, paragraph 20.3; BLG 8/18, section 14; MSC 78/26, paragraph 22.12
H.1	Environmental and safety aspects of alternative tanker designs under MARPOL 73/78 regulation I/13F		BLG 3/18, paragraph 15.7
	.1 assessment of alternative tanker designs, if any (as necessary)	Continuous	BLG 1/20, section 16; BLG 4/18, paragraph 15.3
H.2	Requirements for protection of personnel involved in the transport of cargoes containing toxic substances in all types of tankers	2005	BLG 1/20, section 12; BLG 8/18, section 9 and paragraph 15.4.2.1

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- Notes:**
- 1 "H" means a high priority item and "L" means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.
 - 2 Items printed in bold letters have been selected for the provisional agenda for BLG 9.

Sub-Committee on Bulk Liquids and Gases (BLG) (continued)

	Target completion date/number of sessions needed for completion	Reference
H.3 Oil tagging systems	2 sessions	MEPC 45/20, paragraph 17.4; BLG 8/18, section 10 and paragraph 15.4.3.1
H.4 Revision of the fire protection requirements of the IBC, IGC, BCH and GC Codes (in co-operation with FP, as necessary)	2005	MSC 74/24, paragraph 18.5; BLG 8/18, section 11
H.5 Amendments to resolution MEPC.2(VI)	2006	MEPC 51/22, paragraph 17.12
H.6 Development of standards regarding rate of discharge for sewage	2006	MEPC 51/22, paragraph 17.15
H.7 Development of provisions for gas-fuelled ships (co-ordinated by DE)	2007	MSC 78/26, paragraph 24.11
H.8 Review of the OSV Guidelines (co-ordinated by SLF)	2005	MSC 78/26, paragraph 24.12
H.9 Development of guidelines for uniform implementation of the 2004 BWM Convention	2006	MEPC 52/24, paragraph 2.21.6
H.10 Clarification of the definition of fuel oil in the revised MARPOL Annex I	2005	MEPC 52/24, paragraph 6.6
H.11 Guidelines for the application of the revised MARPOL Annex I requirements to FPSOs and FSUs	2005	MEPC 52/24, paragraph 13.19

SUB-COMMITTEE ON DANGEROUS GOODS, SOLID CARGOES AND CONTAINERS (DSC)

		Target completion date/number of sessions needed for completion	Reference
1	Harmonization of the IMDG Code with the UN Recommendations on the Transport of Dangerous Goods	Continuous	MSC 63/23, paragraph 10.6; DSC 9/15, section 3
2	Reports on incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Continuous	CDG 45/22, section 11 and paragraph 20.2; DSC 9/15, section 6
3	Amendments to the BC Code, including evaluation of properties of solid bulk cargoes	Continuous	BC 34/17, section 3; DSC 9/15, section 4
4	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4; DSC 9/15, section 6
H.1	Amendment (33-06) to the IMDG Code and supplements	2005	DSC 3/15, paragraph 12.6; DSC 9/15, section 3
H.2	Review of Annex III of MARPOL 73/78	2005	DSC 3/15, paragraph 12.6; MEPC 48/21, paragraph 18.3.1; DSC 9/15, section 3
H.3	Mandatory application of the BC Code	2007	DSC 3/15, paragraph 12.7; MSC 78/25, paragraph 13.7 ; DSC 9/15, section 4

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 - 2 Items printed in bold letters have been selected for the provisional agenda for DSC 10.

Sub-Committee on Dangerous Goods, Solid Cargoes and Containers (DSC) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.4	Measures to enhance maritime security	2006	MSC 75/24, paragraph 22.9; DSC 9/15, section 9
H.5	Guidance on serious structural deficiencies in containers: reporting procedure on serious structural deficiencies	2005	MSC 75/24, paragraph 22.15; DSC 9/15, section 8
H.6	Review of the SPS Code (co-ordinated by DE)	2 sessions	MSC 78/26, paragraph 24.9
H.7	Amendments to the CSS Code	2005	DSC 8/15, section 5; MSC 78/26, paragraph 24.15.3
H.8	Revision of the LHNS and OSV Guidelines	2006	MSC 79/23, paragraph 20.8
H.9	Amendments to the Guidelines for partially weathertight hatchway covers on board containerhips	2005	MSC 79/23, paragraph 20.6
H.10	Extension of the BLU Code to include grain	2006	MSC 79/23, paragraph 20.7

SUB-COMMITTEE ON FIRE PROTECTION (FP)

		Target completion date/number of sessions needed for completion	Reference
1	Analysis of fire casualty records	Continuous	MSC 75/24, paragraph 22.18; FP 48/19, section 13
2	Consideration of IACS unified interpretations	Continuous	MSC 78/26, paragraph 22.12
H.1	Passenger ship safety	2006	MSC 74/24, paragraph 21.4; FP 48/19, section 4; MSC 79/23, paragraph 4.12
H.2	Performance testing and approval standards for fire safety systems	2005	MSC 74/24, paragraph 21.12; FP 48/19, section 5
H.3	Review of the fire protection provisions of the LHNS Guidelines	2006	MSC 75/24, paragraph 22.4; FP 48/19, section 8
H.4	Performance standards for evacuation guidance systems	2006	MSC 75/24, paragraph 22.19; FP 48/19, section 9
H.5	Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code	2005	MSC 76/23, paragraphs 8.19 and 20.4; FP 48/19, section 10
H.6	Amendments to resolution A.754(18) relating to performance criteria for fire doors	2005	MSC 77/26, paragraph 23.12; FP 48/19, section 14

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 - Items printed in bold letters have been selected for the provisional agenda for FP 49.

Sub-Committee on Fire Protection (FP) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.7	Amendments to resolution A.653(16) relating to the preparation of specimens for sealants and mastics	2005	MSC 77/26, paragraph 23.13; FP 48/19, section 15
H.8	Recommendation on evacuation analysis for new and existing passenger ships	2005	MSC 73/21, paragraph 4.16; FP 48/19, section 12
H.9	Review of the SPS Code (co-ordinated by DE)	2 sessions	MSC 78/26, paragraph 24.9
H.10	Development of provisions for gas-fuelled ships (co-ordinated by DE)	2007	MSC 78/26, paragraph 24.19
H.11	Measures to prevent fires in engine-rooms and cargo pump-rooms	4 sessions	MSC 79/23, paragraph 20.11
L.1	Smoke control and ventilation	2 sessions	FP 39/19, section 9; FP 46/16, section 4

SUB-COMMITTEE ON FLAG STATE IMPLEMENTATION (FSI)

		Target completion date/number of sessions needed for completion	Reference
1	Mandatory reports under MARPOL 73/78	Continuous	MSC 70/23, paragraph 20.12.1; FSI 12/22, section 3
2	Casualty statistics and investigations	Continuous	MSC 68/23, paragraphs 7.16 to 7.24; FSI 12/22, section 4
3	Regional co-operation on port State control	Continuous	FSI 12/22, section 5
4	Reporting procedures on port State control detentions and analysis and evaluation of reports	Continuous	MSC 71/23, paragraph 20.16; FSI 12/22, section 6
5	Responsibilities of Governments and measures to encourage flag State compliance	Continuous	MSC 68/23, paragraphs 7.2 to 7.8; FSI 12/22, section 7
6	Comprehensive analysis of difficulties encountered in the implementation of IMO instruments	Continuous	MSC 69/22, paragraph 20.28; FSI 8/19, section 4; FSI 12/22, section 8
7	Review of the Survey Guidelines under the HSSC (resolution A.948(23))	Continuous	MSC 72/23, paragraph 21.27; FSI 12/22, section 9
8	Consideration of IACS unified interpretations	Continuous	MSC 78/26, paragraph 22.12

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 - 2 Items printed in bold letters have been selected for the provisional agenda for FSI 13.

Sub-Committee on Flag State Implementation (FSI) (continued)

	Target completion date/number of sessions needed for completion	Reference
H.1 PSC on seafarers' working hours	2006	MSC 70/23, paragraph 20.12.3; FSI 7/14, paragraphs 7.11 to 7.13; MSC 71/23, paragraph 13.13; FSI 12/22, section 10
H.2 Illegal, unregulated and unreported (IUU) fishing and implementation of resolution A.925(22)	2005	MSC 72/23, paragraph 21.28; FSI 10/17, section 11; MSC 75/24, paragraphs 13.11 and 22.25.3; FSI 12/22, section 11
H.3 Development of provisions on transfer of class	2005	MSC 74/24, paragraph 2.13.15.2; FSI 10/17, paragraphs 14.2 and 14.10.4.1; MSC 75/24, paragraph 22.24; FSI 12/22, section 12
H.4 Measures to enhance maritime security	2006	MSC 76/23, paragraph 20.60.2; FSI 12/22, section 15; MSC 78/26, paragraph 24.23
H.5 Review of reporting requirements for reception facilities	2005	FSI 11/23, paragraph 20.5.4.3; FSI 12/22, section 18

Sub-Committee on Flag State Implementation (FSI) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.6	Development of survey guidelines required by regulation E-1 of the 2004 BWM Convention	2006	MEPC 51/22, paragraph 2.11.6
H.7	Development of guidelines on port State control under the 2004 BWM Convention	2006	MEPC 52/24, paragraph 2.21.2
H.8	Development of guidelines on port State control for MARPOL Annex VI	2006	MEPC 52/24, paragraph 4.13
H.9	Review of the Code for the investigation of marine casualties and incidents	2007	MSC 79/23, paragraphs 20.15 to 20.18

SUB-COMMITTEE ON RADIOCOMMUNICATIONS AND SEARCH AND RESCUE (COMSAR)

		Target completion date/number of sessions needed for completion	Reference
1	Global Maritime Distress and Safety System (GMDSS)		COMSAR 8/18, section 3
	.1 matters relating to the GMDSS Master Plan	Continuous	COMSAR 8/18, paragraphs 3.1 to 3.3
	.2 exemptions from radio requirements	Continuous	COMSAR 4/14, paragraphs 3.38 to 3.41
2	Promulgation of maritime safety information (MSI) (in co-operation with ITU, IHO, WMO and IMSO)		
	.1 operational and technical co-ordination provisions of maritime safety information (MSI) services, including review of the related documents	Continuous	COMSAR 8/18, paragraphs 3.4 to 3.7
3	ITU World Radiocommunication Conference matters	Continuous	COMSAR 8/18, section 4
4	Radiocommunication ITU-R Study Group 8 matters	Continuous	COMSAR 8/18, section 4
5	Satellite services (Inmarsat and COSPAS-SARSAT)	Continuous	COMSAR 8/18, section 5

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 - 2 Items printed in bold letters have been selected for the provisional agenda for COMSAR 9.

Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) (continued)

		Target completion date/number of sessions needed for completion	Reference
6	Matters concerning search and rescue, including those related to the 1979 SAR Conference and the implementation of the GMDSS		
.1	harmonization of aeronautical and maritime search and rescue procedures, including SAR training matters	2005	COMSAR 8/18, paragraphs 7.1 to 7.7
.2	plan for the provision of maritime SAR services, including procedures for routing distress information in the GMDSS	Continuous	COMSAR 8/18, paragraphs 7.8 to 7.12
.3	revision of the IAMSAR Manual	Continuous	MSC 71/23, paragraph 20.2; COMSAR 8/18, section 11
.4	medical assistance in SAR services	2005	MSC 75/24, paragraph 22.29; COMSAR 8/18, paragraphs 7.13 to 7.16
7	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4
H.1	Amendments to SOLAS chapter IV pursuant to the criteria set out in resolution A.888(21)	3 sessions	MSC 72/23, paragraph 21.33.1.2
H.2	Developments in maritime radiocommunication systems and technology	2005	MSC 74/24; paragraph 21.25.1; COMSAR 8/18, section 10
H.3	Emergency radiocommunications, including false alerts and interference	2006	COMSAR 8/18, section 6

Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.4	Review of the OSV Guidelines (co-ordinated by SLF)	2007	MSC 75/24, paragraph 22.4
H.5	Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code (co-ordinated by DE)	2005	MSC 75/24, paragraph 22.8; MSC 76/23, paragraphs 8.19 and 20.4; COMSAR 8/18, section 12
H.6	Measures to enhance maritime security	2005	MSC 75/24, paragraph 22.9; COMSAR 8/18, section 13
H.7	Review of the SPS Code (co-ordinated by DE)	2 sessions	MSC 78/26, paragraph 24.9
H.8	Revision of the performance standards for SART	2 sessions	MSC 78/26, paragraph 24.26
H.9	Passenger ship safety	2006	MSC 78/26, paragraph 4.45 ; MSC 79/23, paragraph 4.12
L.1	Review of the FAL and SALVAGE Convention provisions regarding the treatment of persons rescued at sea	2005	MSC 75/24, paragraphs 11.53 and 22.30.2; COMSAR 8/18, paragraph 8.6
L.2	Recommendations on high-risk oceanic crossings by adventure craft (co-ordinated by NAV)	2005	MSC 76/23, paragraph 20.24; COMSAR 8/18, paragraph 15.4

SUB-COMMITTEE ON SAFETY OF NAVIGATION (NAV)

		Target completion date/number of sessions needed for completion	Reference
1	Routeing of ships, ship reporting and related matters	Continuous	MSC 72/23, paragraphs 10.69 to 10.71, 20.41 and 20.42; NAV 49/19, section 3
2	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4; NAV 49/19, section 14
3	Consideration of IACS unified interpretations	Continuous	MSC 78/26, paragraph 22.12; NAV 50/19, paragraphs 16.2 and 18.42 to 18.44
H.1	World-wide radionavigation system (WWRNS)	2005	MSC 75/24, paragraph 22.37
	.1 new developments in the field of GNSS, especially Galileo	2005	NAV 50/19, paragraphs 13.1 to 13.3
	.2 review and amendment of IMO policy for GNSS (resolution A.915(22))	2005	NAV 48/19, paragraph 16.3.2
	.3 recognition of radionavigation systems as components of the WWRNS (resolution A.953(23))	2005	NAV 48/19, paragraph 16.3.3

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 - 2 Items printed in bold letters have been selected for the provisional agenda for NAV 51.

Sub-Committee on Safety of Navigation (NAV) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.2	Passenger ship safety: effective voyage planning for passenger ships	2006	MSC 73/21, paragraph 18.23; MSC 74/24, paragraph 21.4; NAV 50/19, section 11 ; MSC 79/23, paragraph 4.12
H.3	Review of the OSV Guidelines (co-ordinated by DE)	2007	MSC 75/24, paragraph 22.4 ; NAV 50/19, paragraph 16.2
H.4	Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code (co-ordinated by DE)	2005	MSC 75/24, paragraphs 12.22 and 2.8; MSC 76/23, paragraphs 8.19 and 20.4; NAV 50/19, section 5
H.5	Measures to enhance maritime security	2005	MSC 75/24, paragraph 22.9; NAV 50/19, section 12
H.6	ITU matters, including Radio-communication ITU-R Study Group 8 matters	2006	MSC 69/22, paragraphs 5.69 and 5.70; NAV 50/19, section 10
H.7	Review of the SPS Code (co-ordinated by DE)	2006	MSC 78/26, paragraph 24.9; NAV 50/19, paragraph 16.2

Sub-Committee on Safety of Navigation (NAV) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.8	Revision of the performance standards for INS and IBS	2006	MSC 78/26, paragraph 24.30; NAV 50/19, paragraphs 16.2 and 18.19 to 18.21
H.9	Evaluation of the use of ECDIS and ENC development	2006	MSC 78/26, paragraph 24.33; NAV 50/19, paragraphs 16.2 and 18.31 to 18.37
H.10	Revision of the performance standards for VDRs and S-VDRs	2006	MSC 79/23, paragraph 20.24

SUB-COMMITTEE ON SHIP DESIGN AND EQUIPMENT (DE)

		Target completion date/number of sessions needed for completion	Reference
1	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4
2	Consideration of IACS unified interpretations	Continuous	MSC 78/26, paragraph 22.12
H.1	Amendments to resolution A.744(18)	2006	DE 45/27, paragraphs 7.18 and 7.19; DE 47/25, section 3
H.2	Safety aspects of ballast water management	2006	MSC 71/23, paragraph 9.11; DE 47/25, paragraphs 22.4 and 22.5
H.3	Passenger ship safety	2006	MSC 74/24, paragraph 21.4 ; DE 47/25, section 4 ; MSC 79/23, paragraph 4.12
H.4	Measures to prevent accidents with lifeboats (in co-operation with FSI, NAV and STW)	2006	MSC 74/24, paragraph 21.34; DE 47/25, section 5

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- Notes:**
- 1 “H” means a high priority item and “L” means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.
 - 2 Items printed in bold letters have been selected for the provisional agenda for DE 48.

Sub-Committee on Ship Design and Equipment (DE) (continued)

	Target completion date/number of sessions needed for completion	Reference
H.5 Protection of fuel tanks (in co-operation with BLG and SLF, as necessary)	2005	DE 44/19, paragraph 2.7.2; MEPC 46/23, paragraph 20.18; MSC 74/24, paragraph 21.36 ; DE 47/25, section 6
H.6 Anchoring, mooring and towing equipment (in co-operation with NAV)	2005	MSC 74/24, paragraph 21.42; DE 47/25, section 8
H.7 Performance testing and approval standards for SOLAS personal life-saving appliances	2005	MSC 74/24, paragraph 21.46; DE 47/25, section 9
H.8 Review of the OSV Guidelines (co-ordinated by SLF)	2007	MSC 75/24, paragraph 22.4; DE 47/25, paragraph 22.6
H.9 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code (in co-operation with FP, COMSAR, NAV and SLF)	2005	MSC 75/24, paragraph 12.22; MSC 76/23, paragraphs 8.19 and 20.4; DE 47/25, section 10
H.10 Performance standards for protective coatings	2006	MSC 76/23, paragraphs 20.41.2 and 20.48; DE 47/25, section 18
H.11 Inspection and survey requirements for accommodation ladders	2006	MSC 77/26, paragraph 23.32; DE 47/25, paragraph 2.6

Sub-Committee on Ship Design and Equipment (DE) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.12	Mandatory emergency towing systems in ships other than tankers greater than 20,000 dwt	2006	MSC 77/26, paragraph 23.33; DE 47/25, paragraph 24.9
H.13	Compatibility of life-saving appliances	2006	DE 47/15, paragraph 5.3; MSC 78/26, paragraph 24.37.1
H.14	Inconsistencies in IMO instruments regarding requirements for life-saving appliances	2006	DE 42/15, paragraph 9.7 MSC 78/26, paragraph 24.37.2
H.15	Guidelines under MARPOL Annex VI on prevention of air pollution from ships		MEPC 41/20, paragraph 8.22.1; DE 42/15, paragraphs 10.2 to 10.4
.1	Guidelines on equivalent methods to reduce on-board NOx emission	2 sessions	
.2	Guidelines on on-board exhaust gas cleaning systems	2005	DE 46/32, paragraphs 3.10 and 29.9.6.1; DE 47/25, section 20
.3	Guidelines on other technological methods verifiable or enforceable to limit SOx emission	2 sessions	
H.16	Revision of the Guidelines for systems for handling oily wastes in machinery spaces of ships (MEPC/Circ.235)	2006	MEPC 51/22, paragraph 20.5

Sub-Committee on Ship Design and Equipment (DE) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.17	Review of the SPS Code (in co-operation with DSC, FP, NAV, COMSAR and SLF)	2 sessions	MSC 78/26, paragraph 24.9
H.18	Amendments to resolution A.761(18)	2 sessions	MSC 78/26, paragraph 24.38
H.19	Development of provisions for gas-fuelled ships (in co-operation with BLG and FP)	2007	MSC 78/26, paragraph 24.39
H.20	Test standards for extended service intervals of inflatable liferafts	2006	MSC 78/26, paragraph 24.41
H.21	Amendments to the Guidelines for ships operating in Arctic ice-covered waters (in co-operation with SLF, as necessary)	2 sessions	MSC 79/23, paragraph 8.25
H.22	Revision of the Code on alarms and indicators (in co-operation with appropriate sub-committees, as necessary)	2 sessions	MSC 79/23, paragraph 20.28
H.23	Amendments to the MODU Code	2 sessions*	MSC 79/23, paragraph 22.51
L.1	Revision of resolution A.760(18)	2 sessions	DE 46/32, paragraph 31.23; DE 47/25, paragraph 22.6
L.2	Free-fall lifeboats with float-free capabilities	1 session	MSC 76/23, paragraphs 20.41.3 and 20.48; DE 47/25, paragraph 22.6

* The item should be included in the provisional agenda for DE 49.

SUB-COMMITTEE ON STABILITY AND LOAD LINES AND ON FISHING VESSELS SAFETY (SLF)

		Target completion date/number of sessions needed for completion	Reference
1	Analysis of intact stability casualty records	Continuous	MSC 70/23, paragraph 20.4; SLF 30/18, paragraphs 4.16 and 4.17
2	Analysis of damage cards	Continuous	MSC 70/23, paragraph 20.4; SLF 41/18, paragraph 17.5; MSC 78/26, paragraph 12.10; SLF 47/17, paragraph 14.2
	.1 revision of the IMO damage card	2006	
3	Consideration of IACS unified interpretations	Continuous	MSC 78/26, paragraph 22.12
H.1	Development of explanatory notes for harmonized SOLAS chapter II-1	2006	MSC 69/22, paragraph 20.60.1; SLF 47/17, section 4
H.2	Safety of small fishing vessels (in co-operation with DE, COMSAR, FP, NAV and STW, as necessary)	2009	SLF 47/17; paragraph 14.1; MSC 79/23, paragraph 11.15
H.3	Safety aspects of ballast water management	2005	MSC 71/23, paragraph 9.11; SLF 47/17, paragraph 16.3

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2 Items printed in bold letters have been selected for inclusion in the provisional agenda for SLF 48.

Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF) (continued)

	Target completion date/number of sessions needed for completion	Reference
H.4 Passenger ship safety	2006	MSC 74/24, paragraph 21.4; SLF 47/17, section 8; MSC 79/23, paragraph 4.12
H.5 Revision of the Intact Stability Code	2007	SLF 41/18, paragraph 3.14; SLF 47/17, section 6
H.6 Review of the LHNS and OSV Guidelines (in co-operation with BLG, DSC, COMSAR, DE and NAV)	2005	MSC 75/24, paragraph 22.4; SLF 47/17, section 7
H.7 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code (co-ordinated by DE)	2005	MSC 76/23, paragraphs 8.19 and 20.4; SLF 47/17, section 13
H.8 Revision of technical regulations of the 1966 LL Convention	2005	MSC 76/23, paragraph 20.51; SLF 47/17, section 11
H.9 Review of the SPS Code (co-ordinated by DE)	2006	MSC 78/26, paragraph 24.9
L.1 Harmonization of damage stability provisions in other IMO instruments, including the 1993 Torremolinos Protocol (probabilistic method)	2005	MSC 62/25, paragraph 21.23; SLF 47/17, section 9
L.2 Revision of resolution A.266(VIII)	2006	SLF 45.14, paragraphs 3.19 and 11.1.4.1; MSC 76/23, paragraph 20.50; SLF 47/17, paragraph 14.2

Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF) (continued)

		Target completion date/number of sessions needed for completion	Reference
L.3	Tonnage measurement of open-top containerships	2006	MSC 78/26, paragraph 24.50 ; SLF 47/17, paragraph 14.2
L.4	Revision of MSC/Circ.650	2006	SLF 47/17, paragraph 3.8

SUB-COMMITTEE ON STANDARDS OF TRAINING AND WATCHKEEPING (STW)

		Target completion date/number of sessions needed for completion	Reference
1	Validation of model training courses	Continuous	STW 31/17, paragraph 14.4; STW 35/19, section 3
2	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4; MSC 77/26, paragraphs 18.10 and 23.40.2
H.1	Unlawful practices associated with certificates of competency	2005	MSC 71/23, paragraph 20.55.2; STW 35/19, section 5
H.2	Passenger ship safety	2005	MSC 74/24, paragraph 21.4; STW 35/19, section 6; MSC 79/23, paragraph 4.12
H.3	Training of crew in launching/ recovering operations of fast rescue boats and means of rescue in adverse weather conditions	2006	MSC 74/24, paragraph 21.56; STW 35/19, section 7
H.4	Measures to prevent accidents with lifeboats (co-ordinated by DE)	2005	MSC 74/24, paragraph 21.34; STW 35/19, section 8

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- Notes:**
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 - 2 Items printed in bold letters have been selected for the provisional agenda for STW 36.

Sub-Committee on Standards of Training and Watchkeeping (STW) (continued)

		Target completion date/number of sessions needed for completion	Reference
H.5	Measures to enhance maritime security	2005	MSC 75/24, paragraphs 22.9 and 22.45; STW 35/19, section 9
H.6	Education and training requirements for fatigue prevention, mitigation and management	2006	MSC 75/24, paragraph 22.48; STW 35/19, section 10
H.7	Requirements for knowledge, skills and training for officers on WIG craft	2005	MSC 76/23, paragraph 20.55; STW 35/19, section 11
H.8	Development of training requirements for the control and management of ship's ballast water and sediments	2007	MSC 71/23, paragraph 20.55.3; STW 35/19, section 12 and paragraph 16.5
H.9	Development of competences for ratings	2005	MSC 77/26, paragraph 23.40.1; STW 35/19, section 13
H.10	Training and certification requirements for company and port facility security officers	2005	MSC 77/26, paragraphs 6.82 and 23.41; STW 35/19, section 15
L.1	Review of the implementation of STCW chapter VII	2 sessions	MSC 72/23, paragraph 21.56; STW 35/19, section 14
L.2	Clarification of the STCW-F Convention provisions and follow-up action to the associated Conference resolutions	2 sessions	STW 34/14, paragraph 11.8

ANNEX 44**PROVISIONAL AGENDAS FOR THE FORTHCOMING SESSIONS
OF THE SUB-COMMITTEES****SUB-COMMITTEE ON BULK LIQUIDS AND GASES (BLG) - 9TH SESSION***

Opening of the session and election of the Chairman and Vice-Chairman for 2005

- 1 Adoption of the agenda
- 2 Decisions of other IMO bodies
- 3 Evaluation of safety and pollution hazards of chemicals and preparation of consequential amendments
- 4 Requirements for protection of personnel involved in the transport of cargoes containing toxic substances in all types of tankers
- 5 Revision of the fire protection requirements of the IBC, IGC, BCH and GC Codes
- 6 Consideration of IACS unified interpretations
- 7 Amendments to resolution MEPC.2(VI)
- 8 Development of standards regarding rate of discharge for sewage
- 9 Development of provisions for gas-fuelled ships
- 10 Review of the OSV Guidelines
- 11 Development of guidelines for uniform implementation of the 2004 BWM Convention
- 12 Clarification of the definition of fuel oil in the revised MARPOL Annex I
- 13 Guidelines for the application of the revised MARPOL Annex I requirements to FPSOs and FSUs
- 14 Work programme and agenda for BLG 10
- 15 Election of Chairman and Vice-Chairman for 2006
- 16 Any other business
- 17 Report to the Committees

* Agenda item numbers do not necessarily indicate priority.

**SUB-COMMITTEE ON DANGEROUS GOODS, SOLID CARGOES AND CONTAINERS (DSC) -
10TH SESSION***

- Opening of the session
- 1 Adoption of the agenda
 - 2 Decisions of other IMO bodies
 - 3 Amendments to the IMDG Code and supplements, including harmonization of the IMDG Code with the UN Recommendations on the Transport of Dangerous Goods
 - .1 harmonization of the IMDG Code with the UN Recommendations on the Transport of Dangerous Goods
 - .2 amendment (33-06) to the IMDG Code and supplements
 - .3 review of Annex III of MARPOL 73/78
 - 4 Amendments to the BC Code, including evaluation of properties of solid bulk cargoes
 - 5 Mandatory application of the BC Code
 - .1 identification of mandatory and recommendatory parts of the BC Code, including consequential amendments
 - .2 amendments to SOLAS chapters VI and VII on making the BC Code mandatory
 - 6 Casualty and incident reports and analysis
 - 7 Amendments to the CSS Code
 - 8 Guidance on serious structural deficiencies in containers: reporting procedure on serious structural deficiencies
 - 9 Measures to enhance maritime security
 - 10 Revision of the LHNS and OSV Guidelines
 - 11 Amendments to the Guidelines for partially weathertight hatchway covers on board containerhips
 - 12 Extension of the BLU Code to include grain
 - 13 Work programme and agenda for DSC 11
 - 14 Election of Chairman and Vice-Chairman for 2006
 - 15 Any other business
 - 16 Report to the Maritime Safety Committee

* Agenda item numbers do not necessarily indicate priority.

SUB-COMMITTEE ON FIRE PROTECTION (FP) – 49TH SESSION*

- Opening of the session
- 1 Adoption of the agenda
 - 2 Decisions of other IMO bodies
 - 3 Passenger ship safety
 - 4 Performance testing and approval standards for fire safety systems
 - 5 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code
 - 6 Amendments to resolution A.653(16) relating to the preparation of specimens for sealants and mastics
 - 7 Amendments to resolution A.754(18) relating to performance criteria for fire doors
 - 8 Review of the fire protection provisions of the LHNS Guidelines
 - 9 Performance standards for evacuation guidance systems
 - 10 Recommendation on evacuation analysis for new and existing passenger ships
 - 11 Analysis of fire casualty records
 - 12 Development of provisions for gas-fuelled ships
 - 13 Consideration of IACS unified interpretations
 - 14 Work programme and agenda for FP 50
 - 15 Election of Chairman and Vice-Chairman for 2006
 - 16 Any other business
 - 17 Report to the Maritime Safety Committee

* Agenda item numbers do not necessarily indicate priority.

SUB-COMMITTEE ON FLAG STATE IMPLEMENTATION (FSI) – 13TH SESSION*

- Opening of the session
- 1 Adoption of the agenda
 - 2 Decisions of other IMO bodies
 - 3 Mandatory reports under MARPOL 73/78
 - 4 Casualty statistics and investigations
 - 5 Review of the Code for the investigation of marine casualties and incidents
 - 6 Regional co-operation on port State control
 - 7 Reporting procedures on port State control detentions and analysis and evaluation of reports
 - 8 Development of guidelines on port State control under the 2004 BWM Convention
 - 9 Development of guidelines on port State control for MARPOL Annex VI
 - 10 Responsibilities of Governments and measures to encourage flag State compliance
 - 11 Comprehensive analysis of difficulties encountered in the implementation of IMO instruments
 - 12 Review of the Survey Guidelines under the HSSC (resolution A.948(23))
 - 13 Development of survey guidelines required by regulation E-1 of the 2004 BWM Convention
 - 14 PSC on seafarers' working hours
 - 15 Illegal, unregulated and unreported (IUU) fishing and implementation of resolution A.925(22)
 - 16 Development of provisions on transfer of class
 - 17 Measures to enhance maritime security
 - 18 Consideration of IACS unified interpretations
 - 19 Review of reporting requirements for reception facilities
 - 20 Work programme and agenda for FSI 14
 - 21 Election of Chairman and Vice-Chairman for 2006
 - 22 Any other business
 - 23 Report to the Committees

* Agenda item numbers do not necessarily indicate priority.

**SUB-COMMITTEE ON RADIOCOMMUNICATIONS AND SEARCH AND RESCUE (COMSAR) -
9TH SESSION***

- Opening of the session
- 1 Adoption of the agenda
- 2 Decisions of other IMO bodies
- 3 Global Maritime Distress and Safety System (GMDSS)
 - .1 matters relating to the GMDSS Master Plan
 - .2 operational and technical co-ordination provisions of maritime safety information (MSI) services, including review of the related documents
- 4 ITU maritime radiocommunication matters
 - .1 Radiocommunication ITU-R Study Group 8 matters
 - .2 ITU World Radiocommunication Conference matters
- 5 Satellite services (Inmarsat and COSPAS-SARSAT)
- 6 Emergency radiocommunications, including false alerts and interference
- 7 Matters concerning search and rescue, including those related to the 1979 SAR Conference and the implementation of the GMDSS
 - .1 harmonization of aeronautical and maritime search and rescue procedures, including SAR training matters
 - .2 plan for the provision of maritime SAR services, including procedures for routing distress information in the GMDSS
 - .3 medical assistance in SAR services
- 8 Developments in maritime radiocommunication systems and technology
- 9 Revision of the IAMSAR Manual
- 10 Review of the OSV Guidelines
- 11 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code

* Agenda item numbers do not necessarily indicate priority.

- 12 Measures to enhance maritime security
- 13 Passenger ship safety
- 14 Review of the FAL and SALVAGE Convention provisions regarding the treatment of persons rescued at sea
- 15 Recommendations on high-risk oceanic crossings by adventure craft
- 16 Work programme and agenda for COMSAR 10
- 17 Election of Chairman and Vice-Chairman for 2006
- 18 Any other business
- 19 Report to the Maritime Safety Committee

SUB-COMMITTEE ON SAFETY OF NAVIGATION (NAV) – 51ST SESSION*

- Opening of the session
- 1 Adoption of the agenda
 - 2 Decisions of other IMO bodies
 - 3 Routeing of ships, ship reporting and related matters
 - 4 Revision of the performance standards for INS and IBS
 - 5 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code
 - 6 Evaluation of the use of ECDIS and ENC development
 - 7 Review of the OSV Guidelines
 - 8 Review of the SPS Code
 - 9 ITU matters, including Radiocommunication ITU-R Study Group 8 matters
 - 10 Passenger ship safety: effective voyage planning for passenger ships
 - 11 Measures to enhance maritime security
 - 12 World-wide radionavigation system (WWRNS)
 - 13 Casualty analysis
 - 14 Consideration of IACS unified interpretations
 - 15 Revision of the performance standards for VDRs and S-VDRs
 - 16 Work programme and agenda for NAV 52
 - 17 Election of Chairman and Vice-Chairman for 2006
 - 18 Any other business
 - 19 Report to the Maritime Safety Committee

* Agenda item numbers do not necessarily indicate priority.

SUB-COMMITTEE ON SHIP DESIGN AND EQUIPMENT (DE) - 48TH SESSION*

- Opening of the session
- 1 Adoption of the agenda
 - 2 Decisions of other IMO bodies
 - 3 Amendments to resolution A.744(18)
 - 4 Passenger ship safety
 - 5 Measures to prevent accidents with lifeboats
 - 6 Anchoring, mooring and towing equipment
 - 7 Protection of fuel tanks
 - 8 Compatibility of life-saving appliances
 - 9 Performance testing and approval standards for SOLAS personal life-saving appliances
 - 10 Inconsistencies in IMO instruments regarding requirements for life-saving appliances
 - 11 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code
 - 12 Performance standards for protective coatings
 - 13 Guidelines on on-board exhaust gas cleaning systems
 - 14 Mandatory emergency towing systems in ships other than tankers greater than 20,000 dwt
 - 15 Review of the OSV Guidelines
 - 16 Inspection and survey requirements for accommodation ladders
 - 17 Safety aspects of ballast water management
 - 18 Revision of the Guidelines for systems for handling oily wastes in machinery spaces of ships (MEPC/Circ.235)
 - 19 Development of provisions for gas-fuelled ships
 - 20 Test standards for extended service intervals of inflatable liferafts

* Agenda item numbers do not necessarily indicate priority.

- 21 Consideration of IACS unified interpretations
- 22 Work programme and agenda for DE 49
- 23 Election of Chairman and Vice-Chairman for 2006
- 24 Any other business
- 25 Report to the Maritime Safety Committee

**SUB-COMMITTEE ON STABILITY AND LOAD LINES AND ON FISHING VESSELS SAFETY (SLF) -
48TH SESSION***

- Opening of the session
- 1 Adoption of the agenda
 - 2 Decisions of other IMO bodies
 - 3 Development of explanatory notes for harmonized SOLAS chapter II-1
 - 4 Revision of the Intact Stability Code
 - 5 Review of the LHNS and OSV Guidelines
 - 6 Passenger ship safety
 - 7 Harmonization of damage stability provisions in other IMO instruments
 - 8 Consideration of IACS unified interpretations
 - 9 Revision of technical regulations of the 1966 LL Convention
 - 10 Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code
 - 11 Revision of resolution A.266(VIII)
 - 12 Tonnage measurement of open-top containerships
 - 13 Review of the SPS Code
 - 14 Safety aspects of ballast water management
 - 15 Analysis of damage cards: revision of the IMO damage card
 - 16 Safety of small fishing vessels
 - 17 Revision of MSC/Circ.650
 - 18 Work programme and agenda for SLF 49
 - 19 Election of Chairman and Vice-Chairman for 2006
 - 20 Any other business
 - 21 Report to the Maritime Safety Committee

* Agenda item numbers do not necessarily indicate priority.

SUB-COMMITTEE ON STANDARDS OF TRAINING AND WATCHKEEPING (STW) - 36TH SESSION*

- Opening of the session
- 1 Adoption of the agenda
 - 2 Decisions of other IMO bodies
 - 3 Validation of model training courses
 - 4 Unlawful practices associated with certificates of competency
 - 5 Passenger ship safety
 - 6 Training of crew in launching/recovering operations of fast rescue boats and means of rescue in adverse weather conditions
 - 7 Measures to prevent accidents with lifeboats
 - 8 Measures to enhance maritime security: training and certification requirements for ship security officers
 - 9 Education and training requirements for fatigue prevention, mitigation and management
 - 10 Requirements for knowledge, skills and training for officers on WIG craft
 - 11 Development of training requirements for the control and management of ship's ballast water and sediments
 - 12 Development of competences for ratings
 - 13 Training and certification requirements for company and port facility security officers
 - 14 Work programme and agenda for STW 37
 - 15 Election of Chairman and Vice-Chairman for 2006
 - 16 Any other business
 - 17 Report to the Maritime Safety Committee

* Agenda item numbers do not necessarily indicate priority.

ANNEX 45**STATEMENT BY THE DELEGATION OF TURKEY**

In short, the document submitted by Turkey under reference 'MSC 79/INF.10' provides information on the 9-month implementation of the Turkish Straits Vessel Traffic Services (TSVTS) System. As we announced earlier, TSVTS became fully operational on 30 December 2003 following a 6-month trial period prior to this date.

The data collected during January-September 2004 clearly indicate that the TSVTS has increased the efficiency of the vessel traffic flow by proper organization without compromising the safety rules and regulations. Comparatively monthly vessel passage statistics for the first 9 months for the years 2000 through 2004 display an increase in the number of vessels passing through the Straits of Istanbul and Çanakkale, albeit such increase (or decrease) has not been designated as an operational aim for the system. These results, however, must be attributed to a proper and efficient traffic organization achieved by the TSVTS.

The efficiency and success of the services provided by the TSVTS system and its positive effects on the safety of navigation in the Turkish Straits has confirmed once again the crucial importance of the VTS for the Turkish Straits. The Government of Turkey is determined to ensure the continued quality of the services by updating the technological infrastructure and regular systematic training of the operational personnel and to inform all users as well as IALA accordingly. It is believed, however, that maximizing navigational safety and maritime security and minimizing risks needs cooperation and full compliance by shipmasters during their passage through the Turkish Straits and their making use of pilotage service, as is strongly recommended by IMO resolution A.827(19).

We kindly ask the Committee to note the information provided in our document and Turkey's best efforts for the successful launching of TSVTS system in the Turkish Straits.

The paper submitted by the Russian Federation on the use of Turkish Straits VTS System contains major errors, presents a misleading picture against the facts on the ground and disregards Turkey's efforts to enhance the efficiency of maritime traffic through the Turkish Straits. The real picture is displayed in the updated version of our information paper that was originally prepared to brief the Committee on TSVTS at its 78th session. Delegations will find in this paper, which is now issued under reference MSC 79/INF.10, computer generated data with graphics and charts demonstrating the efficient implementation of the system during the period covering January-September 2004. We believe this paper is a clear indication of our sincere and transparent approach on matters relevant to the international maritime community.

Indeed, we have always approached perceptively to the views voiced by IMO member countries, including the Russian Federation. In fact, we hold regular bilateral maritime consultations with the Russian Federation, in which we also take up the issue of maritime traffic through the Straits. The next round of these consultations is expected to take place in Moscow next month.

The case of the lost Russian ship is an unfortunate accident due to adverse weather conditions coupled with technical problems faced by the ship, including communications failure. In short, the ship master was unable to take its anchor back on board and dragged to the shore, even if he was warned in advance by the Turkish VTS Centre to take necessary precautions.

In view of the information paper that is submitted to the MSC and the explanations we have made, we believe that the rationale of the requested action in Russian Federation's document is invalidated.

As such, the suggestions in the Russian paper cannot be accepted by Turkey.

Turkey is fully committed to the Montreaux Convention of 1936 while, at the same time, is equally determined to ensuring the safety of navigation, maritime security as well as protecting environment, human life and property throughout the Turkish Straits. We cannot ignore the fact that the Strait of Istanbul, one of the busiest waterways in the world, runs right through the city of Istanbul, a city of cultural heritage for all mankind with a population of more than 12 million people.
