MODEL SAFETY REGULATIONS FOR INLAND WATERWAYS VESSELS AND NON-CONVENTION CRAFT, INCLUDING FISHING VESSELS, OPERATING IN AFRICA

JANUARY 2002

TABLE OF CONTENTS

PREAMBLE

1. In many African countries both coastal and landlocked, there has not been established a body of standards, rules and regulations procedures and practices to cater for the shipping industry taking place in the inland water masses comprising the lakes and navigable rivers. The foregoing scenario has contributed to the continuing tragic loss of life, damage to property and the marine environment in many of Africa's inland waterways. The need for harmonized standards, regulatory laws, rules, procedures and practices for vessels operating on inland waterways in Africa cannot be over emphasized.

2. The importance of having a body of regulations for inland waterways vessels would be, amongst others, to:
promote safety of navigation and hence enhance safety of lives, vessels, and cargo;
provide guidance and harmonized standards in important areas such as construction and maintenance of craft, surveys, training and the certification of crews;
promote the development of a safe fishing industry;
prevent pollution and preserve the marine environment;
promote waterborne regional/international trade for countries sharing common water masses;
promote the development of a safe waterborne tourism industry.

3. In recognition of the lack of effective safety regulations for vessels operating on inland waterways the International Maritime Organization (IMO), under a technical co-operation project PR267 TC02RAF/98/109, has developed model safety regulations for inland waterways vessels and non-convention craft, including fishing vessels, operating in Africa. The model regulations were agreed by representatives of: Burundi, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Sierra Leone, Tanzania, Uganda, Zambia and Zimbabwe during a Workshop held in Mwanza, Tanzania between 15 and 19 October 2001.

4. The model regulations provide a regional safety and pollution prevention standard for new vessels and barges and, as appropriate, existing vessels and convention-sized vessels that trade regularly and consistently on inland waterways and at sea on non-international voyages, and for personnel serving aboard them. The basic standards are derived from the existing regulations of the Participating Countries and the *Amended proposal for a Directive of the European Parliament and of the Council amending Directive 82/714/EEC of 4 October 1982 laying down technical requirements for inland waterway vessels (2000/C 365 E/08) COM(2000) 419 final 97/0335(COD)*. They also have regard to the standards set out in the *Tripartite Agreement on Inland Waterway Transport between Kenya, Uganda and Tanzania,* made on 30 April 1998.

5. The provisions of the model regulations are intended to facilitate the operations of vessels to which the relevant international conventions are not applicable but for which the application of the basic safety principles embodied in the above instruments and international conventions, if applied, would ensure a higher level of safety for the vessels and personnel on board and protection of the marine environment. Therefore, the principles that are contained in the above instruments and the Conventions identified below have been incorporated, as far as practicable, in the present model regulations. The model regulations also contain provisions to enable African inland waterways administrations, as far as practicable and reasonable, to apply the same standards to existing vessels if they need to do so.

6. The provisions specified in the model regulations take into account, as appropriate, the spirit of the provisions of the following IMO Conventions:

(a) The International Convention for Safety of Life at Sea (SOLAS), 1974, as amended;

(b) The International Convention on Load Lines (LL), 1966, as amended;

(c) The International Regulations for Preventing Collisions at Sea (COLREG), 1972, as amended;

(d) The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended; and

(e) The International Convention for the Prevention of Marine Pollution from Ships (MARPOL 73/78).

7 The footnotes refer, for guidance, to a number of specifications adapted from the standards of the International Maritime Organization. Provision is also made for the acceptance by individual countries of other appropriate technical standards, which may be national or industry standards.

8 The representatives of the Countries participating in the Workshop agree that the model regulations provide great potential for harmonization, if adopted as regulations for inland waterways, between multiple groups of countries co-operating either as formal regional organizations or with a view to developing a common inland waterways legislation. It is, therefore, essential that countries that share common inland waterways co-operate in harmonizing the inland waterways regulations amongst themselves.

EXPLANATORY NOTES

1. The Model Regulations use length extensively as a measure of vessel size. Administrations may need to use other measures of vessel size in national legislation based on the Model Regulations, for example to provide consistent units within national legislation. As a guide to the application of these Model Regulations, the following table provides an approximate relationship between length, gross tonnage and deadweight.

Length	15m	24m	35m	45m	80	100	150
Equivalent gross tonnage	20	150	300	500	1800	3000	7000
Equivalent deadweight	35	100	225	400	1250	2000	5000

Individual Administrations may wish to apply alternative conversion factors, based upon the characteristics of their national fleets.

2. Regulation 1.7 of the Model Regulations makes provision for the classification of inland waterways for the purpose of applying safety standards consistent with the additional risk that may apply to operations on certain waterways as a consequence of the severity of the wave/weather conditions that may be encountered in particular locations or at particular times of the year. The classifications adopted are “open” waters and “sheltered” waters. In implementing the Model Regulations Administrations should identify waters on which their vessels operate in terms of these classifications.

3. Regulation 1.9 of the Model Regulations requires reports of casualties and incidents to be made to the Administration. Annex 6 provides guidance on the content of the report required. In the interests of effective accident reporting, which is essential to provide the Administration with information on which to base improvements in the regulations, Administrations may wish to consider making mandatory the provision of information detailed in Annex 6.

4. Regulation 1.11 of the Model Regulations makes the Company and the master responsible for safe management and environmental protection on board a vessel, but the regulation does not specify the way in which safety management should be achieved. The reference to the Administration’s requirements, coupled with the reference to the International Safety Management Code, provides an avenue for Administrations to introduce more formal procedures for the management of safety and environmental protection at an appropriate time.

5. The Model Regulations do not provide specific requirements covering the construction, equipment and operation of high speed craft. However, where a vessel is of a type, and is engaged in operations similar to those, to which the International Code of Safety for High Speed Craft (HSC Code) applies an Administration may wish to apply the requirements of the Code to a vessel engaged on voyages within its waters or on inland waterways as though the Code applied to it. The standards of the HSC Code are contained in IMO Resolutions MSC.36(63) and/or MSC.119(74), depending on the date of build of the high speed craft concerned.

6. The Model Regulations are concerned with physical aspects of the safety standards applying to inland waterways vessels. A number of the provisions are of such a nature that sanctions should apply to non-compliance in order to encourage the achievement of an appropriate standard of safety in the construction, equipment and operation of vessels and the persons who serve on them. The Model Regulations

themselves make no provision for such sanctions. When adapting the Model Regulations into national legislation, Administrations may wish to include sanctions in the regulations themselves or to refer to sanctions provided in appropriate superior legislation.

7. The provisions of the Model Regulations relating to qualifications of seafarers are based on the requirements of the existing legislation of a number of African countries and are constructed on the basis of a framework drawn from the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers. These provisions, including those relating to periods of service and age, provide an appropriate standard for seafarers serving on inland waterways vessels and non-Convention craft. However, an Administration implementing the Model Regulations may need to interpret such provisions in the context of existing marine legislation or other legislation that relates to qualifications and employment in its country.

8. The Model Regulations are comprehensive as regards the specification of matters relating to seafarer competency for the various grades of certificate and how it should be demonstrated. They do not, however, provide for the administration of matters concerning issue or withdrawal of the certificates of competency. Individual Administrations may wish to incorporate such provisions in a way that is consistent with other relevant national legislation, particularly in relation to action on withdrawal of a certificate following a legally-constituted inquiry or other process.

9 The provisions of the Model Regulations relating to manning of vessels are intended to provide guidance to an Administration on numbers and qualifications of persons that should be carried to achieve safety in operation.

10. The provisions of the Model Regulations give guidance on the manning of vessels carrying cargo and/or passengers. The wide variation in the nature of fishing vessels and their operations made it impracticable to develop similar guidance for the manning of fishing vessels that was acceptable on a multilateral basis. Individual Administrations may wish to develop such standards in the context of their national fishing vessel fleet and operations in legislation based on the Model Regulations.

11. Provisions of the Model Regulations relating to environmental protection do not necessarily reflect other environmental protection legislation that has been enacted by African countries. An Administration implementing the Model Regulations may wish to ensure that the relevant provisions are consistent with any such other environmental protection requirements enacted in its country. Chapter 14 includes a definition of “designated waterway”, which provides a mechanism for associating the Model Regulations with other national environmental protection legislation having effect on particular waterways.

12. The provisions of the Model Regulations relating to fishing vessels provide a basic level of safety equipment for vessels less than 12.5m in length. The Model Regulations also require fishing vessels 12.5m and above in length to be equipped with certain items of life-saving and fire-fighting equipment as though they are cargo vessels of equivalent length. Limited standards of occupational safety and health are also provided for all fishing vessels. The Model Regulations make no provision for the certification or knowledge or experience levels of persons serving on fishing vessels. Administrations may wish to consider whether national regulations relating to particular sizes and/or types of fishing vessels should specify requirements additional

to all or any of the basic level standards considered appropriate for the Model Regulations.

13. Chapter 12 acknowledges that national legislation relating to the carriage of dangerous goods may govern the safety measures to be taken on board vessels but is not specific concerning the type of certificate that may be necessary under that legislation. Administrations implementing the Model Regulations may wish to ensure that the relevant provisions are consistent with any other requirements concerning the transport of dangerous goods.

14. Port State control provisions of Chapter 1 parallel the equivalent provisions of the SOLAS Convention[1]. The incorporation of such provisions into national law should pay appropriate regard to treaties or other agreements between countries jointly responsible for inland waterways or treaties or other agreements in relation to non-Convention coastal vessels in the ports of a party to such a treaty or agreement.

15. Footnotes to a number of the provisions of the Model Regulations make reference to international standards. Such references are intended to provide the Administration with guidance on available standards and are drafted to make it clear that they are not intended to be mandatory. Administrations may wish to supplement the footnotes by incorporating reference to relevant national or multilateral standards.

[1] The International Convention for the Safety of Life at Sea, 1974, as amended

CHAPTER 1 - GENERAL PROVISIONS

1.1 Application

1.1.1 The Regulations shall apply to vessels 4m and above in length. **Chapter 10** applies to all vessels.

1.1.2 Subject to 1.1.1 the following are excluded from the Regulations:

(a) floating equipment and floating installations, to the extent that the Administration considers that application of the Regulations is not appropriate ;

(b) pleasure craft, except for pleasure craft operated for hire or reward or for any other kind of monetary consideration;

(c) naval vessels;

(d) sea-going vessels operating or based on tidal waters or temporarily on inland waterways that carry a valid national or Convention certificate; and

(e) dugout canoes and similar vessels of primitive build.

1.1.3 **Chapter 15** applies to fishing vessels. The only regulations in other chapters that apply to fishing vessels are those specified in that Chapter.

1.1.4 The Regulations apply to barges only when specifically stated in the text of a regulation.

1.1.5 All existing vessels shall, as a rule, comply with the requirements existing prior to coming into force of the Regulations. Where no such requirements are applicable, vessels shall comply with the Regulations to the extent the Administration considers to be reasonable and practicable. Existing vessels that undergo replacement of equipment or outfitting related thereto shall comply with the requirements specified in the Regulations as far as it is considered reasonable and practicable by the Administration.

1.2 General Definitions

For the purposes of the Regulations and the Annexes thereto:

accommodation means any space intended for the use of persons normally living on board, or of passengers, and includes the galley, storage space for provisions, toilets and washing facilities, laundry facilities, landings and gangways, but not the wheelhouse;

approved means approved by the Administration;

barge means a vessel that is not fitted with any means of propulsion;

breadth means the maximum breadth of the hull measured to the outermost edge of the plating or planking, excluding rubbing strakes, paddle wheels and similar fittings, at the mid-length of the vessel;

bulkhead deck means the uppermost deck to which transverse watertight bulkheads are carried;

cargo-passenger vessel means a cargo vessel that is approved by the Administration to carry more than twelve passengers on identified services and that meets safety requirements set out in the Regulations for that type of vessel and such other safety requirements specified by the Administration as are deemed necessary to provide a satisfactory level of safety;

classification society means an organization that complies with the standards adopted by the Organization[2] and is recognized, or otherwise authorized, by the Administration for the purpose of conducting inspections and surveys in accordance with **2.3** on behalf of the Administration;

Company means the owner of the vessel or any other organization or person such as the manager who has assumed responsibility for operation of the vessel from the owner of the vessel and who, on assuming such responsibility has agreed to take over all the duties and responsibilities connected with vessel safety and the prevention of pollution;

depth means, where not otherwise defined, the distance from the top of the keel to the top of the deck plating or planking of the uppermost continuous deck at side, measured at the point of mid-length of the vessel. In the case of an open or partially-decked vessel it means the distance from the top of the keel to a straight line drawn between the gunwales or the top of the partial deck at side, measured at the point of mid-length of the vessel;

engine room means the space in which the propulsion machinery and auxiliaries are installed;

existing vessel means a vessel that is not a new vessel;

fishing vessel is a vessel used for catching fish, or other living resources of the water;

floating equipment means any floating structure carrying mechanical installations and intended for work on waterways or in ports (eg a dredger,
elevator, sheer-legs or crane);

floating installation means a raft or any other structure, object or assembly capable of navigation not being a vessel or floating equipment;

freeboard means the distance between the plane of maximum draught and a parallel plane passing through the lowest point of the side deck or, in the absence of a side deck, the lowest point of the upper edge of the full planking or plating;

length means the distance measured from the forward edge of the bow along the centerline of the uppermost continuous deck to the outer edge of the planking or plating attached to that deck at the stern. In the case of a vessel having a pointed stern, the length shall be measured from the forward edge of the bow to the aftermost edge of the sternpost and, in the case of a vessel having a transom stern, the length shall be measured from the forward edge of the bow to the outer edge of the transom plating or planking;

margin line is a line drawn at least 76mm below the upper surface of the deck from which freeboard is measured as defined in **4.1.2**;

master means the person having command of a vessel and includes any person in charge of a vessel;

new vessel means a vessel the keel of which is laid or that is at a similar stage of construction on or after ***{insert the date of adoption of the Regulations}***;

passenger vessel means any vessel built and operated to carry more than 12 passengers and that is not a cargo-passenger vessel;

plane of maximum draught means the waterplane corresponding to the maximum draught at which the vessel is authorized to navigate;

pleasure vessel means a vessel that is used, or, being a vessel in the course of construction, is intended to be used, wholly for recreational or sporting activities;

recognized standards are standards accepted by the Administration, which may include applicable international or national standards or standards adopted by a classification society;

short voyage means a voyage of less than 30 nautical miles;

[2] Refer to resolution A.739(18) Guidelines for the Authorization of Organizations acting on behalf of the Administration;

the Administration means the government department or agency having responsibility for maritime and inland waterways matters and in particular for the administration of the Regulations;
the Organization means the International Maritime Organization;
the Regulations means the *Model safety regulations for inland waterways vessels and non-convention craft, including fishing vessels, operating in Africa*;
vessel means a craft operating on inland waterways and does not include a floating installation or floating equipment; and
wheelhouse means the space in which all the equipment necessary for navigating and controlling the vessel is installed;

1.3 Exemptions

1.3.1 The Administration may exempt from the application of all or part of the Regulations:

(a) vessels or classes of vessels operating on navigable waterways as designated by the Administration, where it considers that the sheltered nature and conditions of such operations are such as to render the application of any specific provisions of the Regulations unreasonable or unnecessary; and

(b) vessels the keels of which were laid down before the entry into force of these regulations.

1.3.2. The Administration may authorize, in respect of navigation on its national waterways, exemptions from one or more provisions of the Regulations for limited local voyages or in harbour areas provided that it complies with such other requirements that are, in the opinion of the Administration, adequate for the intended voyage. Such exemptions and the voyages or areas to which they are apply shall be specified in the vessel's Certificate of Seaworthiness.

1.3.3. Where a vessel is exempted from these regulations under **1.3.1(a)**, the Administration may require compliance with the provisions of the Regulations as far as is practicable and reasonable.

1.3.4 The Administration may exempt a vessel that embodies features of a novel kind from any of the provisions of the Regulations, the application of which might seriously impede research into development of such features and their incorporation in vessels. Any such vessel shall, however, comply with such safety requirements that, in the opinion of the Administration, are adequate for the service for which it is intended and are such as to ensure the overall safety of the vessel.

1.4 Equivalents

Where the Regulations require that a particular fitting, material, appliance, apparatus or type thereof, shall be fitted or carried in a vessel, or that particular provision shall be made, the Administration may allow any fitting, material, appliance, apparatus or type thereof to be fitted or carried, or any other provision to be made in that vessel, if it is satisfied by trials thereof or otherwise that such fitting, material, appliance, apparatus or type thereof is at least as effective as that required by the Regulations.

1.5 Standards

1.5.1 The construction, installation, structural strength, fittings, material, appliances and apparatus unless expressly provided by the Regulations, shall be of recognized standards.

1.5.2 In addition to the requirements and standards referred to in the Regulations, other requirements and standards recommended by the Organization may be applied whenever the Administration considers such requirements and standards to be appropriate.

1.6 Carriage of passengers

1.6.1 Vessels not propelled by mechanical means shall not carry any passengers unless specifically authorized by the Administration.

1.6.2 The maximum number of passengers carried on board a passenger vessel or a cargo-passenger vessel shall not exceed the number identified on the Certificate of Seaworthiness.

1.6.3 A notice showing the maximum number of passengers permitted to be carried on specific decks and in specific spaces, calculated in accordance with **4.8**, shall be clearly displayed at the access to each such deck and space

1.7 Classification of inland waterways and coastal waters

For the purposes of the Regulations, inland waterways and coastal waters shall be classified as follows:

1.7.1 *sheltered waters*, defined and designated by the Administration as waters, or areas of a body of water, within which the conditions are such that it is appropriate to apply basic standards of safety to vessels operating thereon; and

1.7.2 *open waters*, being all other inland waterways or areas of a body of water, within which the conditions are such that it is appropriate to apply the highest standards of safety to vessels operating thereon.

1.8 Plans, signs, instruction manuals, name plates and languages

1.8.1 All name plates, signs, instructions, notices, plans and documents on board vessels, relating to safety and operation of the vessel and its machinery, shall be drawn up in the official language of ***{insert name of country}*** or in a language readily understood by the persons on board and in the English language.

1.8.2 All vessels propelled by mechanical means shall carry adequate information including drawings, plans and instruction manuals necessary for their safe operation and safety of life.

1.9 Casualties and incidents

1.9.1 In the event of a casualty or incident involving the vessel resulting in loss of life or the vessel being materially damaged, stranded, abandoned or lost, the master or the Company shall inform the Administration immediately. If it is not possible to inform the Administration directly, information on the casualty or incident shall be provided to the nearest surveyor, registrar of vessels, police officer or harbourmaster, who shall immediately notify the Administration. In the case of the death or disappearance of any person on or from the vessel the information notified to the Administration shall include at least:

(a) the date, time and location of the accident or occurrence;
(b) the name of each person that died or disappeared;
(c) the identification number, name, flag and port of registry of the vessel; and
(d) the name and address of the Company.

1.9.2 The Company shall submit a report to the Administration when as a result of a casualty or incident that involves the vessel or its equipment:

(a) a person dies;
(b) a person is injured and requires medical treatment beyond first aid;
(c) a person disappears from a vessel in circumstances that indicate probable death or injury; or
(d) damage occurs to the vessel or other property.

1.9.3 The report required by **1.9.2** shall be made:

(a) within 48 hours of the casualty or incident if a person dies within 24 hours of the occurrence, requires medical treatment beyond first aid or disappears from a vessel; or
(b) within 10 days of the occurrence if an earlier report is not required by **1.9.3(a)**.

1.9.4 The report required by **1.9.2** shall be in writing, dated and signed on completion by the person or persons that prepared it. Guidance on the information that should be included in such a report is provided at **Annex 6**.

1.9.5 The Administration should conduct an investigation[3] into any occurrence meeting the criteria specified in **1.9.1** or **1.9.2** that occurs to, or on board, a vessel flying its flag.

1.10 Vessel Design, Construction and Maintenance

Vessels designed, constructed and maintained in compliance with the structural, mechanical and electrical requirements of a classification society may be accepted as complying with the relevant requirements of **Chapters 3, 5 and 6** of the Regulations.

[3] Refer to Res A.849(20) Code for the investigation of marine casualties and incidents, as amended by Res A.884(21), MSC/Circ 953 and MEPC/Circ.372 Reports on marine casualties and incidents – revised harmonized reporting procedures and as appropriate to MSC/Circ.539/Add.2 Reports on casualty statistics concerning fishing vessels and fishermen at sea.

1.11 Management of safety and environmental protection

1.11.1 The Company and the master of the vessel shall be responsible for compliance with the applicable provisions of the Regulations and for management of the vessel so as to achieve safety in operations and protection of the environment.

1.11.2 The Company and the master of the vessel shall comply with the requirements of the Administration in relation to the management of safe operation and environmental protection[4].

1.12 Vessel identification

The identification number of the vessel required by **{insert reference to any appropriate requirements of national vessel registration legislation[5]}** shall be entered on the Certificate of Seaworthiness required by **2.1.1**.

1.13 Official log book

1.13.1 The master of a vessel 10m and above in length shall keep an official log book in the form required by the Administration and shall make, or cause to be made, such entries in that log book so required.

1.13.2 An entry in an official log book shall be:
(a) made as soon as possible after the occurrence to which it relates; and
(b) made and dated so as to show the date of the occurrence and the entry.

1.14 Port State control

1.14.1 Every vessel when in a port of another Country is subject to control by officers duly authorized by such Government in so far as this control is directed towards verifying that the certificates issued under **Chapter 2** are valid.

1.14.2 Such certificates, if valid, shall be accepted unless there are clear grounds for believing that the condition of the vessel or of its equipment does not correspond substantially with the particulars of any of the certificates or that the vessel is not seaworthy.

1.14.3 In the circumstances specified in **1.14.2** or where a certificate has expired or ceased to be valid, the officer carrying out the control shall take steps to ensure that the vessel shall not leave the port unless it can proceed to the next port of call, or leave the port for the purpose of proceeding to an appropriate repair yard, without danger to the vessel or persons on board.

1.14.4 In the event of this control giving rise to an intervention of any kind, the officer carrying out the control shall forthwith inform, in writing, the Consul or, in the absence of the Consul, the nearest diplomatic representative of the Country whose flag the vessel is entitled to fly of all the circumstances in which intervention was

[4] as appropriate, refer to Res A.741(18) International Management Code for the Safe Operation of Ships and for Pollution Prevention.
[5] as appropriate, refer to Res A.600(15) IMO Ship Identification Number Scheme

deemed necessary. Where appropriate, nominated surveyors or recognized organizations responsible for the issue of the certificates shall also be notified.

1.14.5 The port State authority concerned shall notify all relevant information about the vessel to the authorities of the next port of call in addition to parties mentioned in paragraph **1.14.4**, if it is unable to take action as specified in **1.14.4** or **1.14.5** or if the vessel has been allowed to proceed to the next port of call.

1.14.6 When exercising control under **1.14** all possible efforts shall be made to avoid a vessel being unduly detained or delayed. If a vessel is thereby unduly detained or delayed it shall be entitled to compensation for any loss or damage suffered.

CHAPTER 2 – CERTIFICATION AND SURVEYS

2.1 Certification

2.1.1 Vessels operating on the waterways identified in **1.7** shall carry a Certificate of Seaworthiness attesting to compliance with the technical requirements of these regulations. The Certificate of Seaworthiness shall be drawn up following the model given in **Annex 1** and shall be issued in accordance with the procedures required by **Chapter 2**. The *Record of equipment and vessel information* forms part of the Certificate of Seaworthiness and shall be attached to that Certificate.

2.1.2 The Administration may adopt technical requirements additional to those of the Regulations for vessels operating on waterways within its territory. Such additional requirements shall be specified in the Certificate of Seaworthiness referred to in **2.1.1**. Where appropriate in the context of a bilateral or multilateral agreement on vessel safety and pollution prevention, such additional requirements shall be communicated to other relevant Administrations at least six months before their entry into force.

2.2 Conditions and procedures for issuing Certificates of Seaworthiness

2.2.1. The Certificate of Seaworthiness shall be issued to new vessels following a survey carried out prior to the vessel being put into service and designed to ensure that the vessel complies with the technical requirements set out in the Regulations.

2.2.2 The Certificate of Seaworthiness shall be issued to vessels in service on the date of entry into force of these Regulations and to vessels laid down before that date following a survey to be carried out by a date designated by the Administration, to ensure that the vessel complies with relevant technical requirements.

2.2.3 The Certificate of Seaworthiness shall be issued by the Administration in the Country in which the vessel is registered. The Administration may, where appropriate, in the context of a bilateral or multilateral agreement on vessel safety and pollution prevention, request another Administration to issue the Certificate of Seaworthiness.

2.2.4 Any Administration may request another Administration, in the context of a bilateral or multilateral agreement on vessel safety and pollution prevention, to issue a Certificate of Seaworthiness in respect of a vessel registered in or having its home port in its territory, or owned by persons or companies established therein.

2.2.5 The period of validity of the Certificate of Seaworthiness shall not exceed 1 year.

2.2.6 The Certificate of Seaworthiness shall be renewed on expiry of its period of validity, in accordance with the conditions and requirements for the issue of the Certificate of Seaworthiness.

2.2.7 The validity of the Certificate of Seaworthiness may exceptionally be extended for a maximum period of 3 months by the Administration. Such extension shall be indicated on the Certificate of Seaworthiness.

2.2.8 Any valid Certificate of Seaworthiness may be withdrawn by the Administration if the vessel ceases to comply with the requirements specified in the Certificate of Seaworthiness.

2.2.9 The Administration may lay down the conditions under which a valid Certificate of Seaworthiness that has been lost or damaged may be replaced.

2.2.10 Any decision to refuse to issue or renew a Certificate of Seaworthiness shall state the grounds on which it is based. The person concerned shall be notified thereof and of any appeal procedure in relation to such a decision that is provided in national law.

2.2.11 The Administration may at any time check that a vessel is carrying a Certificate of Seaworthiness valid under the terms of the Regulations and that it satisfies the requirements set out in the Certificate of Seaworthiness.

2.3 Surveys and inspections

2.3.1 The Company or the Company's representative shall present the vessel for inspection in an unladen, cleaned and equipped condition and is required to lend such assistance as is necessary for the inspection. This may include supplying a boat appropriate for the use of the surveyor, making personnel available and facilitating the examination of parts of the hull or installations that are not directly accessible or visible.

2.3.2 Where the Administration considers it necessary it may require:
(a) inspection of the vessel out of the water;
(b) operational trials;
(c) proof by calculation of the strength of the hull; and
(d) proof by calculation of stability, where necessary, on the basis of an inclining experiment.

2.3.3 The survey referred to in **2.2.1** and **2.2.2** shall be carried out by the Administration or by organizations or individuals authorized by the Administration. The surveyor may refrain from subjecting the vessel in whole or in part to survey where it is evident from a valid attestation, issued by a classification society, that the vessel satisfies in whole or in part the technical requirements of the Regulations.

2.3.4 In the event of major alterations or repairs that modify the structural soundness or characteristics of the vessel, the vessel shall again undergo, prior to any further voyage, the survey provided for in **2.2.1** and **2.2.2**. Following this inspection, a new Certificate of Seaworthiness consistent with the modified technical characteristics of the vessel shall be issued.

2.4 Refusal to issue or withdrawal of a Certificate of Seaworthiness

2.4.1 If the surveyor or other authorized person determines upon inspection that the Certificate of Seaworthiness is invalid, or that the vessel does not satisfy the requirements set out in the Certificate of Seaworthiness, but that such invalidity or failure to satisfy the requirements does not constitute a manifest danger, the

Company or the Company's representative shall be required to take all necessary measures to remedy the situation.

2.4.2 If, upon making the inspection referred to in **2.4.1**, it is found that the Certificate of Seaworthiness is not being carried or that the vessel constitutes a manifest danger, the Administration may prevent the vessel from proceeding until the necessary steps have been taken to remedy the situation. It may also prescribe measures that will enable the vessel to proceed safely, where appropriate, on termination of its transport operations, to a place where it will be either inspected or repaired.

2.4.3 Any decision to interrupt the passage of a vessel taken pursuant to measures adopted in implementation of the Regulations shall state in detail the reasons on which the decision is based. The decision shall be notified to the master and the Company, together with appropriate advice on any appeal procedure in relation to such a decision that is provided in national law.

CHAPTER 3 – CONSTRUCTION AND EQUIPMENT

3.1 General

Vessels shall be constructed in accordance with good shipbuilding practice.

3.2 Construction

3.2.1 The hull shall be sufficiently strong to withstand all stresses to which it is subjected in service under normal conditions.

3.2.2 The Company shall submit to the Administration for approval plans showing the construction materials and scantlings of the hull.

3.2.3 In the case of new structures fitted to existing vessels or major conversions of existing vessels affecting vessel strength , adequate strength shall be demonstrated by the presentation of proof in the form of design calculations. Certification of the vessel's strength by a classification society may be taken by the Administration to demonstrate compliance with **3.2.1** to **3.2.3** inclusive.

3.2.4 Watertight bulkheads extending to the deck or, in the absence of a deck, to the upper edge of the hull planking or plating shall be installed, consistent with the construction and type of the vessel, as follows:

(a) a collision bulkhead at an appropriate distance from the bow; and

(b) in vessels 25m and above in length, a stern bulkhead at an appropriate distance from the stern.

3.2.5 The accommodation and engine room, and any working spaces forming part of the engine room, shall be separated from each other and from the holds by means of watertight bulkheads. Such bulkheads shall be watertight to the top of the engine room or the hold, as the case may be, and shall be:

(a) made of steel and insulated to provide an effective fire division; or

(b) if made of any other material, so insulated and/or treated as to provide an effective barrier to heat and flame for at least 15 minutes.

3.2.6 Any compartment not capable of being sealed during a voyage shall be capable of being pumped dry. It shall be possible to pump out each compartment separately.

3.2.7 Accommodation shall not be fitted forward of the collision bulkhead. Accommodation shall be directly accessible from the deck, except where the construction or the type of vessel makes it impracticable. Where there is no such access, there shall be an emergency exit leading directly from the accommodation onto the deck.

3.2.8 No openings shall be fitted in the bulkheads and other partitions between spaces required by **3.2.4** and **3.2.5**. However, manholes are permitted, in bulkheads other than the collision bulkhead, on condition that they are bolted in a watertight manner. Hatchways in the stern bulkhead and openings for propeller shafts, piping, etc., are permitted when they are constructed in such a manner as to not affect the effectiveness of the bulkheads and other partitions between spaces.

3.2.9 Notwithstanding the requirements of **3.2.6** and **3.2.8**, the stern compartment may communicate with an engine room by means of a readily accessible, self-closing drain installation.

3.2.10 All penetrations of the hull and piping connected to such penetrations shall be constructed so as to prevent the accidental admission of water into the vessel.

3.2.11 Water intakes and outlets and pipes connected to them are considered watertight if they are made in such a way that any unintentional ingress of water into the vessel is impossible.

3.3 Anchors, chains and anchor cables

3.3.1 The bow of a vessel less than 15m in length shall be equipped with one anchor having a mass determined in accordance with **3.3.4**.

3.3.2 The bow of a vessel 15m and above in length shall be equipped, with two anchors having a combined mass determined in accordance with **3.3.4**.

3.3.3 In vessels less than 45m in length that, owing to their design and intended purpose, are only used on predetermined short-haul sections, the Administration may accept bow anchors having a mass two-thirds of that determined in accordance with **3.3.4**.

3.3.4 The anchor mass required by **3.3.1** to **3.3.3** inclusive is:

$$P = k.x\ B.xT\ (kg)$$

where:

B is the breadth of the vessel;
T is the depth of the vessel; and
k is a coefficient given by $45x(L/8B)^{0.5}$
where L = length of the vessel.

Where a vessel is required to be fitted with two anchors, the total mass shall be distributed so that the mass of the lightest anchor is not less than 45% of that total mass.

3.3.5 The anchor mass established in accordance with **3.3.4** may be reduced for certain special anchors as permitted by the Administration.

3.3.6 Cast iron anchors shall not be fitted.

3.3.7 The mass of each anchor shall be marked on the anchor so that it stands out in relief in a durable manner.

3.3.8 A windlass or windlasses shall be fitted where a vessel carries any single anchor having a mass in excess of 50kg. Powered windlasses shall be capable of being operated by hand.

3.3.9 Each anchor shall be fitted with a chain having a length of:
(a) at least 40m in a vessel less than 30m in length;

(b) at least 10m longer than the vessel in a vessel 30m and above and less than 50m in length;
(c) at least 60 m in a vessel 50m and above in length.

3.3.10 The minimum tensile strength of the anchor chains shall be calculated as follows:
(a) anchors of a mass of 0-500kg:

$$R = 0.35P' \text{ (kN)};$$

(b) anchors of a mass of more than 500kg and not exceeding 2,000kg:

$$R = \left(0.35 - \frac{P'-500}{15000}\right) \times P' \text{ (kN)}$$

(c) anchors of a mass of more than 2,000kg:

$$R = 250P' \text{ (kN)}.$$

In the above formulae P' is the mass of each anchor determined in accordance with **3.3.1** to **3.3.5** inclusive. Where the anchors have a mass greater than that required by **3.3.1** to **3.3.5** inclusive, the tensile strength of the anchor chain shall be determined as a function of that greater anchor mass.

3.3.11 The attachments between anchor and chain shall withstand a tensile load 20% higher than the tensile strength of the corresponding chain.

3.3.12 Cables may be fitted instead of anchor chains provided that the cables have the same tensile strength as that required for chains and are 20% longer than the required chain.

3.4 Cranes, derricks and winches

3.4.1 Winches shall be designed in such a way as to enable work to be carried out in complete safety. They shall be fitted with devices that prevent unintentional load release. Winches that do not lock automatically shall be fitted with a brake that is adequate to deal with their tractive force.

3.4.2. Hand-operated winches shall be fitted with devices to prevent kick-back of the crank. Winches that are both power- and manually-driven shall be designed in such a way that the motive-power control cannot actuate the manual control.

3.4.3 Cranes, derricks and winches shall be manufactured in accordance with good engineering practice and maintained in accordance with the manufacturer's instructions. The vessel's supporting structure shall take account of the forces arising during their use.

3.4.4 A manufacturer's plate shall be affixed to cranes, derricks and winches and shall show:
(a) manufacturer's name and address;
(b) the year of manufacture;
(c) series or type reference; and

(d) where appropriate, serial number.

3.4.5 The maximum permissible loadings shall be permanently marked in a clearly legible manner.

3.4.6 Cranes, derricks and winches on new and existing vessels shall be inspected annually to verify their continued fitness for use.

3.4.7 Devices shall be fitted to protect against crushing or shearing accidents. The outer parts of any crane or derrick shall have a safety clearance of 0.5m upwards, downwards and to the sides, between them and all surrounding objects except that the safety clearance to the sides is not required outside the work and access areas.

3.4.8 Mechanical cranes shall be protected against unauthorized use. It shall only be possible to start these up from the crane's driving position. The control shall be of the automatic-return type (buttons without stops); their operating direction shall be unambiguously clear.

3.4.9 An appropriate device shall be fitted to prevent the load from dropping if the motive power of a crane or derrick fails. An appropriate device shall be fitted so as to stop any upward movement of the hoisting device and to prevent the safe load being exceeded. Any downward movement of the hoisting device shall be stopped if there are less than two cable windings on the drum. The tensile strength of the cables for mobile loads shall correspond to five times the cable's permissible loading.

3.5 Towing vessels and barges

3.5.1 Craft used for towing operations shall be capable of remaining manoeuvrable and stable when towing.

3.5.2 Craft intended for tugging or towing shall be fitted with a tow hook that shall be capable of safe release from within the wheelhouse.

3.5.3 Towing devices shall be installed forward of the propeller plane unless the vessel is steered by its drive units such as cycloidal propulsion units or swivelling propellers. Winches or a tow hook that can be released from within the wheelhouse shall constitute towing devices.

3.5.4 The towing equipment shall be arranged in such a way that its use does not compromise the safety of the vessel, crew or cargo. Its strength and arrangement shall be appropriate to the towing operation.

3.5.5 Deflector hoops shall be fitted where there is a risk of the towing cables snagging on the stern of the vessel

3.5.6 The propulsion machinery shall be able to be operated and controlled from within the wheelhouse;

3.5.7 The surface of decks, side decks and hatch covers of a barge shall have an anti-slip finish. Where necessary, sloping surfaces shall be fitted with raised slats.

3.5.8 Where the deck or side decks of a barge form an angle with the side plating or planking, toe rails or stringer bars shall be fitted and shall be at least 30mm high. Guard rails shall be fitted and shall be at least 900mm high. The guard rails may be removable. No guard rails are required at the bow.

3.6 Miscellaneous equipment

3.6.1 Vessels shall be provided with at least the following equipment:
(a) ropes and metal cables consistent with the function of the vessel;
(b) collision mat;
(c) gangway at least 400mm wide and of an appropriate length in relation to the dimensions of the vessel, having its sides marked by a light coloured stripe and fitted with handrails;
(d) buoyant fenders or floating wood fenders;
(e) boat-hook;
(f) first-aid kit and instructions for its use;
(g) binoculars;
(h) fireproof container with a cover for storing oily rags and similar solid wastes and a fire-resistant marked container with a cover for storing oil and similar liquid wastes;
(i) heaving line;
(j) axe; and
(k) waterproof electric hand torch.

3.6.2 Vessels having a deck over 1.5m above the waterline equivalent to the maximum operational freeboard shall be fitted with a companion way or accommodation ladder.

3.6.3 Vessels propelled by outboard motors shall carry emergency propulsion in the form of a sail, oars or a paddle.

3.7 Heating, cooking and refrigeration appliances

3.7.1 Heating, cooking and refrigeration equipment, together with its accessories, shall be so designed and installed that it is not dangerous even in the event of overheating. It shall be so installed that it cannot overturn or be moved accidentally.

3.7.2 When the equipment referred to in **3.7.1** uses liquid fuel it may be operated only with fuels whose flashpoint is above 55°C, except that cooking appliances and heating and refrigeration appliances fitted with burners with wicks and working on commercial paraffin may be permitted in the accommodation and wheelhouse, subject to the capacity of the fuel tank not exceeding 12 litres.

3.7.3 The installations referred to in **3.7.1** may not be installed in spaces or engine rooms in which volatile substances are stored or used. Flues from such installations shall not be routed through such spaces or engine rooms.

3.7.4 The intake of air necessary for combustion shall be ensured. Closing devices shall not be fitted in ducts served by ventilation fans.

3.7.5 Heating and cooking appliances shall be securely connected to the flues. The flue pipes shall be maintained in good condition and fitted with suitable caps or devices affording protection from the wind. The flues of heating installations shall be arranged in such a manner as to limit the possibility of obstruction by combustion products and to permit cleaning.

3.7.6 Vents shall be fitted above the outlets of refrigeration appliances working on liquid fuel.

3.8 Openings and penetrations in watertight or weathertight structures, coamings on exterior openings and freeing ports

3.8.1 Engine exhaust outlets that penetrate the hull below the deck shall be provided with an effective means to prevent backflooding into the hull through the exhaust system.

3.8.2 Access openings in a weathertight superstructure, deckhouse or deck shall be fitted with weathertight doors or hatches that open outward and that are generally hinged on the forward or outboard sides.

3.8.3 Exterior openings through which downflooding into the hull can occur shall be fitted with coamings of equivalent strength to the structure in which they are located.

3.8.4 The coamings shall be constructed as high as is practicable and their height shall not be less than the following:

Location	**Area of operation**	
	Open waters	Sheltered waters
Door sills and companion ways on the main deck	380mm	230mm
Hatches	450mm	300mm
Ventilators	760mm	300mm
Air pipes	600mm on freeboard deck and 300mm on superstructure deck	300mm or as approved by the Administration

3.8.5 The minimum area of freeing ports on any deck fitted with bulwarks shall not be less than 10 per cent of the area of each continuous portion of the bulwark.

3.8.6 Hatchway covers shall be of appropriate strength and stiffness and shall be fitted with means of securing and maintaining weathertightness.

CHAPTER 4 – FREEBOARD AND STABILITY

4.1 Minimum Freeboard

4.1.1 The minimum freeboard shall be that freeboard at which vessels in the maximum condition of loading meet the stability requirements as determined by a stability proof test, carried out in accordance with **4.6** or other requirements that the Administration considers appropriate in relation to the type of vessel, its service and its area of operation. The minimum freeboard shall be the greater of:

(a) 250mm; and

(b) 300 + 44x(L-4.5) mm

where L = the length of the vessel.

4.1.2 Where the minimum freeboard of a loaded vessel occurs abaft a point 75% of the length of the vessel from the foreside of the foremost part of the vessel, excluding guard rails, the minimum freeboard shall be taken to be the freeboard measured at the 75% of the length point. The Administration may accept a lesser value of freeboard where the construction or the type of vessel makes it impracticable to achieve the above freeboard calculated as above.

4.1.3 When demonstrating compliance with **4.7**, the freeboard shall be taken as the vertical distance between the waterline at which the vessel is floating with maximum load on board and shall be measured:

(a) for a flush deck or well deck vessel, to the top of the weather deck at the side of the vessel;

(b) for a partially-decked vessel, to the top of the deck or to the top of the gunwale, whichever is the less; and

(c) for a cockpit vessel or for an open vessel, to the top of the gunwale.

4.2 Loading Marks

Vessels shall have permanent loading marks placed on each side forward, amidships and aft to indicate the maximum allowable draft and trim corresponding to the minimum freeboard determined according to **4.1**. Such a loading mark shall be a horizontal line of at least 200mm in length forward and aft and 300mm amidships and 25mm in height, with its upper edge passing through the point of maximum draft. The loading mark shall be painted in a contrasting colour to the sideshell paint.

4.3 Loading of vessels

The loading marks of a vessel shall not be submerged at any time when it departs on a voyage, during a voyage or on arrival.

4.4 Stability Information for Operating Personnel

4.4.1 Stability information shall be provided on vessels 20m and above in length to enable the master to rapidly and easily determine the stability of a vessel in various loading conditions in relation to accepted standards. Guidance on stability information to be provided is given in **Annex 4.**

4.4.2 The Administration may require stability information to be provided on vessels less than 20m in length.

4.5 General requirements relating to intact stability

4.5.1 The Company or operator of a vessel 20m and above in length shall submit to the Administration for approval the following information and the necessary calculations used to determine that information:

(a) allowable number of passengers and crew on each deck;
(b) maximum cargo permitted on the vessel;
(c) deepest waterline drafts and freeboard;
(d) location of watertight bulkheads and openings in watertight bulkheads;
(e) location, type and amount of fixed ballast;
(f) location and details of any foam flotation material fitted; and
(g) maximum weight of portable equipment permitted on the vessel.

4.5.2 The Administration may require vessels 20m and above in length to undergo a stability proof test.

4.5.3 Vessels less than 20m in length shall undergo a stability proof test in accordance with **4.6** in the presence of an Administration surveyor to determine that a vessel, as built and operated, has the appropriate level of initial stability.

4.5.4 Passenger vessels and cargo-passenger vessels may be required by the Administration to have stability determined by calculation.

4.5.5 The Administration may prescribe additional or different intact stability requirements for broad, shallow draft vessels with little or no ballast outside the hull.

4.6 Conduct of stability proof test

4.6.1 Vessels shall be in the condition specified in **4.6.2** to **4.6.12** inclusive when a stability proof test is performed.

4.6.2 Vessels shall be moored in a quiet, sheltered area free from extraneous forces such as propeller wash from passing vessels, or sudden discharges from shore-side pumps, and in a manner that allows unrestricted heeling.

4.6.3 The location of the test shall be chosen so that the density of water during the test is no greater than that on the route for which a vessel is to be certificated.

4.6.4 The construction of vessels shall be complete in all respects.

4.6.5 Ballast, where necessary, shall be on board and in place and shall be in compliance with **4.10**.

4.6.6 Each fuel and water tank shall be approximately three-quarters full.

4.6.7 A weight equal to the total weight of all passengers, crew, and other loads permitted on a vessel shall be on board and distributed so as to provide normal operating trim and to simulate the vertical centre of gravity causing the least stable

condition that is likely to occur in service. For this purpose, the crew shall be counted as passengers. If a vessel carries passengers on diving excursions, the total weight of the diving gear shall be included in the loaded condition.

4.6.8 The heel of a vessel prior to the commencement of the stability proof test shall not exceed 2 degrees.

4.6.9 Unless otherwise specified, weight and vertical centre of gravity shall be as follows:

(a) the weight of primary lifesaving equipment shall be simulated at its normal location, if not on board at the time of the test;

(b) the weight of one person shall be taken as 75kg except that where a vessel operates exclusively on sheltered waters or when passenger loads invariably consist of a mix of adults and children, the weight of one person may be taken as 65kg; and

(c) the vertical centre of gravity of the simulated weight of passengers, crew, and other loads shall be at least 760mm above the relevant deck.

4.6.10 On vessels having one upper deck available to passengers above the main deck, the vertical weight distribution shall not be less than the following:

Weight on Upper Deck = (Number of passengers located on upper deck) x (weight per passenger) x 1.33

Weight on Main Deck = Total Test Weight - Weight on Upper Deck

4.6.11 On vessels where more than one deck is available to passengers above the main deck the vertical weight distribution used for the calculations shall be approved.

4.6.12 All non-return closures on cockpit scuppers or on weather deck drains shall be kept open during the test.

4.6.13 Guidance on the conduct of the stability proof test and the associated calculations is given in **Annex 2**.

4.7 Stability and freeboard requirement

4.7.1 The heeling moments to be applied in order to demonstrate the stability of vessels by means of calculation or a stability proof test shall be the greater of:

(a) $M_p = (W) \times (B_p)/6$; and

(b) $M_w = P \times A \times H$

where:

M_p = passenger heeling moment (kg-m);

W = the total passenger weight using 75 kg per passenger or, where the vessel operates exclusively on sheltered waters, 65 kg per passenger;

B_p = the maximum transverse distance (m) of a deck that is accessible to passengers;

M_w = wind heeling moment (kg-m);

P = wind pressure of:

(i) 36.6 kg/m^2 for operation on sheltered waters; or

(ii) 73.3 kg/m^2 for operation on open waters;

A = area (m^2) of the projected lateral surface of the vessel above the waterline, including each projected area of the hull, superstructure and area bounded by railings and structural canopies. For sailing vessels this is the bare poles area, or, where the vessel has no auxiliary power, with storm sails set; and

H = height (m) of the centre of area (A) above the waterline, measured up from the waterline.

4.7.2 In a stability proof test the moment determined in accordance with **4.7.1** shall be applied by means of a weight or weights placed at a transverse distance from the centreline of a vessel so that the product of the weight(s) and distance(s) is equal to the required moment. When a vessel is subjected to this heeling moment, the immersion of the loading mark shall not exceed the percentage of the freeboard as follows:

(a) on a flush deck vessel, 50 per cent;

(b) on a well deck vessel, 50 per cent; or
100 per cent where the vessel operates on sheltered waters, has non-return scuppers or freeing ports and the minimum freeboard is not more than one-quarter of the vertical distance from the waterline to the gunwale;

(c) on a cockpit vessel, the percentage is calculated from the following:
on open waters: $(2L - 1.5L_N)/4L$
on sheltered waters: $(2L - L_N)/4L$
where:
L = length of the weather deck; and
L_N = length of cockpit in the same units as L;

(d) on an open boat, 25 per cent; and

(e) on a flush deck sailing vessel, 100 per cent.

4.7.3 Notwithstanding the percentages specified in **4.7.2**, when a vessel is subject to the greater of the heeling moments determined according to **4.7.1**, the immersion shall not exceed a value equivalent to one-eighth of the breadth of the vessel measured at the point of minimum freeboard as defined in **4.1.1.**

4.7.4 Where during a stability proof test a vessel fails to meet the requirements of **4.7.2** or **4.7.3**, the entire test shall be repeated with a reduced load equivalent to a reduced number of passengers or a reduced weight of cargo or by utilising any other corrective measures available to enable the vessel to meet the requirements of **4.7.2** or **4.7.3**.

4.7.5 Following the application of the greater of the heeling moments determined according to **4.7.1**, where any portlight is located at a vertical distance above the waterline of 100mm or less, such portlight on each side shall be closed in a permanent manner. An appropriate notice shall be fixed inside the relevant compartment, close to each such portlight.

4.7.6 Following the application of the greater of the heeling moments determined according to **4.7.1**, where any scupper or drain is found to be below the waterline so as to permit entry of water into the vessel or onto the deck, such opening on each side shall be fitted with automatic non-return valves.

4.7.7 Vehicle ferries shall also be tested by using equivalent weights, by calculation, or other method acceptable to the Administration to determine that the trim or heel during loading or unloading will not submerge the deck edge. The criterion for this test is that the deck edge shall not be submerged during loading or unloading of the vessel with the total number of passengers and the maximum weight of vehicles and cargo permitted on board in the most unfavourable location.

4.8 Maximum number of passengers

4.8.1 The maximum number of passengers permitted to be carried on passenger vessels or cargo-passenger vessels is the number shown by calculation or by means of a stability proof test, as appropriate, that results in a minimum freeboard meeting the requirements of **4.7.2 or 4.7.3**. The maximum number of passengers shall be entered on the Certificate of Seaworthiness and the maximum number of passengers permitted to be carried on specific decks and in specific spaces shall be entered on the *Record of equipment and vessel information*.

4.8.2 The combinations of passengers and cargo in respect of which a vessel complies with the requirements of **4.7.2 or 4.7.3** shall be entered on the *Record of equipment and vessel information*.

4.9 Subdivision of passenger vessels and certain cargo-passenger vessels

4.9.1 On:
(a) passenger vessels 20m and above in length; and
(b) passenger vessels and cargo-passenger vessels less than 20m in length, that are certified to carry 50 passengers or more and to operate in open waters;

transverse watertight bulkheads extending from side to side of the vessel shall be fitted so that, when a vessel is damaged from the keel to the deck in way of any one compartment in the length of the vessel, but not extending to damage to a transverse bulkhead bounding the longitudinal limits of the damage, the vessel may be demonstrated to float in a stable condition having the margin line above the still water level and to float in a stable condition in intermediate stages of flooding.

4.9.2 Vessels specified in **4.9.1** may, as an alternative to meeting the requirements of **4.9.1**, be fitted with transverse watertight bulkheads extending from side to side of the vessel having the positions of the bulkheads calculated in accordance with **4.9.3**.

Location of Watertight Bulkheads for Subdivision

4.9.3 The maximum distance between adjacent main transverse watertight bulkheads on a vessel, required to comply with this regulation by **4.9.2**, shall not be more than the lesser of:

(a) one third of the length of the bulkhead deck; or

(b) the distance d given by:

$$\frac{F \times f \times L}{D}$$

where:

F = the floodable length factor from **Table 4.9-1** at the appropriate value of l/L;

f = the effective freeboard (m) calculated for each pair of adjacent bulkheads in accordance with **4.9.4**;

L = length over deck (m) measured over the bulkhead deck, excluding fishing and other platforms, bowsprits, railings, guards and similar fittings;

l = distance (m) from the midpoint of the compartment to the forwardmost point on the bulkhead deck excluding sheer; and

D = the depth (m), at amidships at a point one-quarter of the breadth as defined in 1.2 from the centreline, measured vertically from the inside of the bottom planking or plating to the level of the top of the bulkhead deck (See **Figure 4.9-1**), corrected where appropriate as shown in **Annex 3**.

Table 4.9-1: Table of floodable length factors[1]

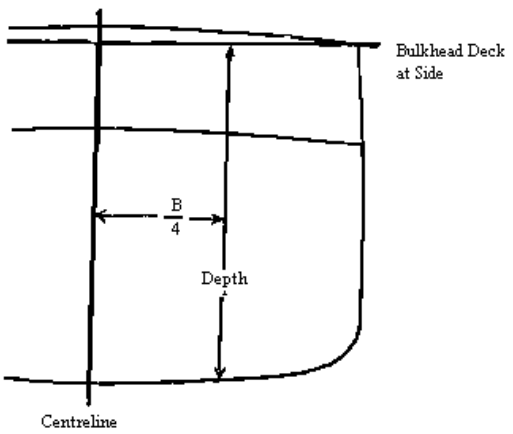
(l/L)x100	F[2]	(l/L)x100	F
0-15	0.33	55	0.63
20	0.34	60	0.58
25	0.36	65	0.53
30	0.38	70	0.48
35	0.43	75	0.44
40	0.48	80	0.40
45	0.54	85	0.37
50	0.61	90-100	0.34

Note to Table 4.9-1

1 Symbols are as defined in **4.9.3**

2 Intermediate values of floodable length factor shall be obtained by interpolation.

Figure 4.9-1: Transverse location for measuring depth(D)



4.9.4 The effective freeboard for each compartment shall calculated from:

$$f = 0.5 (a+b)$$

where:

f = the effective freeboard;

a = the freeboard at the forwardmost main transverse watertight bulkhead of the compartment; and

b = the freeboard at the aftermost main transverse bulkhead of the compartment,

the freeboards a and b being calculated from the deepest waterline to:

(i) the top of the bulkhead deck where a vessel has a flush deck; or

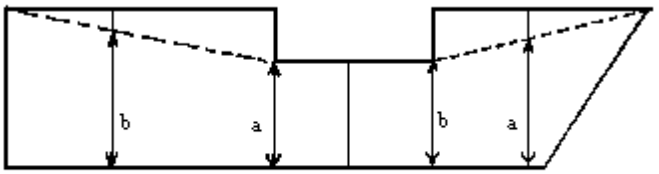
(ii) to the line shown in **Figure 4.9-2** where a vessel has a stepped bulkhead deck; or

(iii) to the line shown in **Figure 4.9-3** where a vessel has an opening scuttle (porthole) below the bulkhead deck; or

(iiii) to the corrected bulkhead deck line, calculated as shown in **Annex 3** where the vessel has a deck of the configuration shown in **Annex 3**; or

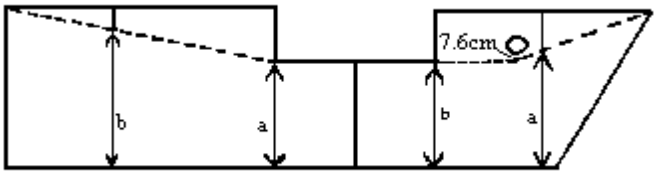
(v) as determined by the Administration where the vessel has a deck of a configuration not identified above.

Figure 4.9-2: Freeboard measurement - vessel with stepped bulkhead deck



Note to Figure 4.9-2: a and b are shown for two sample compartments

Figure 4.9-3: Freeboard measurement - vessel with stepped bulkhead deck and a porthole below the bulkhead deck



Note to Figure 4.9-3: a and b are shown for two sample compartments

4.9.5 Guidance on the subdivision calculation is given in **Annex 3** to the Regulations. The calculations may be performed on the basis of plans or on a completed vessel, following the methodology detailed in **Annex 3**.

4.9.6 Where calculations are performed for a completed new vessel on the basis of a practical test, or where the Administration requires such calculations to be

performed on an existing vessel, and the actual compartment length exceeds the permissible length or 0.333L, whichever is the lesser, the Administration may require that additional bulkheads be fitted or the amount of cargo or number of passengers be reduced as it considers appropriate.

4.10 Installation of Ballast

Solid fixed ballast shall be stowed in a manner that prevents shifting of the ballast and shall be installed to the satisfaction of the Administration.

4.11 Stability of open boats

4.11.1 Open boats when fully loaded and having the vertical height of the centre of gravity of cargo and passengers carried at the highest position likely to be encountered in service shall , when totally flooded, have sufficient buoyancy to be able to remain afloat in a stable condition.

4.11.2 Open boats shall be deemed by the Administration to have sufficient buoyancy by practical test or where detailed calculations show:
(a) that the buoyancy of the boat is greater than the total weight of the vessel and its load; and
(b) that the boat is stable in a loaded, flooded condition.

4.12 Foam flotation material

4.12.1 Foam shall only be installed as flotation material on a vessel when approved by the Administration.

4.12.2 Where foam is installed as flotation material, the following requirements shall be met to the satisfaction of the Administration:
(a) foam shall not be installed in void spaces that contain ignition sources;
(b) foam shall not be installed adjacent to fuel tanks, unless the boundary between the tank and the space has double continuous fillet welds;
(c) the structure enclosing any foam installed shall be strong enough to accommodate the buoyancy of the foam;
(d) piping and cables shall not pass through spaces containing foam unless they are within piping and cableways accessible from both ends; and
(e) blocked foam shall be used in each area that may be exposed to water; and shall have a protective cover, approved by the Administration, to protect it from damage.

4.12.3 Foam used as flotation material shall be:
(a) impervious to water absorption;
(b) structurally stable under service conditions;
(c) chemically inert in relation to other medium with which it may be in contact;
(d) properly secured in place; and
(e) easily removable for inspection of the void space.

4.12.4 Foam used as flotation material shall be subjected to a water submergence test for a period of at least 7 days to demonstrate to the satisfaction of the

Administration that the foam has adequate strength to withstand a hydrostatic head equivalent to submergence of a vessel to its bulkhead deck.

4.12.5 The density of the installed foam shall be determined from sample foam specimens obtained during installation of the foam and recorded in the *Record of equipment and vessel information*.

4.13 Intact stability requirements for a sailing vessel

4.13.1 Subject to **4.13.3**, sailing vessels shall undergo a stability proof test in accordance with **4.7**.

4.13.2 Sailing vessels certificated to operate in open waters shall be equipped with a self-bailing cockpit.

4.13.3 For vessels certificated to operate in sheltered waters, the Administration may perform operational tests to determine whether the vessel has adequate stability and satisfactory handling characteristics under sail in lieu of, or in addition to, conducting a stability proof test.

4.13.4 For sailing vessels the heeling moment used in a stability proof test shall be the greater of the following:

(a) passenger heeling moment from **4.7.1**;
(b) wind heeling moment from **4.7.1**; and
(c) wind heeling moment calculated from the wind heeling moment equation in **4.7.1** as

$$M_w = P \times A \times H$$

where:

M_w = wind heeling moment in kg-m;
P = 4.9 kg/m^2;
A = the windage area (m^2)of the vessel with all sails set and trimmed flat;
H = height (m) of the centre of effort of area (A) above the waterline, measured up from the waterline.

CHAPTER 5 - MACHINERY AND BILGE PUMPING ARRANGEMENTS

5.1 General

5.1.1 All machinery and associated installations shall be designed, constructed and installed in accordance with good engineering practice.

5.1.2 Engines shall be installed and fitted in such a way as to be adequately accessible for operation and maintenance and shall not present any danger to the persons assigned to those tasks. Engines shall be secured against inadvertent starting.

5.1.3 Power plants, ancillaries, boilers and pressure vessels, together with their accessories, shall be fitted with safety devices.

5.1.4 Where the laws of a country require the issue of a fitness or other certificate to boilers and other pressure vessels, such equipment shall be installed and used in compliance with the conditions of such certificate.

5.1.5 Main and secondary machinery shall operate on fuel with a flashpoint above 55 °C. Fuel with a flashpoint below 55°C may be used in starting aids.

5.1.6 Engines providing power for winches, boats and portable motor pumps may operate on fuel with a flashpoint below 55°C.

5.1.7 In vessels 25m and above in length, a means of communication shall be provided between the engine room, wheelhouse and emergency steering position.

5.1.8 Where an inboard engine is not fitted within a machinery space it shall be enclosed within a weathertight enclosure. Such an enclosure shall be constructed of steel or, if so required by the design of the vessel, in any equivalent material in terms of fireproofing.

5.2 Engine exhaust system

5.2.1 Exhaust gases shall be ducted out of the vessel.

5.2.2 Suitable measures shall be taken to avoid ingress of the exhaust gases into any compartment. Exhaust pipes passing through accommodation or the wheelhouse shall, within such spaces, be covered by protective gas-tight sheathing. The gap between the exhaust pipe and such sheathing shall be open to the outside air.

5.2.3 Exhaust pipes shall be arranged and protected in such a way that they cannot cause a fire.

5.2.4 Exhaust pipes shall be suitably insulated or cooled in engine rooms. Subject to 5.2.2, outside engine rooms exhaust pipes may be located or protected to prevent physical contact.

5.3 Engine and boiler rooms

5.3.1 Engine and boiler rooms shall be arranged in such a way that the equipment therein may be operated, serviced and maintained safely and easily.

5.3.2 Engine and boiler rooms and other areas in which inflammable or toxic gases may be evolved shall be adequately ventilated. It shall be possible, where so needed, to shut down the motors driving the blower and suction fans from outside the spaces in which they are located, and from outside the engine room.

5.3.3 Companionways and ladders providing access to engine and boiler rooms shall be permanently affixed and made of steel or an alternative, equally strong and fire-resistant, material.

5.3.4 Engine and boiler rooms shall have two exits, one of which may be an emergency exit, unless it is demonstrated to the Administration that such an arrangement is not practicable.

5.4 Propulsion machinery

5.4.1 It shall be possible to start, stop and reverse propulsion machinery quickly and safely.

5.4.2 Where propulsion machinery is not controlled from the wheelhouse whilst a vessel is under way, a reliable two-way communication system shall be provided between the wheelhouse and the engine room.

5.5 Fuel tanks, pipes and accessories

5.5.1 Liquid fuels shall be stored in steel tanks or, if so required by the design of the vessel, in any equivalent material in terms of fireproofing. Such tanks shall form part of the hull or be firmly attached to it. Such requirement shall not apply to tanks having a capacity of no more than 12 litres that have been incorporated in ancillaries at the factory. Fuel tanks shall not have common surfaces with drinking water tanks.

5.5.2 Tanks and their pipework and other accessories shall be laid out and arranged in such a way that neither fuel nor gas may accidentally reach the inside of the vessel. Tank valves intended for fuel sampling or water drainage shall close automatically.

5.5.3 Fuel tanks shall not be located ahead of the foremost transverse watertight bulkhead.

5.5.4 Liquid fuel or lubricating oil tanks shall be rigidly installed and may not have common boundaries with accommodation spaces.

5.5.5 Daily supply tanks and their fittings shall not be located above engines or exhaust pipes.

5.5.6 Orifices for liquid-fuel tank filler necks shall be located on the deck, except for the daily-supply tanks. Each such filler neck shall be fitted with a cap. Liquid fuel

tanks shall be fitted with a breather pipe terminating in the open air above the deck and arranged in such a way that water ingress is not possible. Breather pipes shall have a sectional area at least 1.25 times the cross section area of the corresponding filler neck. Filler orifices for fuel tanks shall be marked to show clearly the tanks to which they are connected.

5.5.7 Pipework for the distribution of liquid fuels shall be fitted with a shut-off device at the tank outlet that can be operated from the deck. Such shut-off devices shall be protected against unauthorized operation. This requirement shall not apply to tanks mounted directly on the engine.

5.5.8 Fuel pipes, their connections, seals and fittings shall be made of materials that are able to withstand the mechanical, chemical and thermal stresses to which they are likely to be subjected in operation. The fuel pipes shall not be subjected to any damaging effects of heat and it shall be possible to monitor them throughout their length.

5.5.9 Fuel tanks shall be provided with a capacity-gauging device that is legible up to the maximum filling level. Such devices shall be effectively protected against impacts, shall be fitted with automatically closing taps at their base and shall be attached at their upper part to the tanks above their maximum filling level. Materials used in the manufacture of such devices shall not deform at normal ambient temperatures where they are located.

5.5.10 Liquid-fuel tanks shall be provided with openings having leak-proof closures that permit cleaning and inspection.

5.5.11 Fuel tanks directly supplying power plants and engines needed for navigation purposes shall be fitted with a device emitting both visual and audible signals in the engine room if their level of filling is not sufficient to ensure continued reliable operation.

5.5.12 Batteries shall not be fitted under a fuel tank, fuel cock or fuel filler.

5.6 Steering gear

5.6.1 Vessels shall be equipped with reliable steering gear that ensures good manoeuvrability, having regard to the operation and characteristics of a vessel. Steering gear shall be capable of putting the rudder over in not more than 30 seconds from hard on one side to hard on the other.

5.6.2 Powered steering systems shall be designed in such a way that the rudder cannot change position unexpectedly.

5.6.3 The steering system as a whole shall be designed for permanent lists of up to 15 degrees and ambient temperatures up to 50^{o}C.

5.6.4 The component parts of the steering system shall be constructed and arranged so as to be able to withstand the stresses to which they may be subjected during normal operation. The steering equipment and its controls shall be designed and constructed to that its operation is not impaired when external forces are applied to the rudder.

5.6.5 The steering system shall incorporate a powered steering control if so required by the forces needed to actuate the rudder.

5.6.6 Power-actuated steering devices shall be protected against overloads by means of a system that restricts the torque applied by the control.

5.6.7 Penetrations for the rudder stocks shall be designed so as to prevent the spread of water-polluting lubricants.

5.6.8 A rudder angle indicator shall be fitted in the wheelhouse where it can be seen by the person steering the vessel.

5.7 Steering gear control system

5.7.1 If the steering system is power-actuated, a second control system, or manual control, shall be fitted. It shall be demonstrated that the second system may be brought into use within five seconds if the primary steering control system fails or malfunctions.

5.7.2 If the second control system or manual control is not designed to come into operation automatically it shall be possible to do so immediately by means of a single simple, quick action by the helmsman.

5.7.3 Where fitted, a second control system or manual control shall be demonstrated to achieve good manoeuvrability.

5.8 Steering system hydraulic drive

5.8.1 No hydraulically-actuated device may be connected to the hydraulic actuating system for the steering system. Where two independent steering controls are installed, such a connection to one of the two systems is acceptable if such device is connected to the return line and is able to be disconnected from the steering control by means of an isolating mechanism.

5.8.2 Where two hydraulic systems are fitted, a separate hydraulic reservoir shall be provided for each of the two systems. A double reservoir arrangement will be deemed to meet this requirement. Hydraulic reservoirs shall be fitted with a warning system that monitors any drop in the oil level below the lowest content level needed for reliable operation.

5.8.3 If a steering system cannot be actuated from the wheelhouse manually or by a manually-controlled hydraulic system, a second steering system shall be fitted.

5.8.4 The dimensions, design and arrangement of pipework shall as far as possible ensure that it is protected from damage as a result of mechanical factors or fire.

5.8.5 In a hydraulically-driven system, provided that the two control systems are designed to operate independently and if the pipework system is able to withstand a pressure at least 1.5 times that of the maximum designed service pressure a separate pipework system is not required for the second steering system.

5.8.6 Flexible piping shall only be fitted where its use is essential to damp vibrations or to allow freedom of movement of components. Such piping shall be designed for a pressure of at least twice the maximum service pressure.

5.9 Power source for steering system

5.9.1 Steering systems fitted with two powered actuators shall be fitted with at least two power sources.

5.9.2 If the second power source for the power-driven steering system is not constantly available while a vessel is under way a buffer device shall be fitted having adequate capacity to provide back up during the period needed for start up of the second power source.

5.10 Manual actuation of steering system

5.10.1 Hand-operated steering wheels shall not be driven by the power actuation system.

5.10.2 Regardless of rudder position, the mechanism shall prevent hand wheel kickback when the manually-operated wheel is engaged automatically.

5.11 Rudder systems

5.11.1 Where the thrust vectoring of a rudder-propeller, water jet, cycloidal propeller or bow thruster system is remotely actuated by electric, hydraulic or pneumatic power, two independent actuation systems shall be fitted between the wheelhouse and the system.

5.11.2 Where multiple rudder-propeller, water jet, cycloidal propeller or bow-thruster systems are fitted that are independent of each other the second actuation system is not necessary if the vessel, in the case of failure of one of the systems, is demonstrated to retain acceptable manoeuvrability.

5.12 Bilge pumping systems

5.12.1 Subject to **5.12.2** vessels shall be provided with a pumping system capable of pumping from and draining any watertight compartment in a vessel.

5.12.2 A watertight compartment less than 7% of the total underdeck volume may be drained into the adjacent compartment by means of a self-closing valve or cock. The valve or cock shall be fitted outside the compartment to be drained and shall be operable from a readily accessible position.

5.12.3 In passenger vessels 15m and above in length the system shall permit pumping and draining from every space in a vessel whilst any one watertight compartment is flooded.

5.12.4 Vessels shall be provided with fixed bilge pumps as follows:

Length of vessel (m)	Manual pumps discharge capacity as installed		Power pumps discharge capacity as installed	
	No	Capacity. in kilolitres/hr	No	Capacity. in kilolitres/hr
10m and above and less than 12.5m	1	5.5	1	5.5
12.5m and above and less than 17.5m	1	5.5	1	11.0
17.5m and above and less than 20m	1	8.0	1	11.0
20m and above and less than 25m	Not permitted		2	11.0
25m and above and less than 35m	Not permitted		2	15.0

5.12.5 Open vessels 7.5m and above and less than 10m in length shall be fitted with one hand-operated pump and two bailers. Open vessels less than 7.5m in length shall be fitted with two bailers.

5.12.6 Partially-decked vessel less than 10m in length shall be fitted with one hand-operated pump and two bailers. The hand-operated pump may be a portable pump.

5.12.7 In **5.12.5** and **5.12.6**, one of the bailers may be replaced by a 10 litre bucket.

5.12.8 In all vessels:

(a) a power pump may be substituted for a manually operated pump;

(b) a power pump may be driven by a main engine, an auxiliary engine or by an electric motor. However, where two power pumps are required each pump shall not be dependent on the same source of power;

(c) where a vessel is required by **5.12.4** to be fitted with two power pumps and the capacity of one of those pumps is less than that specified by not more than 20%, the deficiency may be made good by an excess of capacity in the other power pump;

(d) a bilge pump shall be of the self priming type or be provided with a suitable priming device; and

(e) manually operated bilge pumps may be fitted to watertight compartments under 4m in length.

5.13 Bilge piping

5.13.1. Bilge piping diameter shall be calculated as follows:

(a) the inside diameter (d)of the bilge pipe shall be at least:

$$d = 1.5\,(L(B+D))^{0.5} + 25\ (mm);$$

(b) the inside diameter (d_b)of the branch pipes connecting at the various suction strainers shall be at least:

$$d_b = 2.0\,(l(B+D))^{0.5} + 25\ (mm)$$

where:

L is the length of the vessel (m);

l is the length of the relevant watertight compartment (m);

B is the moulded breadth of the vessel (m); and

D is the moulded depth up to the main deck (m).

5.13.2 Flat-bottomed compartments over 5m wide, shall be fitted with at least one suction strainer on either side. Where an engine room is over 5m long at least two suction strainers shall be fitted at opposite ends.

5.13.3 Branch drain pipes from various compartments shall be connected to a main by means of closable non-return valves. Compartments or other spaces fitted out for ballast need only be connected to the draining system by means of a simple shut-off device.

5.13.4 The rearmost compartment may be drained via the main engine room by means of an easily accessible, automatically closable set of pipes.

5.13.5 Drainage spurs for each compartment shall be linked to the main drain by means of lockable non-return valves.

5.13.6 Ballast compartments or other ballast spaces shall be linked to the drainage system by means of a single closing device.

5.13.7 Notwithstanding the provisions of **5.13.6**, holds used for ballast water shall be filled by means of permanently installed ballast piping independent of the drainage pipes, or by means of spurs consisting of flexible pipes or intermediate pipes connected to the main drain. Holds used for water ballast shall be filled by means other than water intake valves located in the base of the hold. Such holds shall be fitted with depth gauges.

5.13.8 Where drainage systems incorporates permanently fixed pipework, bilge-bottom drainage pipes intended to extract oily water shall be equipped with closures that have been sealed in position.

5.14 Storage of oily-water and drained oil

5.14.1 Water contaminated with oil by operations on board shall be stored on board. The engine-room bilge is considered to be a store for this purpose. Such water shall be discharged in accordance with **14.5**.

5.14.2 Engine rooms shall contain one or more dedicated containers for the storage of waste oils, the capacity of which corresponds to at least 1.5 times the quantity of waste oils from all of the internal combustion engines, all of the equipment installed and hydraulic fluids from the hydraulic-fluid reservoirs. Connections used to empty such containers shall be fitted to the Administration's requirements. Waste oils from such containers shall be discharged in accordance with **14.5**.

5.14.3 Where vessels operate exclusively on short voyages the Administration may grant exemptions from the requirements of **5.14.2**, subject to arrangements for the discharge of waste oils complying with **14.5**.

CHAPTER 6 - ELECTRICAL INSTALLATIONS

6. 1 General

6.1.1 Electrical installations shall comply with the requirements of **Chapter 6**.

6.1.2 The following shall be carried on board vessels 25m and above in length:

(a) circuit and installation diagrams, specifying the types and makes of electrical machinery and appliances on board, the types and cross-sections of cables and all other information necessary for an assessment of the safety of electrical installations; and

(b) operating instructions for the electrical installations.

6.1.3 Electrical installations shall be designed, constructed and installed to withstand a permanent transverse list of up to 15 degrees and ambient temperatures up to 50°C.

6.1.4 Electrical cables shall be flameproof or, for applications where flameproof cable is not available, shall be protected from fire as far as is reasonable and practicable.

6.2 Maximum permissible voltages

6.2.1 Voltages specified in **Table 6.2-1** shall not be exceeded:

Table 6.2-1: Maximum permissible voltages and current ratings

Nature of installation	Permissible maximum voltage		
	Direct current	Single-phase alternating current	Three-phase alternating current
A. Power and heating installations, including relevant sockets	250V	250V	500V
B. Lighting installations, including relevant sockets	250V	250V	-
C. Sockets for current supply to hand-held appliances used on open decks or in confined or damp metal-enclosed spaces other than boilers and tanks:			
1.in general	50V	50V	-
2.where an isolating transformer serves a single appliance[1].	-	250V	
3. where appliances with reinforced or double insulation are used	250V	250V	-
4. where ≤ 30mA default circuit breakers are used	-	250V	500V
D. Sockets for supply to hand-held equipment used in boilers and tanks	50V	50V	-

Note to Table 6.2-1:

1: both wires of such systems shall be insulated from earth

6.2.2 Subject to compliance with appropriate safety measures, higher voltages than specified in **6.2.1** are permissible as follows:

(a) in installations for battery charging equipment, as the charging process requires;

(b) for machinery the capacity of which so requires; or

(c) for special shipboard installations (eg radio installations and ignition equipment).

6.2.3 Current ratings shown in **Table 6.2-2** shall not be exceeded.

Table 6.2-2: Current ratings in amperes for cables run open or enclosed[1]

Cable mat'l	**pvc insulation**			**butyl, EP or silicone**[2] **insulation**		
Cross-section mm^2	single core	twin core	3-or 4-core	single core	twin core	3-or 4-core
1.0	10	8	7	15	12	10
1.5	13	11	9	21	18	15
2.5	17	14	12	27	23	19
4.0	23	19	16	36	31	25
6.0	30	25	21	46	39	32
10	41	35	29	62	53	43
16	54	46	38	83	70	58
25	71	60	50	110	93	77
35	86	73	60	135	115	94
50	100	85	70	160	135	110
70	130	110	91	205	175	145
95	160	135	110	250	210	175
120	185	155	130	290	245	205
150	210	180	145	330	280	230
185	240	205	170	375	320	260
240	285	240	200	445	380	310
300	330	280	230	510	435	355
	DC AC	DC AC		DC AC		
400	390 380	330 325	265	610 590	-	-
500	450 430	- -	-	690 640	-	-
630	520 470	- -	-	790 690	-	-

Notes to Table 6.2-2

1 Nominal current ratings are shown for dc, single-phase ac or 3-phase ac installations

2 Silicone ratings are for single core cable only

6.3 Shore connections

6.3.1 Where an electrical installation is powered by an on-shore source of current, the cables shall have a fixed connection on board or be equipped with permanent connection or with current take-off devices. Care shall be taken to ensure that cables and their connections are not subject to tensile load.

6.3.2 Only flexible cable insulated by oil-resistant and flame-retardant sheathing shall be used for shore connections.

6.3.3 If the lead-in voltage exceeds 50V, the hull shall be effectively earthed. The plug-in socket on the hull shall be marked accordingly.

6.3.4 The main switchboard shall be fitted with an indicator showing whether the connection to the shore network is carrying current.

6.4 Generators and motors

6.4.1 Generators and motors shall be readily accessible for inspection, measurement and repair and shall be located so as to protect the windings from water and oil. Terminal boxes shall be readily accessible.

6.4.2 Generators driven by a main engine, propeller shaft or auxiliary sets intended for another function shall be designed for the range of rotational speeds expected to occur in service.

6.5 Batteries

6.5.1 Batteries shall be accessible and fitted and arranged so as to not shift with movements of the vessel. They shall not be placed where in service they are exposed to excessive, extreme heat or cold, spray, steam or vapour. They shall not be installed in a wheelhouse, accommodation or holds. This requirement shall not apply to batteries for portable appliances, or to batteries requiring a charging power of less than 0.2kW.

6.5.2 Batteries requiring a charging power of more than 2kW (calculated on the basis of the maximum charging current and the nominal voltage of the battery and taking into account the characteristic charging curve of the charging appliance) shall be installed in a special room. If located on deck they shall be enclosed in a cabinet. Batteries requiring a charging power not exceeding 2kW may be installed below decks in a cabinet or chest. Provided that they are protected against falling objects and dripping water such batteries may be installed in an engine room or in any other well-ventilated space.

6.5.3 The interior surfaces of all rooms, cabinets or boxes, shelving or other built-in features intended for batteries shall be protected against the harmful effects of electrolyte.

6.5.4 Provision shall be made for effective ventilation when batteries are installed in a closed compartment, cabinet or chest. Forced-draught ventilation shall be provided for nickel-cadmium batteries requiring a charging power of more than 2kW and for lead-acid batteries requiring a charging power of more than 3kW. The air shall enter at the bottom and be discharged at the top so as to ensure total gas extraction. Ventilation ducts shall not include any devices that obstruct the air flow, such as stop valves.

6.5.5 The required air throughput (Q) in m^3/h shall be calculated from:

$$Q = 0.11 \times I \times n$$

where:

I = one-quarter of the maximum current admissible by the charging device (A),

n = the number of cells.

6.5.6 In the case of emergency or standby batteries within the onboard network, other methods of calculation taking into account the characteristic charging curve of the charging device may be accepted by the Administration, provided that these

methods are based on the standards of classification societies or on recognized standards.

6.5.7 Where natural ventilation is used the cross-section of the ducts shall be sufficient for the required air throughput on the basis of an air-flow velocity of 0.5 m/sec. The cross-section shall be at least 8,000mm² for lead-acid batteries and 12,000mm² for nickel-cadmium batteries.

6.5.8 Where forced-draught ventilation is used a fan preferably of the suction type shall be provided, the motor of which shall be clear of the gas or air stream. Fans shall be designed to preclude the generation of sparks through contact between a blade and the fan casing and to avoid electrostatic charges.

6.5.9 'No smoking` signs having a minimum diameter of 100mm shall be affixed to doors or covers of compartments, cabinets and chests containing batteries.

6.6 Electrical switchboards

6.6.1 Appliances, switches, protective devices and switchboard instruments shall be arranged so as to be clearly visible and shall be accessible for maintenance and repair.

6.6.2 Terminals for voltages up to 50V, and those for voltages higher than 50V, shall be kept separate and marked appropriately.

6.6.3 Marker plates identifying the circuits of all switches and appliances shall be affixed to the switchboards. The current ratings and circuits for protective devices shall be identified.

6.6.4 Live components of appliances with an operating voltage greater than 50V, installed behind doors, shall be protected against accidental contact when the doors are open.

6.6.5 The materials of switchboards shall have suitable mechanical strength and be durable, non-flammable and self-extinguishing. The materials shall not be hygroscopic.

6.6.6 Accessories and equipment for bodily protection shall be available for installing and removing fuses with a high breaking capacity in electrical switchboards.

6.6.7 Switchboards shall be located in accessible and well-ventilated spaces and be protected against water and mechanical damage. Piping and air ducts shall be arranged so that switchboards cannot be damaged in the event of leakage. If installation near electrical switchboards is unavoidable, pipes in the vicinity shall not be fitted with detachable connections.

6.6.8 Cabinets and wall recesses in which unprotected circuit-breaking equipment is installed shall be of non-flammable materials or be protected by metal or other non-flammable sheathing.

6.6.9 Insulating gratings or mats extending across the front of the main switchboard shall be placed at the operator's position when the voltage is greater than 50V.

6.7 Switches, protective devices and circuits

6.7.1 Generator circuits and consumer circuits shall be protected against short circuits and overcurrent on all non-earthed conductors. Overload circuit-breakers or fuses may be used for this purpose.

6.7.2 Circuits supplying power to the steering-gear motors and their control circuits shall be protected only against short circuits. Where circuits include thermal circuit-breakers these shall be neutralized or set at not less than twice the nominal current rating.

6.7.3 Outputs from the main switchboard to appliances operating at more than 16A shall include a load or power switch.

6.7.4 Propulsion systems, steering systems, rudder position indicators, navigation systems and safety systems, and appliances with a nominal current rating greater than 16A, shall be supplied by separate circuits.

6.7.5 Circuits of appliances required for propulsion and manoeuvring shall be supplied directly by the main switchboard.

6.7.6 Circuit-breaking equipment shall be fitted on the basis of current rating, thermal or dynamic strength and breaking capacity. Switches shall simultaneously cut off all live conductors. The switching position shall be identifiable.

6.7.7 Emergency circuit breakers for oil burners, fuel pumps, fuel separators and engine-room ventilators shall be installed outside the spaces containing the equipment.

6.7.8 Fuses shall be of the enclosed-melt type and be made of porcelain or an equivalent material. Arrangements for changing fuses shall minimize the danger of operator contact.

6.8 Measuring and monitoring devices

6.8.1 Generator, battery and distribution circuits shall be equipped with measuring and monitoring devices where the safe operation of the installation so requires.

6.8.2 Non-earthed networks where the voltage is higher than 50V shall include an earth-insulation checking device equipped with a visual and audible alarm. Such a device is not required in secondary installations such as control circuits.

6.8.3 Appropriate earth detector equipment shall be provided for all unearthed circuits of over 50V.

6.9 Lighting

6.9.1 Lighting appliances shall be installed so that emitted heat cannot set fire to nearby inflammable objects or units.

6.9.2 Lighting appliances in enclosed spaces in which batteries are installed, or paints and other highly inflammable substances are stored, shall be of a type that minimises the risk of explosion.

6.9.3 Lighting appliances in engine and boiler rooms shall be distributed between at least two circuits.

6.10 Signal lights

6.10.1 Switchboards for the control of the lights required by **10.3** and **Annex 7** shall be installed in the wheelhouse and shall be powered by a separate cable from the main switchboard.

6.10.2 Each light shall be supplied separately from the light-control switchboard and be separately protected and controlled. Lights forming a group may be supplied by a single circuit provided that the switchboard is arranged so that failure of any light activates the alarm in the monitoring equipment.

6.10.3 Where signal lights cannot be monitored directly from the wheelhouse, they shall be monitored by means of indicator lghts, or similar devices, fitted on the control panel in the wheelhouse. A fault in the indicator light shall not affect the operation of the light that it monitors.

6.11 Earthing

6.11.1 Metal parts that are not intended to carry current when in use, such as machine frames and casings, appliances, fittings and accessories, shall be earthed if they are not already mounted in effective metallic contact with the hull.

6.11.2 In direct current systems, metal fittings and accessories and metal sheaths of cables and ducts shall be earthed at both ends at least. Where cables are mounted on wood or a plastic substance, only one earth connection need be fitted. In alternating current operation, single-conductor cables and ducts shall not be earthed at more than one point.

6.11.3 Earthing is not required in circuits carrying less than 50V.

6.11.4 Where the voltage exceeds 50V, the casings of mobile current-consuming appliances, if not made of an insulating material or not protected, shall be earthed through the feeder cable by means of an additional conductor not normally carrying current.

6.12 Emergency source of power

6.12.1 Vessels 10m and above in length shall be equipped with an emergency source of power complying with **6.12.5** to supply power to the electrical installations listed in **6.12.3** and **6.12.4** if the main power supply is interrupted.

6.12.2 The emergency source of power and its switchboard shall be installed outside the main engine room and the space where the main switchboard is located and shall be separated from those spaces by fire-resistant and watertight bulkheads.

6.12.3 In vessels 25m and above in length, auxiliary power sources shall be capable of supplying simultaneously at least the following electrical installations where they have no independent power supply:

(a) signal lights;
(b) audible warning devices;
(c) emergency lighting of the following spaces and stations:
    (i) evacuation routes;
    (ii) spaces where life-saving equipment is stored and deployed, including the areas identified in **8.8.4(b)**;
    (iii engine rooms and their exits;
    (iv) wheelhouse;
    (v) space in which the emergency source of power and switchboard are located;
    (vi) locations of fire extinguishers, fire pumps and the controls of fixed fire extinguishing systems; and
    (vii) areas in which passengers and crew are assembled for evacuation;
(d) radio telephone equipment;
(e) alarm and loudspeaker systems;
(f) emergency floodlight;
(g) fire alarm system;
(h) fire pumps, bilge pumps and fire extinguishing systems; and
(i) other safety installations

6.12.4 Vessels 10m and above and less than 25m in length shall be fitted with a source of auxiliary power to the electrical installations listed in 6.12.3(a)to 6.12.3(f) inclusive.

6.12.5 The emergency source of power may be:

(a) an emergency set, the fuel supply system and cooling system of which is independent of the main power plant and that, in the event of a network failure can provide the entire power supply within 30 seconds, and
    (i) is started automatically, or
    (ii) can be started manually if it is installed in the immediate vicinity of the wheelhouse or other station that is manned continuously by qualified crew members; or may be
(b) A battery that, in the event of a network failure, can provide the equipment listed with power for the required amount of time without being recharged and without any unacceptable fall in voltage and
    (i) is automatically phased to the line, or
    (ii) can be connected manually if it is installed in the immediate vicinity of the wheelhouse or other station that is manned continuously by qualified crew members.

6.12.6 The operating time for the emergency source of power shall be determined in accordance with the intended use of the vessel, but shall not be less than 30 minutes.

6.12.7 Failure of main or emergency power equipment shall not adversely affect the operational safety of electrical installations that it serves.

CHAPTER 7 – FIRE PROTECTION

7.1 General

7.1.1 Vessels shall be fitted with the fire extinguishing systems required by **Chapter 7**. Vessels 25m and above in length shall be fitted with a fixed fire extinguishing system in the engine room complying with **7.3.2, 7.3.3** or **7.3.4**.

7.1.2 Details of fire extinguishing systems shall be entered in the *Record of equipment and vessel information*.

7.1.3 Where fire-fighting appliances are installed so as to be concealed from view, the partition covering them shall be marked with a red letter 'F' at least 100mm high.

7.1.4 In vessels 10m and above in length a fire control plan shall be displayed in the wheelhouse, showing fire divisions fitted on the vessel, particulars of any fire extinguishing systems and the position of fire pumps, fire hydrants, fire hoses and fire extinguishers.

7.2 Portable fire extinguishers

7.2.1 Power-driven vessels shall carry adjacent to, but clear of, the engine room or engine enclosure:
(a) a box containing sand together with a scoop; or
(b) if required by the Administration, an asbestos blanket.

7.2.2 Portable fire extinguishers shall be provided on board vessels as follows:

Length	Propulsion	Extinguisher type
Less than 10m	Sail or oars	Sand box or bailer
Less than 10m	Power	1x 4 litre chemical foam
10m to less than 12.5m	Sail	1 x 6kg dry powder
10m to less than 12.5m	Power	1 x 4 litre chemical foam 2 x 6kg dry powder
12.5m to less than 15m	Sail	2 x 6kg dry powder
12.5m to less than 15m	Power	2 x 9 litre chemical foam 2 x 6 kg dry powder
15m and above	Sail	2 x 6kg dry powder
15m and above	Power	2x 9 litre chemical foam 3x 6kg dry powder

7.2.3 Vessels required by **9.1.1** to carry communications equipment shall, in addition to the requirements of **7.2.2**, carry a portable fire extinguisher located close to such equipment, of a type suitable for fighting electrical fires.

7.2.4 Vessels in which the total power output exceeds 110kW shall, in addition to complying with the requirements of **7.2**, carry a portable fire extinguisher suitable for fighting oil fires located in a suitable place in the engine room.

7.2.5 Passenger vessels and cargo-passenger vessels 12.5m and above in length shall carry twice the number of extinguishers required by **7.2.2** for vessels of their length and type of propulsion.

7.2.6 Company decisions on the location of the portable fire extinguishers required by **7.2.2** should be guided by the following recommended locations:

(a) in the wheelhouse;
(b) near points of access from deck to accommodation;
(c) at the point of access to service areas not accessible from the accommodation and in which are installed heating, cooking or refrigerating equipment running on solid or liquid fuel;
(d) in galleys, if an extinguisher in **7.2.6(c)** is not readily accessible from a galley
(e) near engines or at the entrance to engine rooms.

7.2.7 Portable fire extinguishers fitted in vessels, where the size is not specified in **7.2.2**, shall comply with the following requirements:

(a) the capacity of portable chemical foam extinguishers shall not be more than 13.5 litres or less than 9 litres. The contents of portable dry-powder extinguishers shall be at least 6kg;
(b) the extinguishing agent shall be suitable for putting out the type of fire most likely to occur in the space or spaces for which the extinguisher is chiefly provided. On vessels where the operating voltage of the electrical installations exceeds 50V, the extinguishing agent shall also be suitable for fighting fires in electrical installations;
(c) instructions for use shall be clearly shown on each portable extinguisher;
(d) the extinguishing substance shall not be Halon or contain substances that are likely to release toxic gases during use, such as carbon tetrachloride. Portable fire extinguishers using CO2 may only be used to fight fires at specific locations such as control panels and kitchens; the quantity of CO2 in the extinguisher shall not constitute a health hazard; and
(e) extinguishers that are sensitive to extreme cold or heat shall be so installed or protected as to ensure their continued effectiveness.

7.3 Fire extinguishing systems

7.3.1 The fire extinguishing system required by **7.4** and **7.5** shall satisfy the following requirements:

(a) the fire pump or pumps shall not be installed forward of the collision bulkhead;
(b) the water pressure in the hydrants shall be able to be maintained at not less than 0.25N/mm^2;
(c) piping and hydrants shall be so designed that the hoses can be easily connected;
(d) all piping through which flooding of the vessel could occur shall be fitted with non-return valves;
(e) all nozzles shall be fitted with a device for regulating the water jet at high-pressure or spray and for stopping the flow; and
(f) the entire system shall conform to recognized standards.

7.3.2 A fixed fire extinguishing system fitted in compliance with **7.1.1** and using CO2 as the fire extinguishing medium shall comply with the following requirements where:

(a) the CO2 extinguishing systems shall only be able to be actuated in the engine rooms, boiler rooms and pump rooms. Devices shall be installed that enable all of the orifices to be protected that are likely to allow air to enter,

or CO_2 to exit, the spaces concerned. The triggering devices shall be installed in such a way that their actuation is possible even in the event of a fire; The automatic release of CO_2 shall not be permitted;

(b) the combustion air needed for the internal combustion engines intended for vessel propulsion shall not be drawn from the engine rooms, boiler rooms or pump rooms;

(c) all permanently-installed CO_2 extinguishing systems shall be fitted with a warning device having clearly audible signals even under the noisiest possible operating conditions on all of the spaces that can be flooded with CO_2 gas and that can be clearly distinguished from all other audible warning devices on board. Such CO_2 alarms shall also be clearly audible in the adjoining rooms with any communicating doors closed, and under operating conditions corresponding to the greatest amount of noise possible, where escape may be effected via the spaces that are to be flooded with CO_2 gas. The CO_2 alarm shall operate for a suitable period before the release of the CO_2. A panel containing the following message in red letters on a white background shall be affixed at a suitable point at the exit and entrance of all of the spaces likely to be affected by CO_2:"Immediately leave this area on hearing the CO_2 signal (description of signal…). Danger of suffocation";

(d) the instructions for use shall be affixed in a clearly legible and durable manner close to all CO_2 extinguisher actuators. The pipework reaching the various spaces that are likely to be affected by CO_2 shall be fitted with a shut-off device. Before the extinguishing system is triggered the alarm required by **7.3.2(c)** shall previously be activated automatically;

(e) the CO_2 containers shall be placed in a room or cabinet that is separate from the other spaces and is proof against gas leaks. The doors of those rooms or cabinets shall open outwards, be lockable and bear the legend "CO_2" in red on a white background;

(f) spaces for the storage of CO_2 located below the deck shall only be accessible directly from outside. No direct links with other spaces shall be permitted. Spaces located beneath the deck shall have adequate stand-alone ventilation that is completely separate from the other on-board ventilation systems. The ventilation apertures shall be arranged in such a way that if there is a leak from the CO_2 container the gas cannot reach the inner parts of the vessel;

(g) cabinets or lockers for the storage of CO_2 shall only be permitted on the deck if they are firmly attached and outside the accommodation area. If there is a leak from the CO_2 container it shall not be possible for the gas to reach the inner parts of the vessel;

(h) the cabinets or lockers shall protect the containers against heat, cold and humidity;

(i) the temperature within any space, cabinet or locker in which CO_2 is stored shall not exceed 50°C;

(j) spaces protected against fire by CO_2 extinguishing systems shall be equipped with suitable extinguishing substance extractors. It shall not be possible to actuate the extractors during the extinguishing process;

(k) the piping system installed in the engine rooms shall enable 85% of the quantity of gas, determined in accordance with **7.3.2(l)**, to be fed into the spaces within a two-minute period;

(l) the minimum quantity of CO_2 needed for the space or spaces to be protected shall be at least 40% of the gross volume of the space or spaces. The volume of CO_2 released shall be taken as $0.56 m^3/kg$;

(m) the filling rate of CO_2 containers shall not exceed 0.75 kg/litre;

(n) CO_2 containers shall be placed upright and protected against falling. Pressurized containers, CO_2 fittings and pipework shall meet recognized standards; and

(o) the alarms required by 7.3.2(c) and the extinguishing equipment shall be checked annually.

7.3.3 Fixed foam fire extinguishing system

(a) a fixed fire extinguishing system fitted in compliance with **7.1.1** and using foam as the extinguishing medium shall be capable of discharging through fixed discharge outlets in not more than 5 minutes a quantity of foam sufficient to cover to a depth of 150 mm the largest single area over which oil fuel is liable to spread;

(b) such installation shall be capable of generating foam suitable for extinguishing oil fires and means shall be provided for the effective distribution of the foam through a permanent system of piping and control valves or cocks to discharge outlets, and for the foam to be effectively directed by fixed sprayers on other main oil fire hazards in the protected space either simultaneously or separately;

(c) such installation shall include mobile sprayers ready for immediate use in the firing area of the boiler and in the vicinity of the oil fuel unit;

(d) fixed foam fire extinguishing installations fitted in oil cargo spaces of tankers shall be capable of distributing on the decks over oil cargo tanks through fixed discharge outlets in not more than 15 minutes a quantity of foam sufficient to cover to a depth of at least 50mm the whole of the tank deck area;

(e) installations required by **7.3.3(d)** shall be capable of generating foam suitable for extinguishing oil fires and means shall be provided for the effective distribution of the foam through a permanent system of piping and control valves or cocks to discharge outlets. There shall be sufficient mobile foam sprayers capable of being connected to the installation whereby foam can be directed into any tank; and

(f) for the purpose of **7.3.3(d)**, “tank deck area” means an area equivalent to the overall length of the cargo tanks multiplied by the breadth of the vessel.

7.3.4 Fixed fire extinguishing systems using extinguishing substances not specified in the Regulations shall be fitted in accordance with the requirements of the Administration.

7.4 Fire pumps

7.4.1 General requirements

(a) every fire pump required to be operated by power shall be operated by a means other than the main engine, except that in the case of a vessel less than 15m in length fitted with main engines that can be operated independently of the propeller shafting, one of the power fire pumps may be operated from the main engines;

(b) bilge, ballast and general service pumps of suitable capacity and pressure may be accepted as fire pumps, but pumps connected so that they may be used for pumping oil shall not be accepted as fire pumps;

(c) the water pressure in the hydrants shall be able to be maintained at not less than $0.25N/mm^2$ and power fire pumps shall be capable of producing a throw

of at least 12m from every nozzle. The throw may be reduced by the Administration on consideration of the size and type of vessel;

(d) fire pumps shall not be installed forward of the collision bulkhead;

(e) piping and hydrants shall be so designed that the hoses can be easily connected;

(f) all piping through which flooding of the vessel could occur shall be fitted with non-return valves; and

(g) the entire system shall conform to recognized standards.

7.4.2 Power-driven vessels 15m and above and less than 30m in length shall be fitted with at least one hand-operated fire pump of the rotary type or centrifugal type that shall either be self priming or be fitted with an effective priming device.

7.4.3 Power-driven vessels 30m and above in length shall be fitted with

(a) at least one mechanically operated fire pump;

(b) an additional fire pump, that shall not be required to be operated mechanically; and

(c) additional water pumps, as may be required by the Administration, having regard to the safety of the vessel and its cargo and passengers.

7.4.4 The additional pump required by **7.4.3(b)** shall:

(a) be permanently connected to fire water-service pipes, if any;

(b) together with its source of power, if any, not be situated in the same compartment as the pump required by **7.4.3(a)**; and

(c) if a hand pump, be of the rotary type.

7.4.5 In vessels equipped with a water pump, a water-suction valve shall be fitted, operated from outside the machinery space.

7.5 Hydrants and hoses

7.5.1 Power driven vessels 15m and above in length shall be provided with hydrants and fire hoses as follows:

(a) the number and position of the fire hydrants shall be such that at least one jet of water may be directed into any part of the vessel by means of a fire hose, which fire hose shall not exceed 18m in length;

(b) at least one hose shall be provided for each hydrant;

(c) nozzles shall be fitted with a device for regulating the water jet at high-pressure or spray and for stopping the flow;

(d) the internal diameter of the conductor nozzles shall be not less than 13mm;

(e) deck cargo shall not hinder access to hydrants, and water pipes shall be protected from potential damage by the cargo;

(f) valves fitted to water pipes shall be designed to open with an anti-clockwise rotation of the hand wheel;

(g) all fire hydrants shall be equipped with hoses spanners, secured by light chain;

(h) branch water service pipes and hydrants shall be of one standard size in any vessel and shall comply with the requirements of the Administration; and

(i) valves shall be so fitted to the water pipes and shall be so arranged that any fire hoses coupled thereto may be removed while fire pumps are in operation.

7.5.2 Water service pipes shall be fitted with means for draining when pipes are on an exposed deck. In vessels 45m and above in length hydrants shall be fitted on both port and starboard sides of the deck.

7.5.3 The Administration may, as an alternative to fire hoses approve the provision of water-service pipes, where these are of a sufficient diameter, to enable an adequate supply of water to be provided for the efficient operation of at least one fire hose.

7.5.4 The fire hoses required by **7.5.1** shall be made of leather, seamless hemp, closely woven flax, canvas or other suitable material and shall be provided with couplings, conductors, other necessary fittings and a nozzle suitable for dealing with all fires.

7.5.5 Fire hoses shall be stowed so as to be protected against damage.

7.5.6 Fire-fighting equipment shall be kept available and in good order so as to be ready for use at all times.

7.6 Inspections

Fire-fighting arrangements and appliances required by **Chapter 7** and **Chapter 15** shall be inspected annually.

7.7 Engine room access

Doors fitted in the machinery space bulkheads required by **3.2.5** shall, as far as practicable, be equivalent in resisting fire to such bulkheads. If such doors are not weathertight or watertight they shall be fitted with self-closing devices.

CHAPTER 8 - LIFE-SAVING ARRANGEMENTS AND APPLIANCES

8.1 Interpretation

In this Chapter, unless inconsistent with the context:
float-free arrangement means an arrangement that provides for a survival craft to be released automatically from a sinking vessel and be made ready for use;
launching appliance means an appliance that provides for a survival craft to be put in the water safely from its stowed location;
rescue boat means a boat suitable for rescuing persons in distress from the water and marshalling survival craft;
rigid, in respect of a rescue boat, means constructed of rigid materials or a combination of rigid materials and inflatable compartments that does not rely wholly on inflatable compartments or spaces for buoyancy and form; and
survival craft means a lifeboat, a buoyant apparatus, a life raft, a rescue boat, a flotation device, or a boat suitable for performing the functions of a survival craft.

8.2 General requirements

8.2.1 Unless expressly provided otherwise, **Chapter 8** applies to new vessels. Life-saving appliances on existing vessels shall be in compliance with recognized standards.

8.2.2 New and existing vessels shall have displayed in a prominent place instructions for saving and resuscitating drowning persons.

8.2.3 Survival craft and their launching appliances shall provide capacity for 100% of the total number of persons that a vessel is certificated to carry. Where the life-saving appliances and their launching appliances, where applicable, are not accessible from both sides of the vessel, additional life-saving appliances shall be fitted as required by the Administration.

8.2.4 Existing vessels shall, no later than ***{insert appropriate date after the entry into force of the Regulations if appropriate}***, comply with the requirements of **Chapter 8** and **Chapter 9** relating to the following lifesaving equipment:
(a) lifejackets;
(b) lifebuoys;
(c) radar transponders or radar reflectors, as and where required by the Administration in light of the characteristics of the waterway and the equipment carried by potential rescue vessels operating on the waterway;
(d) liferafts and other buoyant apparatus, and hydrostatic release units; and
(e) equipment for locating the vessel and survivors in an emergency.

8.2.5 The Administration may, in respect of equipment required by **Chapter 8** and notwithstanding **8.2.4**, require that existing vessels comply with the requirements of the Regulations.

8.2.6 The Administration may approve the fitting and the design and construction of lifeboats, liferafts, open reversible liferafts, flotation devices, buoyant apparatus and lifebuoys as appropriate, depending on the size and service characteristics of vessels and the areas within which they are certificated to undertake voyages, the

proximity of the proposed routes to rescue facilities and prevailing weather conditions, in order to provide an appropriate level of safety for survivors.

8.2.7 Unless otherwise approved by the Administration, vessels 25m and above in length shall be fitted with lifeboats or liferafts and vessels less than 25m in length shall be fitted with flotation devices.

8.3 Approval of life-saving appliances and arrangements

8.3.1 Life-saving appliances and arrangements required by **Chapter 8** shall be approved by the Administration or by other Administrations or classification societies as determined by the Administration. In approving life-saving appliances and arrangements the Administration shall ensure that such life-saving appliances and arrangements have regard to the recommendations of the Organization[6] or to the provisions of any other national or international standards considered appropriate by the Administration.

8.3.2 Where novel life-saving appliances or arrangements are to be approved, the Administration shall ensure that they provide the same safety standards as specified in this Chapter and that, where appropriate, such appliances and arrangements are evaluated and tested in accordance with the recommendations of the Organization[7].

8.4 Emergency communications equipment

In addition to the radiocommunications equipment required by **Chapter 9**, the Administration may require that the following equipment be carried:

8.4.1 at least 4 rocket parachute flares and 4 hand flares located in the wheelhouse of the vessel. Parachute flares shall comply with the requirements of the LSA Code[8]. Hand flares shall comply with the Administration's requirements. Taking into consideration the nature and conditions of the voyage, the Administration may accept hand flares in lieu of rocket parachute flares and may specify that a different number of flares be carried;

8.4.2 at least 2 orange smoke signals complying with the Administration's requirements; and

8.4.3 an effective emergency means of communication for two- way communications between control stations, assembly and embarkation stations and strategic positions on board.

[6] Refer to the Revised Recommendation on Testing of Life -Saving Appliances, adopted by the Organization by resolution MSC.81(70)
[7] Refer to 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)
[8] Refer to the International Life-Saving Appliance Code, adopted by the Organization by resolution MSC.48(66)

8.5 Personal life-saving appliances

8.5.1 Vessels 25m and above in length shall carry at least four lifebuoys complying with the requirements of **8.5.2**. Vessels less than 25m in length shall carry at least two such lifebuoys. The Administration may require more lifebuoys to be carried on a passenger vessel or a cargo-passenger vessel. As far as is practicable, lifebuoys shall be equally distributed on both sides of the vessel. Of the lifebuoys carried, at least one shall be provided with a self-igniting light and one shall be fitted with a buoyant lifeline. On vessels 25m and above in length, two of the buoys carried shall be fitted with self-activating smoke signals and shall be capable of quick release from the wheelhouse.

8.5.2 Lifebuoys shall:

(a) possess buoyancy of not less than 100N in fresh water;

(b) be manufactured of suitable material and be resistant to oil and its derivatives and to temperatures of up to 50°C;

(c) be so coloured as to be readily visible in the water;

(d) have a mass not less than 2.5kg;
have an inside diameter of 0.45m ±10%;

(e) be fitted with a grab rope;

(f) be fitted with float-free arrangements, except for lifebuoys fitted with self-activating smoke signals;

(g) be marked with retro-reflective material; and

(h) be marked in block capitals of the Roman alphabet with the name and port of registry of the vessel on which it is carried.

8.5.3 Vessels shall carry lifejackets, complying with the Administration's requirements, for every person on board. Where the Administration approves the carriage and use of inflatable lifejackets, they shall have provision for inflation by mouth.

8.5.4 In addition to the requirement of **8.5.3**, vessels shall carry in unlocked and clearly marked, dry stowage conditions a sufficient number of lifejackets as required by the Administration for persons on watch or on duty and for use at remotely-located survival craft stations. On passenger and cargo-passenger vessels, ten percent of children's lifejackets shall be carried in addition to the number required by **8.5.3**.

8.5.5 Lifejackets shall be located on vessels so as to be readily accessible and their positions shall be plainly indicated. Every lifejacket shall be fitted with retro-reflective material and shall be provided with a whistle firmly secured by a cord.

8.6 Manning and survival procedures

8.6.1 The provisions of **8.6.2** and **8.6.6** to **8.6.12** inclusive apply to new and existing vessels.

8.6.2 All persons manning vessels subject to the Regulations shall be trained in launching and operating all types of survival craft carried on the vessel[9].

8.6.3 Illustrations and instructions relating to the use of life-saving appliances in appropriate languages shall be exhibited at assembly stations and in crew spaces.

[9] Refer to resolution A.(657)16 concerning instructions for action in survival craft

8.6.4 Posters or signs shall be provided in the vicinity of the stored location of survival craft and their launching controls illustrating the launching and boarding procedures for the survival craft.

8.6.5 Assembly stations and embarkation stations shall be adequately illuminated by floodlights supplied from the emergency source of electric power.

8.6.6 Each member of the crew shall participate in at least one abandon ship drill and one fire drill every month. On-board training in the use of life-saving appliances, including survival craft equipment, shall be provided at such drills.

8.6.7 Each lifeboat, where carried, shall be launched with its assigned operating crew aboard and manoeuvered in the water at least once every three months during an abandon ship drill required by **8.6.6**.

8.6.8 Rescue boats, other than lifeboats that are also rescue boats, shall be launched with their assigned operating crew aboard and manoeuvered in the water, where reasonable and practicable every month, but in no case less than once every three months.

8.6.9 Emergency instructions, giving clear instructions to be followed in case of emergency, shall be provided and exhibited in conspicuous places within the vessel, including the wheelhouse, machinery spaces and accommodation spaces. The instructions shall specify details of the general emergency alarm required by **8.11** and action to be taken by the crew and other persons on board when the alarm is sounded. Instructions on action to be taken subsequent to the signal for fire on board and the order to abandon the vessel shall also be provided.

8.6.10 The attention of all passengers shall be drawn to the emergency instructions before vessels depart on voyages by means of a broadcast over a vessel's public address system or by other appropriate means.

8.6.11 On passenger vessels and cargo-passenger vessels the use of lifejackets shall be demonstrated either before a vessel departs on the voyage or immediately thereafter.

8.6.12 Records relating to abandon ship drills, fire drills and on-board training shall be entered in the official log book required by **1.13**.

8.7 Survival craft

8.7.1 The arrangement and stowage of the survival craft required by **Chapter 8** shall be approved by the Administration having regard to:

(a) the arrangement and stowage of the survival craft in positions providing for demonstrated easy side-to-side transfer at a single open deck level or the provision of additional survival craft to ensure the effective evacuation of the vessel;

(b) the need for carriage of a rescue boat or dinghy in place of one or more survival craft; and

(c) the alternative arrangements that may be adopted, as agreed by the Administration.

8.7.2 Every oil tanker shall, in addition to complying with the requirements of **8.2.3**, carry at least one rigid rescue boat unless:

(a) all of the required survival craft are lifeboats; or

(b) at least one of the required survival craft is a lifeboat complying with the requirements for a rescue boat.

8.7.3 The equipment to be provided in survival craft shall be determined by the Administration, taking into account the areas within which the vessel is certificated to operate, distance from the nearest ports of refuge and search and rescue services available in the area.

8.7.4 Vessels 25m and above in length shall carry a rescue boat[10] complying with the Administration's requirements, the capacity of which may be substituted for the capacity of the survival craft required by **8.2.3**. If the rescue boat also functions as a work boat its capacity shall not be counted towards the total capacity required on board the vessel by **8.2.3**.

8.8 Stowage, launching, recovery and embarkation

Stowage, launching and recovery arrangements for survival craft

8.8.1 Survival craft shall be stowed:

(a) so that neither the survival craft nor its stowage arrangements will interfere with the operation of any other survival craft or rescue boat at any launching station;

(b) as near the water surface as is safe and practicable;

(c) so that the life boats and any rescue boats required can easily be launched from the vessel; and

(d) in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than 5 minutes.

8.8.2 Where a liferaft is not provided with a launching appliance it shall be stowed with its painter permanently attached to the vessel by a hydrostatic release unit, a disposable hydrostatic release unit or other arrangements demonstrated to be no less effective than a hydrostatic release unit.

Embarkation and launching arrangements for survival craft

8.8.3 Survival craft embarkation arrangements shall be so designed so that, as far as possible, lifeboats and davit-launched liferafts can be boarded and launched from the embarkation deck.

8.8.4 Suitable arrangements shall be made for embarkation into survival craft that shall include:

(a) one or more embarkation ladders or other approved means to provide access to waterborne survival craft;

(b) 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

[10] Refer to Chapter V of *Resolution* MSC.48(66): International Life-Saving Appliance Code

until the process of launching is completed, the power for which is to be supplied from the emergency source of power required by **6.12**;

(c) arrangements for warning all persons on board that the vessel is about to be abandoned; and

(d) means for preventing the discharge of water into the survival craft.

Rescue boats

8.8.5 Rescue boat embarkation and launching arrangements shall be such that the rescue boat can be boarded and launched in the shortest possible time. Arrangements shall be provided to enable a rescue boat to be readily recovered.

8.8.6 Where the rescue boat is one of the vessel's survival craft, the embarkation arrangements and launching station shall comply with the relevant requirements for survival craft of **8.8.1**, **8.8.4** and **8.8.5**.

8.9 Marking of survival craft

8.9.1 Survival craft shall be marked in capital letters of the Roman alphabet with:

(a) the name and port of registry of the vessel;

(b) the name of the Administration or other approving authority; and

(c) the number of persons it is permitted to accommodate.

8.9.2 A label shall be fixed to each inflatable liferaft showing the date of the last service and the date by which the next service is required.

8.10 Operational readiness, maintenance and inspection

8.10.1 Before vessels leave port and at all times during the voyage, all life-saving appliances on board shall be in working order and ready for immediate use.

8.10.2 Instructions for on-board maintenance of life-saving appliances shall be easily understood and illustrated where possible.

8.10.3 Survival craft, rescue boats and launching appliances shall be visually inspected weekly to ensure that they are ready for use.

8.10.4 The general emergency alarm system required by **8.11** shall be tested weekly.

8.10.5 Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using a check list to ensure that such equipment is complete and in good order. A report of the inspection shall be entered in the official log-book.

8.10.6 Inflatable liferafts, inflated rescue boats and hydrostatic release units shall be serviced at intervals of not more than 12 months at an approved servicing station. However, in cases where the service of a vessel and the location of approved service stations makes it impossible to comply with this requirement, the Administration may allow this period to be extended but in no case shall this period be greater than 18 months.

8.11 General emergency alarm and public address systems

8.11.1 Vessels shall be provided with a general emergency alarm system for summoning the passengers and crew to assembly stations, operated from the wheelhouse and powered from main and emergency power. The system shall be capable of operation from any other location required by the Administration and shall be audible throughout all accommodation and normal working spaces.

8.11.2 Passenger vessels shall be provided with a public address system to the Administration's requirements.

CHAPTER 9 –COMMUNICATIONS EQUIPMENT

9.1 Radiocommunications equipment

9.1.1 Vessels 10m and above in length and passenger vessels and cargo-passenger vessels, regardless of length, shall carry radio apparatus capable under normal conditions of transmitting and receiving, on frequencies designated by the Administration, over a distance of 50 nautical miles. This apparatus shall consist, at least, of a VHF set operating on Channel 16.

9.1.2 Vessels not required by **9.1.1** to carry a radio apparatus shall carry an effective means of radiocommunications.

9.2 Emergency position indicating radio beacon

Vessels 10m and above in length shall carry an emergency position indicating radio beacon (EPIRB) operating on a frequency of 406MHz.

9.3 Radar reflector and transponder

9.3.1 Passenger vessels shall be fitted with a radar transponder, where required by the Administration in light of the characteristics of the waterway and the equipment carried by potential rescue vessels operating on the waterway.

9.3.2 A radar transponder, where required by **9.3.1** or **8.2.4(c)**, shall operate in the 9GHz band.

9.3.3 The radar transponder shall be stowed on the vessel so that it can be rapidly placed in any survival craft.

9.3.4 Vessels 10m and above in length shall carry a radar reflector fitted as high on the vessel as is practicable.

9.3.5 The Administration may accept a radar reflector in lieu of the radar transponder required by **9.3.1** or **8.2.4(c)**.

CHAPTER 10 - SAFETY OF NAVIGATION[11]

10.1 Safety obligations and avoidance of collisions

10.1.1 Masters and persons in charge of vessels shall comply with the requirements of **Annex 7** in relation to the prevention and avoidance of collisions.

10.1.2 No provision of **Chapter 10** or **Annex 7** shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with the Regulations or of the neglect of any precaution which may be required by the ordinary practice of seamanship, or by the special circumstances of the case. In construing, and complying with, **Chapter 10** or **Annex 7** due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from the Regulations necessary to avoid immediate danger.

10.1.3 No master or person in charge of a vessel shall navigate such vessel in a manner or at a speed likely to:
(a) endanger the safety of any person in that or any other vessel; or
(b) cause damage to any other vessel or to any moorings, jetty or other property.

10.1.4 No person shall:
(a) endanger the safety of any person in any vessel; or
(b) cause damage to any vessel or to any moorings, jetty or other property.

10.2 Compasses and Navigation

10.2.1 Power-driven vessels 5m and above in length and less than 25m in length shall be provided with at least one compass.

10.2.2 Power-driven vessels 25m and above in length shall be fitted with:
(a) a standard magnetic compass, except as provided in **10.2.5**;
(b) a steering magnetic compass, unless heading information provided by the standard compass required in accordance with **10.2.2(a)** is made available and is clearly readable by the helmsman in the wheelhouse;
(c) adequate means of communication between the standard compass position and the normal navigation control position to the satisfaction of the Administration; and
(d) means for taking bearings as nearly as practicable over an arc of the horizon of 360^0.

10.2.3 Magnetic compasses required by **10.2.2** shall be properly adjusted to the Administration's requirements and their table or curve of residual deviations shall be available on board at all times.

[11] This Chapter is extensively based on, and Annex 7 provides a basic version of, the International Regulations for Preventing Collisions at Sea (COLREG), 1972, as amended, which should be referred to if it is required to interpret the provisions of the Model Regulations or determine appropriate technical standards for equipment specified therein

10.2.4 Vessels 25m and above in length shall carry a spare magnetic compass, interchangeable with the standard compass, unless the steering compass required by **10.2.2(a)** or a gyro-compass is fitted.

10.2.5 The Administration, if it considers it unreasonable or unnecessary to require a standard magnetic compass to be fitted, may exempt individual vessels or classes of vessels from these requirements if the nature of the voyage, the proximity of the route to land or the type of vessel does not warrant carriage of a standard compass. If a vessel is so exempted, a suitable steering compass shall be carried with means for taking bearings according to recognized standards.

10.2.6 Vessels 10m and above in length shall be fitted with a Global Positioning System receiver, where required to do so by the Administration.

10.2.7 Passenger vessels and cargo-passenger vessels 15m and above in length shall be fitted with a radar installation capable of operating in the 9 GHz frequency band. A vessel may be exempted from compliance with this requirement at the discretion of the Administration, provided that the equipment fitted is fully compatible with the radar transponder for search and rescue required by **9.3**.

10.2.8 Where required by the Administration, passenger vessels and cargo-passenger vessels 15m and above in length shall be fitted with an echo sounder.

10.3 Navigation and other lights and sound signals

10.3.1 Vessels shall be fitted with the lights and sound signals specified in **Annex 7**.

10.3.2 The master or person in charge of a vessel, in any vessel under the command of that person, shall be responsible for:
(a) displaying the lights and shapes prescribed by **Chapter 10** and **Annex 7**;
(b) making the signals prescribed by **Chapter 10** and **Annex 7**; and
(c) taking the actions prescribed by **Chapter 10** and **Annex 7**.

10.3.3 Where in **Annex 7** certain actions are expressed as being required to be taken by the vessel, such actions shall be required to be taken by the master or person in charge of the vessel.

10.4 Action on receipt of distress signal

10.4.1 The master or person in charge of a vessel, on receiving a signal of distress, or information from any source that a vessel or aircraft is in distress, shall proceed with all speed to the assistance of such vessel or aircraft, informing it and any monitoring station, if possible, of this action, unless:
(a) it is not possible to do so;
(b) in the special circumstances of the case, it is unreasonable to do so; or
(c) the master is released under the provisions of **10.4.2**.

10.4.2 The master or person in charge of a vessel shall be released from the obligation imposed by **10.4.1** when informed by any monitoring station or vessel that the services are no longer required.

10.5 Distress signals and equipment

10.5.1 No vessel shall proceed on a voyage without being equipped with means of making distress signals, in the form of the equipment and apparatus specified in **Annex 7**, which shall be efficient and kept in working order.

10.5.2 The minimum equipment to be provided to comply with **10.5.1**, where not otherwise specified by **Annex 7**, shall be an electric torch or a lantern and a hand flag.

10.5.3 The signals that shall be used or displayed when a vessel is in distress and requires assistance are specified in **Annex 7**.

10.5.4 No person shall use any of the signals referred to in **10.5.3**, or any signals that may be confused with such signals, except for the purpose of indicating that a vessel is in distress.

10.6 Nautical Publications

All vessels shall carry adequate, proper, and up-to-date charts, sailing directions, lists of aids to navigation, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage.

10.7 Proximity to booms

No vessel shall proceed nearer than a point 90m upstream from a boom above any dam wall.

10.8 Instructions and notices to mariners

Companies, masters and persons in charge of vessels shall comply with any instructions or notices published by the Administration for the purpose of enhancing maritime safety.

CHAPTER 11 - HEALTH AND SAFETY IN THE CREW'S ACCOMMODATION AND WORKING STATIONS

11.1 General

11.1.1 Vessels shall have accommodation for the persons normally living on board, and at least for the number of persons identified in the Certificate of Safe Manning required by **Chapter 13**.

11.1.2 Accommodation shall be so designed, arranged and fitted out as to meet the health, safety and comfort needs of those on board.

11.1.3 The Administration may authorize alternatives to the requirements of **Chapter 11** if the health and safety of those on board are ensured by other means.

11.1.4 **Chapter 11** does not apply to fishing vessels, except to the extent so required by the Administration.

11.2 Vessel design requirements for health and safety

11.2.1 Accommodation shall be ventilated adequately, even when the doors are closed.

11.2.2 Where there is no deck-level access to the accommodation and the difference in level is 300mm or more the accommodation shall be accessible by means of companionways.

11.2.3 Living and sleeping quarters shall have at least two exits that are as far apart from each other as possible and that serve as escape routes. An exit may be designated as an emergency exit. This does not apply to areas with an exit giving directly onto the deck or onto a corridor that serves as an escape route, provided the corridor has two exits at a distance from each other and giving onto the port and starboard sides of a vessel. Emergency exits, that may include skylights and glazing, shall have a clear opening of at least 0.36m² and a shortest side no less than 500mm and permit rapid evacuation in an emergency. Escape routes shall be faced and insulated with fire-resistant materials and their usability assured at all times by appropriate means such as ladders or steps.

11.2.4 Accommodation shall be protected against noise and vibration.

11.2.5 Headroom in the accommodation shall be not less than 2m.

11.2.6 Vessels shall have at least one day-room partitioned off from the sleeping quarters, except where the construction or the type of vessel makes it impracticable.

11.2.7 The free floor area of the living quarters shall be not less than 2m² per person, and in any event not less than 8m² in total (not counting furniture, except tables and chairs).

11.2.8 The cubic capacity of each unit in the living and sleeping quarters shall be not less than 7m³.

11.2.9 The volume of air per person shall be at least 3.5m³ in the living quarters. In the sleeping quarters it shall be at least 5m³ for the first occupant and at least 3m³ for each additional occupant (not counting the volume of furniture). Sleeping cabins shall, as far as possible, be intended for no more than two persons. Berths shall be not less than 300mm above the floor. Where one berth is placed over another, the headroom above each berth shall be not less than 600mm.

11.2.10 Doors shall have a total height, coamings included, of at least 1900mm and a clear width of at least 600mm. The prescribed height may be achieved by means of sliding or hinged covers or flaps. It shall be possible to open doors from either side. Coamings shall comply with the requirements of **3.8**.

11.2.11 Companionways shall be permanently fixed and safely negotiable. They shall be deemed to be safely negotiable when:
(a) they are at least 600mm wide;
(b) the tread is at least 150mm deep;
(c) the steps are non-slip; and
(d) companionways with more than three steps are fitted with at least one handrail or handle.

11.2.12 Pipes carrying dangerous gases or liquids, and particularly those under high pressure in which a leak could pose a danger to human beings, shall not be located in the accommodation or in corridors leading to the accommodation. Steam pipes and hydraulic system pipes may be so located, provided they are fitted in metal sleeves. Liquefied gas piping may be located in the accommodation or in corridors leading to the accommodation when it is connected to installations for domestic purposes.

11.3 Sanitary installations

11.3.1 The minimum sanitary installations provided in vessels with accommodation shall be:
(a) one toilet per accommodation unit or per six crew members, ventilated with fresh air;
(b) one wash basin with waste pipe, connected to hot and cold potable water per accommodation unit or per four crew members; and
(c) one shower or bath connected to hot and cold potable water per accommodation unit or per six crew members. Shower bases shall have non-slip surfaces. If water supplying a shower is not supplied through a controlled temperature device, suitable notices shall be provided to warn against the risk of scalding.

11.3.2 The sanitary installations shall be in close proximity to the accommodation. Toilets shall not have direct access to galleys, mess rooms or combined day-rooms/galleys.

11.3.3 Toilet compartments shall have a floor space of at least 1m² and shall be not less than 750mm wide and 1100mm long. Toilet compartments in cabins for no more than two persons may be smaller. Where a toilet contains a wash basin and/or shower and/or bath, the surface area shall be increased at least by the surface area occupied by the wash basin and/or shower and/or bath.

11.4 Galleys

11.4.1 Vessels shall be fitted with a galley except where the construction or the type of vessel makes it impracticable. Galleys may be combined with day-rooms.

11.4.2 Galleys shall contain:
(a) cooker;
(b) sink with waste connection;
(c) supply of potable water;
(d) refrigerator; and
(e) storage and working space adequate for the functions for which the galley is designed.

11.4.3 The eating area of combined galleys/day-rooms shall be large enough to accommodate the number of crew normally using it at the same time. Seats shall be not less than 600mm wide.

11.5 Potable water

11.5.1 Vessels with accommodation shall be fitted with one or more potable water tanks. Potable water tank filling apertures and potable water pipes shall be marked as being intended exclusively for potable water. Potable water filler necks shall be installed above the deck.

11.5.2 Potable water tanks shall:
(a) be protected against excessive heating;
(b) have a capacity of at least 150 litres per person normally living on board, and at least 150 litres per person identified in the Certificate of Safe Manning required by **13.11.1**;
(c) be made of a material that resists corrosion and poses no physiological danger;
(d) have a suitable, lockable opening to enable the inside to be cleaned;
(e) have a water level indicator; and
(f) have ventilation caps to the open air or be fitted with appropriate filters.

11.5.3 Potable water tanks shall not share walls with other tanks. Potable water pipes shall not pass through tanks containing other liquids. Connections are not permitted between the potable water supply system and other pipes. Pipes carrying gases or liquids other than potable water shall not pass through potable water tanks.

11.5.4 Potable water pressure vessels shall operate only on uncontaminated compressed air. Where it is produced by means of compressors, appropriate air filters and oil separators shall be installed directly in front of the pressure vessel unless the water and the compressed air are separated by a diaphragm.

11.6 Heating, cooling and ventilation

11.6.1 Accommodation shall be heated or cooled as appropriate in accordance with its intended use and the area of operation of a vessel. Heating and cooling installations shall be appropriate for the climatic conditions in that area.

11.6.2 Living and sleeping quarters shall be ventilated adequately even when the doors are closed. The inflow and evacuation of air shall ensure adequate air circulation in all climatic conditions in which a vessel operates. The ventilation system shall provide at least 3 changes of volume per hour.

11.6.3 The accommodation shall be so designed and arranged as to prevent as far as possible the penetration of foul air from other areas of the vessel such as engine rooms or holds.

11.6.4 Where forced-air ventilation is used the intake vents shall be so placed as to satisfy the requirements of **11.6.3**.

11.7 Other accommodation requirements

11.7.1 Each crew member living on board shall have an individual berth and an individual clothes locker fitted with a lock.

11.7.2 Suitable places for storing and drying work clothes shall be provided, but not in the sleeping quarters, except where it is demonstrated to the Administration that a location in the sleeping quarters is the only one practicable for storing or drying work clothes.

11.8 Means of access in the accommodation

11.8.1 Means of access to the accommodation shall be so arranged and of such dimensions that they can be used without danger or difficulty. This requirement is deemed to be fulfilled when:

(a) there is enough space in front of the opening to the access to permit unimpeded entrance;
(b) means of access are clear of installations that present hazards, such as winches, towing or hauling gear and loading gear;
(c) the clear width is at least 600mm and the total height of the access plus coaming is at least 1900mm;
(d) the height required by **11.8.1(c)** may be achieved by using hoods or covers; and
(e) the means of access at emergency exits are insulated and covered with fire-resistant materials.

11.8.2 Doors and hinged covers shall be fitted with means of closure that can be operated from either side and shall be arranged such that accidental opening or closing of doors is not possible.

11.8.3 Where there is no deck level access to the accommodation, and the difference in levels is 300mm or more, the accommodation shall be accessible by means of companionways meeting the requirements of **11.2.11**.

11.9 Accommodation floors, walls and deckheads

11.9.1 Floors, walls and deckheads shall be fitted and arranged so that they may be cleaned easily. Floor coverings shall be non-slip. Surface claddings shall not be harmful to health.

11.9.2 The accommodation, including the passages in the part of the vessel used for crew accommodation, shall be insulated against cold and heat from outside or from nearby or adjacent compartments.

11.10 Daylight and lighting in the accommodation and working areas

All parts of the accommodation and working spaces shall be adequately lit by electric lighting. The living quarters, sleeping quarters and galleys shall receive daylight and should, if practicable, look on to the outside of the vessel.

11.11 Safety devices

11.11.1 Vessels shall be so fitted out that the crew can move about and work easily. Moving parts and openings in the deck shall be protected by safety devices, plating, guard rails and handrails as appropriate. Winches and towing hooks shall be designed to ensure safe operation. All installations required for work on board shall be so designed, sited and protected as to make on-board manoeuvres, maintenance and repairs safe and easy.

11.11.2 The following areas shall be treated or covered so as to present a non-slip surface:
(a) decks in the vicinity of winches and bollards;
(b) engine-room floors;
(c) landings and companionways; and
(d) the tops of bollards.

11.11.3 Tops of bollards, any obstacles in areas where crew move about and the treads of companionways shall be marked by light-coloured paint.

11.11.4 Appropriate devices shall be provided for preventing the accidental movement of stacked hatch covers.

11.12 Safety of working stations

11.12.1 Working stations shall be readily and safely accessible.

11.12.2 Companionways, ladders, steps or similar arrangements shall be provided where there is a difference of over 500mm in the levels of accesses, exits and passageways. Companionways meeting the requirements of **11.2.11** shall be provided where the level of permanently manned working stations differs by more than 1m from the levels from which access is to be gained.

11.12.3 Emergency exits shall be clearly marked.

11.12.4 The number, design and dimensions of exits, including emergency exits, shall be consistent with the purpose and size of the compartments.

11.13 Dimensions of working stations

11.13.1 Working stations shall be of dimensions such that each crew member working in them has adequate freedom of movement.

11.13.2 Permanently manned working stations shall be of sufficient dimensions to ensure:

(a) a net volume of air not less than $7m^3$,except for the wheelhouse of vessels less than 40m in length; and

(b) a free floor area and headroom for each working station that gives adequate freedom of movement for operation and inspection and for ordinary maintenance and repair work.

11.13.3 The clear width of side-decks shall be not less than 600mm. This width may be reduced around bollards.

11.14 Protection against falling

11.14.1 Working stations close to the water or in positions involving differences in level of more than 1m shall be equipped so as to prevent crew slipping or falling.

11.14.2 On crewed vessels, protection against slipping or falling overboard shall be provided by guardrails comprising a handrail, an intermediate protection at knee level and a toe rail. Uncrewed vessels shall be provided with such protection by means of a handrail.

11.15 Access, doors and companion ways of working stations

11.15.1 The size and arrangement of passageways, accesses and corridors for the movement of persons and cargo shall be such that they may be negotiated without risk of accident. The minimum requirements are deemed to be fulfilled when:

(a) the space in front of the access opening permits unimpeded movement;

(b) openings are located clear of installations that might present a source of danger;

(c) the clear width of the passageway is consistent with the purpose of the working station and is not less than 600mm, except where the construction or the type of vessel makes it impracticable, in which case a width of no less than 500mm shall be provided; and

(d) the headroom is not less than 1900mm.

11.15.2 The design and layout of doors shall be such as not to endanger the persons opening or closing them.

11.15.3 Structures for passage from one level to another, particularly companionways, ladders and steps shall be such that their use is free of hazard. The minimum requirements are fulfilled when:

(a) companionways and ladders are permanently fixed or secured against slipping and overturning;
(b) companionways are not less than 500mm wide, the width between handrails is not less than 600mm and ladders and steps are not less than 300mm wide;
(c) the depth of the tread is not less than 150mm;
(d) ladders and steps can be safely negotiated, with no risk of slipping due to the configuration of the ladder or steps;
(e) companionways with more than four steps are fitted with hand-rails;
(f) vertical ladders are fitted with hand-holds above the exits;
(g) portable ladders, wherever used, are secured against overturning and slipping and are long enough, when inclined at an angle of 60° from the horizontal, to extend 1m beyond the rim of a hatchway or the upper landing of the ladder;
(h) portable ladders shall be at least 400mm wide and shall be 500mm wide at the base; and
(i) rungs forming part of a ladder are fixed in the upright so that they cannot turn or become detached and the maximum distance between rungs is 300mm.

11.15.4 Emergency exits and ports or skylights designed for use as emergency exits shall have an area of clear opening of at least 0.36m^2 and the smallest dimension shall be at least 500mm.

11.16 Deck surfaces, walls, deckheads and openings

11.16.1 The floors and hold floorings at internal working stations, deck surfaces at external working stations and all surfaces on which personnel may move about shall be strongly constructed and designed to prevent slipping and falling.

11.16.2 Openings in decks or floors shall, at all times when they are open, be provided with protection against falling.

11.16.3 Floors, deck surfaces, hold floorings, walls and deckheads shall be designed and arranged so as to easily be cleaned.

11.16.4 Ports and skylights shall be arranged and fitted so that they can be handled and cleaned without risk.

11.17 Ventilation and heating of working stations

11.17.1 Closed spaces in which work is carried out, with the exception of storerooms, shall be ventilated. The ventilation devices shall be arranged so as not to cause draughts and shall provide an adequate and regularly renewed supply of air to the working stations for the persons in them. Where the natural rate of air renewed is less than five changes of volumes per hour, mechanical ventilation shall be provided.

11.17.2 The operation of combustion or ventilation equipment shall not result in a deterioration of the quality of the air in any working station.

11.17.3 Heating or cooling equipment capable of maintaining adequate temperatures in permanent working stations shall be installed in vessels where required by the Administration.

11.18 Natural light and lighting of working stations

11.18.1 Where practicable, working stations shall receive adequate natural light even when the doors are closed. Permanently manned working stations shall look out directly on to the outside of the vessel in so far as operating or design requirements make this practicable.

11.18.2 Lighting shall be arranged so as to eliminate dazzle as far as practicable.

11.18.3 Light switches in working stations shall be installed in readily accessible positions near doors.

11.19 Protection against noise and vibration

11.19.1 Permanent working stations and the installations in them shall be designed and sound-proofed so that the safety and health of crew members are protected against noise and vibration. The ambient noise levels in permanently manned working stations shall not exceed 90 dB(A)at head level. A clearly worded warning shall be fixed near each of the means of access to spaces in which a high noise level occurs.

11.19.2 If 90dB(A) is exceeded in the spaces specified in **11.19.1**, individual noise protection devices shall be provided for each person working in such spaces.

11.19.3 Working stations shall be located, fitted out and designed in such a way that crew members are not exposed to harmful vibration.

CHAPTER 12 – CARRIAGE OF CARGOES AND DANGEROUS GOODS

12.1 Carriage of cargoes - General

Vessels and barges carrying cargoes specified below shall comply with the requirements of the Regulations and, to the extent required by the Administration in respect of the characteristics of the vessel and the voyage or voyages in which it is or is to be engaged, comply with the applicable requirements of Chapters VI and VII of SOLAS[12,13]:

12.1.1 grain cargo in bulk;
12.1.2 other cargoes in bulk;
12.1.3 liquid chemicals in bulk;
12.1.4 liquefied gases in bulk;
12.1.5 timber deck cargoes; and
12.1.6 livestock.

12.2 Carriage of dangerous cargoes in packaged form or in bulk

12.2.1 Dangerous goods shall be carried in compliance with the requirements of the International Maritime Dangerous Goods Code[14] and **12.2.3** to **12.2.12** inclusive.

12.2.2 A vessel carrying a certificate issued pursuant to national regulations governing conditions for the transport of dangerous substances shall carry dangerous goods under the conditions stated in that certificate, in addition to complying with **12.2.1**.

12.2.3 No person shall send or convey any dangerous goods on a vessel unless the correct technical name is distinctly marked on the outside of a package in which such goods are contained.

12.2.4 A person who sends dangerous goods for shipment shall provide to the Company or master of the vessel in which such goods are to be carried, before or at the time such goods are taken on board the vessel, documentation as required by regulation VII/5 of the SOLAS Convention.

12.2.5 The Company or master of a vessel shall not take any dangerous goods on board the vessel if such goods are not marked or are not adequately packed to withstand the ordinary risks of handling and transport by water.

---

[12] in relation to the cargoes specified, the provisions of Chapters VI and Chapter VII of the International Convention for the Safety of Life at Sea, 1974, as amended are applicable to all ships.

[13] Refer to :
Code of Safe Practice for Cargo Stowage and Securing;
Code of Safe Practice for Ships Carrying Timber Deck Cargoes;
Code of Safe Practice for Solid Bulk Cargoes (BC Code);
International Code for the Safe Carriage of Grain in Bulk (International Grain Code);
International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code);
International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code).

[14] International Maritime Dangerous Goods Code (IMDG Code);
MSC/Circ.559 "Form for reporting incidents involving dangerous goods and marine pollutants in packaged form on board ships and in port areas"

12.2.6 The Company or master of a vessel shall not take inflammable liquids that are dangerous goods on board the vessel unless adequate ventilation is available in the spaces in which such liquids are to be carried.

12.2.7 The Company or master of a vessel shall stow in a safe and proper manner all dangerous goods that have been taken on board the vessel for carriage.

12.2.8 The Company or master of a vessel in which dangerous goods are being carried shall take such precautions as are necessary to prevent unauthorized access to such goods.

12.2.9 No person shall smoke near or inside a compartment containing dangerous goods.

12.2.10 The Company or master of a vessel shall cause to have exhibited appropriate signs inside and, where necessary, outside any compartment being used to carry dangerous goods.

12.2.11 The Company or master of a vessel shall not take dangerous goods liable to spontaneous combustion on board the vessel for carriage unless proper precautions are taken for the prevention of spontaneous combustion of such goods.

12.2.12 The Company or master of a vessel shall not take dangerous goods in the form of solids that take up water with the production of heat on board the vessel for carriage unless such goods are:
(a) carried in metal drums; or
(b) protected from water.

12.3 Signals to be displayed when handling explosives

The master of a vessel loading, discharging or transferring explosives shall hoist, where it can best be seen, the International Code flag "B" and shall display an all-round red light during the hours of darkness.

12.4 Carriage of livestock

Livestock on board a vessel on a voyage longer than one hour shall be carried in compliance with **Annex 5**.

CHAPTER 13 – CERTIFICATES OF COMPETENCY AND MANNING

13.1 Interpretation

In **Chapter 13**, **Annex 8** and **Annex 9**, unless inconsistent with the context:
chief engineer means the senior engineer officer responsible for the mechanical propulsion and the operation and maintenance of the mechanical and electrical installations of the vessel;
officer means a member of the crew, other than the master, designated as an officer by national law or regulations or, in the absence of such designation, by collective agreement or custom;
oil tanker means a vessel constructed and used for the carriage of petroleum and petroleum products in bulk;
propulsion power means the total maximum continuous rated output power in kilowatts of all the vessel's main propulsion machinery which appears on the vessel's certificate of registry or other official document;
rating means a member of the vessel's crew other than the master or an officer;
STCW Code means the Seafarers' Training, Certification and Watchkeeping (STCW) Code as adopted by the 1995 Conference resolution 2, as it may be amended; and
STCW Convention means the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended.

13.2 Certificates of competency – mandatory minimum requirements for certification

13.2.1 For the issue of a certificate of competency of the grades listed in column 1 of **Table 13.5-1** and **Table 13.6-1**, every candidate shall:
(a) meet the standards of competence specified in column 2 of **Table 13.5-1** or **Table 13.6-1**, as appropriate, for that certificate;
(b) have completed the qualifying service specified in column 3 of **Table 13.5-1** or **Table 13.6-1**, as appropriate, for that certificate;
(c) be not less than the age prescribed in column 4 of **Table 13.5-1** or **Table 13.6-1**, as appropriate, for that certificate; and
(d) meet the standards of medical fitness prescribed by the Administration.

13.3 Training and experience

13.3.1 The training and experience necessary to achieve the level of theoretical knowledge, understanding and proficiency to meet the standards of competence shall:
(a) for masters, be based in part on section A-VIII/1, part 3-1 of the STCW Convention - *Principles to be observed in keeping a navigational watch*; and
(b) for engineers, be based in part on section A-VIII/1, part 3-2 of the STCW Convention - *Principles to be observed in keeping an engineering watch*.

These principles are reproduced in **Annex 9**.

13.3.2 Such training and experience shall also take into account the relevant requirements of the standards of competence in column 2 of **Table 13.5-1** and **Table**

13.6-1 and, to the extent considered appropriate by the Administration, the guidance given in part B of the STCW Code or appropriate national requirements accepted by the Administration as equivalent.

13.3.3 Every candidate for certification shall follow an approved programme of training, such training to include on-board training which:

(a) ensures that during the required period of seagoing service the candidate receives systematic practical training and experience in the appropriate tasks and duties;

(b) is closely supervised and monitored by qualified officers aboard the vessels in which the approved service is performed; and

(c) is adequately documented in a training record book or similar document.

13.4 Service as master or chief engineer

13.4.1 In addition to satisfying the requirements of **Chapter 13** necessary to gain certification, officers holding certificates of classes 3 and 4 shall be required to:

(a) for service on board a vessel in the position of master, demonstrate the competence to undertake the tasks, duties and responsibilities in **Table A8-5 of Annex 8** to these regulations; and

(b) for service on board a vessel in the position of chief engineer, demonstrate the competence to undertake the tasks, duties and responsibilities in **Table A8-6 of Annex 8** to these regulations.

13.5 Standards of competence - for certification as master

Table 13.5-1

Column 1	Column 2	Column 3	Column4
Grade of certificate	**Standards of competence**	**Qualifying experience[1]**	**Minimum Age**
Master Class 1	STCW Code Table A-II/2	3 years as holder of a Master Class 2 certificate including 2 years as an officer in charge of a navigational watch on vessels of a size and type as determined by the Administration	23 years
Master Class 2	STCW Code Table A-II/3	2 years as holder of a Master Class 3 certificate including 1 year as an officer in charge of a navigational watch on vessels of a size and type as determined by the Administration	21 years
Master Class 3	**Annex 8 Table A8-1**	2 years as holder of a Master Class 4 certificate including 1 year as an officer in charge of a navigational watch whilst holding that certificate on vessels of a size and type as determined by the Administration	20 years
Master Class 4	**Annex 8 Table A8-2**	2 years as apprentice or deck hand in any capacity up to boatswain on vessels of a size and type as determined by the Administration including 1 years service as an officer in charge of a navigational watch under supervision	18 years

Note to Table 13.5-1

1 The qualifying experience shown here is for guidance and is not mandatory unless specified or otherwise required by the Administration

13.6 Standards of competence - for certification as engineer

Table 13.6-1

Column 1 Grade of certificate	Column 2 Standards of competence	Column 3 Qualifying experience[1]	Column 4 Minimum Age
Engineer Class 1	STCW Code Table AIII/2	3 years as holder of an engineer Class 2 certificate including 2 years as an officer in charge of an engineering watch on vessels of a propulsion power and type as determined by the Administration	23 years
Engineer Class 2	STCW Code Table AIII/2	2 years as holder of an engineer Class 3 certificate including 1 year as an officer in charge of an engineering watch on vessels of a propulsion power and type as determined by the Administration	21 years
Engineer Class 3	**Annex 8 Table A8-3**	2 years as holder of an engineer Class 4 certificate including 1 year as an officer in charge of an engineering watch on vessels of a propulsion power and type as determined by the Administration	20 years
Engineer Class 4	**Annex 8 Table A8-4**	2 years as apprentice or engine attendant on vessels of a propulsion power and type as determined by the Administration including 1 year service as an officer in charge of an engineering watch under supervision	18 years

Note to Table 13.6-1

1 The qualifying experience shown here is for guidance and is not mandatory unless specified or otherwise required by the Administration

13.7 Certification of ratings forming part of a navigational watch, a watch in a manned engine-room or designated to perform duties in a periodically unmanned engine-room

13.7.1 Persons serving as ratings shall:

(a) as a deck rating forming part of a navigational watch demonstrate the competence to undertake the tasks, duties and responsibilities in **Table A8-7** of **Annex 8** to these regulations; and

(b) as an engine room rating forming part of a watch in a manned engine-room or designated to perform duties in a periodically unmanned engine-room demonstrate the competence to undertake the tasks, duties and responsibilities in **Table A8-8 of Annex 8** to these regulations.

13.7.2 Persons serving as ratings shall not be less than 18 years of age.

13.8 Mandatory minimum requirements for the training and qualifications of masters, officers and ratings serving on tankers

Officers and ratings assigned specific duties and responsibilities related to cargo or cargo equipment on tankers shall have completed an approved shore-based fire-fighting course and shall have completed:

13.8.1 at least one month of approved service on tankers during which they shall have received sufficient information and instruction to provide them with adequate knowledge of safe operational practices; or

13.8.2 an approved tanker familiarization course covering at least the syllabus given for that course in section A-V/1 of the STCW Code.

13.9 Safety training

All persons serving on board a vessel shall have undergone safety training prescribed by, or acceptable to, the Administration in the following areas:

13.9.1 ***Familiarization training***. Before being assigned to duties, all persons employed or engaged on a vessel other than passengers, shall receive familiarization training in personal survival techniques or receive sufficient information and instruction, to be able to:

(a) communicate with other persons on board on elementary safety matters and understand safety information symbols, signs and alarm signals;
(b) know what to do if a person falls overboard, fire or smoke is detected or the fire or abandon ship alarm is sounded;
(c) identify muster and embarkation stations and emergency escape routes;
(d) locate and put on lifejackets;
(e) raise the alarm and have basic knowledge of the use of portable fire extinguishers;
(f) take immediate action upon encountering an accident or other medical emergency before seeking further medical assistance on board; and
(g) close and open the fire doors and weathertight and watertight doors fitted in the particular ship other than those for hull openings.

13.9.2 ***Basic training***. Seafarers employed or engaged in any capacity on board a vessel on the business of that vessel as part of the vessel's crew with designated safety or pollution prevention duties shall, before being assigned to any duties in the operation of the vessel receive appropriate basic training or instruction in:

(a) personal survival techniques as set out in table A-VI/1-1 of the STCW Code;
(b) fire prevention and fire-fighting as set out in table A-VI/1-2 of the STCW Code;
(c) elementary first-aid as set out in table A-VI/1-3 of the STCW Code; and
(d) personal safety and social responsibilities as set out in table A-VI/1-4 of the STCW Code.

13.10 Safe manning

13.10.1 In establishing the minimum safe manning for a vessel, the Administration shall observe the broad principles set out in **13.10.2** and **13.10.3** and shall, as far as is

practicable and reasonable, take into account the guidelines set out in Annex 1 to the principles agreed by the Organization[15].

13.10.2 In all cases the Administration shall ensure the capability to:

(a) maintain safe navigational, engineering and radio watches in accordance with regulation VIII/2 of the STCW Convention, and also maintain general surveillance of the vessel;
(b) moor and unmoor the vessel safely;
(c) manage the safety functions of the vessel when employed in a stationary or near-stationary mode;
(d) perform operations, as appropriate, for the prevention of damage to the marine environment;
(e) maintain the safety arrangements and the cleanliness of all accessible spaces to minimize the risk of fire;
(f) provide for medical care on board the vessel;
(g) ensure safe carriage of cargo during transit; and
(h) inspect and maintain, as appropriate, the structural integrity of the vessel. and

13.10.3 In addition, the Administration shall ensure the ability to:

(a) operate all watertight closing arrangements and maintain them in effective condition, and also deploy a competent damage control party;
(b) operate all on-board fire-fighting and emergency equipment and life-saving appliances, carry out such maintenance of this equipment as is required to be done at sea, and muster and disembark all persons on board; and
(c) operate the main propulsion and auxiliary machinery and maintain the machinery in a safe condition to enable the vessel to overcome the foreseeable perils of the voyage.

13.10.4 In applying the principles set out in **13.10.2** and **13.10.3**, the Administration should also take account, as appropriate, of existing International Maritime Organization, International Labour Organisation, International Telegraphic Union and World Health Organization instruments in force which cover:

(a) watchkeeping;
(b) hours of work or rest;
(c) safety management;
(d) certification of seafarers;
(e) training of seafarers;
(f) occupational health and hygiene; and
(g) crew accommodation.

13.10.5 The following on-board functions, when applicable, should also be taken into account when determining safe manning:

(a) ongoing training requirements for all personnel, including the operation and use of fire-fighting and emergency equipment, life-saving appliances and watertight closing arrangements;
(b) specialized training requirements for particular types of vessels;
(c) provision of proper food and drinking water;

[15] refer to the guidelines set out in Annex 1 to resolution A.890(21) Principles of Safe Manning

(d) need to undertake emergency duties and responsibilities; and
(e) need to provide training opportunities for entrant seafarers to allow them to gain the training and experience needed.

13.11 Safe manning

13.11.1 Vessels shall carry a Certificate of Safe Manning, issued by the Administration, containing the information set out in the form of the Certificate of Safe Manning in **Annex 1** If the language used is not English the information given shall include a translation into English.

13.11.2 Guidance on the number and grade of certificated persons to serve as masters and chief engineers on particular types and sizes of vessel is tabulated in **Table 13.11-1** and **Table 13.11-2 respectively**:

Table 13.11-1: Master

Description of vessel	Passenger vessels and cargo-passenger vessels			
	No of certificated officers to be carried			
Length	Master Class 1	Master Class 2	Master Class 3	Master Class 4
less than 10m				1
above 10m and less than 20m			1	
above 20m and less than 35m			1	
above 35m and less than 50m	1[1]	1		
above 50m	1	1		

	Other vessels, except fishing vessels			
Length	Master Class 1	Master Class 2	Master Class 3	Master Class 4
	No of certificated officers to be carried			
less than 5m				1[2]
above 5m and less than 10m				1
above 10m and less than 20m			1	
above 20m and less than 35m		1		
above 35m and less than 50m	1[1]	1		
above 50m	1	1		

Notes to Table 13.11-1

1 A person holding a Master Class 2 Certificate may be acceptable to the Administration under this category, provided the person has undergone training as required by **13.4**

2 A person holding a qualification as Rating may be acceptable to the Administration under this category

Table 13.11-2: Chief engineer

Description of vessel	All vessels except fishing vessels			
	No of certificated engineer officers to be carried			
Propulsion power	Engineer Class 1	Engineer Class 2	Engineer Class 3	Engineer Class 4
less than 200kW				1
above 200kW and less than 350kW			1	
above 350kW and less than 750kW		1		
above 750kW W	1	1		

CHAPTER 14 – POLLUTION PREVENTION

14.1 Interpretation

In **Chapter 14**, unless inconsistent with the context:
bunker oil or ***heavy fuel*** means oil, with the exception of lubricating oil, used to power the vessel's main or auxiliary machinery;
designated waterway means an inland waterway that has been designated **{insert reference to process or relevant law governing pollution of waterways}** for the purpose of the prevention of pollution;
discharge means any release or discharge, howsoever caused, being part of the operation of the vessel. The term includes escape, disposal, spilling, leaking, pumping or emitting;
garbage means all kinds of waste generated during the normal operation of the vessel such as food residues, glass, earthenware and china, metal protective and packing material, dunnage and sweepings from cargo spaces;
heavy diesel oil means diesel oil other than those distillates the volume of which is reduced by more than 50 per cent at a temperature not exceeding 340°C when tested by ASTM standard method D. 86/59;
oil means crude oil, bunker oil, fuel oil, heavy diesel oil and lubricating oil;
oil mixture means any substance containing any oil having an oil content of more than 100 parts per million by volume;
plastic wastes means all plastics comprising products such as plastic-coated packaging material, synthetic rope and fishing nets;
rate of discharge of oil at any point of time means the rate of discharge of oil in litres per hour at any point in time divided by the speed of the vessel in knots at the same point of time;
vessel's wastes means all forms of waste arising from general running of the vessel including, inter alia, plastic wastes and garbage, as defined. Fresh fish and parts thereof are not considered as vessel's wastes; and
sewage means drainage and other wastes from any form of toilets, urinals, wash basins, wash tubs and water closet scuppers.

14.2 Prohibition

14.2.1 Unless otherwise provided in **14.3**. the discharge of an oil mixture into a designated waterway is prohibited.

14.2.2 The dumping of any kind of vessel's waste into a designated waterway is prohibited.

14.2.3 The dumping of any kind of plastic wastes into a designated waterway is prohibited.

14.2.4 The discharge of sewage into a designated waterway is prohibited.

14.3 Exemptions

14.3.1 The provisions of **14.2** shall not apply to:

(a) the discharge of oil or oil mixture from a vessel for the purposes of securing the safety of a vessel, preventing damage to a vessel or cargo or saving of life on a designated waterway;

(b) the escape of oil or oil mixture resulting from damage to a vessel or unavoidable leakage, provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the leakage for the purpose of preventing or minimising the escape; or

(c) the dumping of wastes or the discharge of sewage when this is necessary to secure the safety of the vessel or the health of persons on board or to save life. The same applies to the discharge of wastes occurring as a result of damage to the vessel, provided that all reasonable measures have been taken to prevent or minimize such discharge.

14.5 Reception facilities and discharge of wastes

14.5.1 The Administration shall undertake to ensure the provision of adequate reception facilities at inland waterway ports and terminals for the reception from vessels of oily waste, sewage and garbage without causing undue delay.

14.5.2 The master of a vessel that has oily wastes or other wastes, sewage or garbage to discharge shall provide advance notice to a port or harbour that is to be requested to provide reception facilities.

14.5.3 Oily wastes, other wastes, sewage and garbage shall be discharged from a vessel into appropriate facilities.

14.6 Precautions relating to the load or discharge of oil or oily mixtures

14.6.1 The following precautions shall be observed when loading or transferring oil, bunkering or discharging oil mixtures:

(a) the vessel shall be securely moored at a berth or jetty by means of ropes or wires that are in good condition and of appropriate size for the loads to which they are likely to be subjected;

(b) prior to commencement of any operation involving oil or oil mixture, all valves through which oil could be discharged into a waterway shall be inspected to ensure that they are closed and, if not in operation they shall be secured to ensure that they cannot be opened;

(c) all scupper holes to which oil or oil mixture would have access in the event of a spillage shall be plugged tight for the duration of any operation involving oil or oil mixture;

(d) dry material, such as sand or an oil absorbent, shall be available at all times during any operation involving oil or oil mixture to deal with any small spill that may occur. Any oil that is spilled shall be immediately cleaned up and contained for subsequent disposal. Spilled oil or oil mixture shall not be washed, or otherwise discharged, overboard;

(e) hoses and other equipment used in any operation involving oil or oil mixture shall be inspected before the commencement of the operation and at regular

intervals during such operation to ensure the early detection of leakage from or damage to the hose or equipment; and

(f) when transferring fuel oil within a vessel any overboard discharge valve from the oil transfer pump shall be properly closed and secured against accidental opening.

14.6.3 A properly qualified person, specifically appointed for the purpose, shall supervise all bunkering operations on the vessel. Close co-operation and continuous communication shall be maintained with shore staff throughout all bunkering operations.

14.6.4 Vessels shall be fitted with means of preventing fuel oil from escaping into the machinery space bilges. This may be effected by means of special oil bilges, gutterways and trays beneath oil pumps, heaters and similar equipment. These arrangements shall be inspected regularly and any accumulation of oil transferred to a storage tank before the risk of overflow into machinery space bilges may arise.

14.7 Oily water separating equipment

Vessels 35m and above in length shall be fitted with oily water separating equipment or a filtering system that complies with the applicable international standards for such equipment, and that is capable of producing an effluent having an oil content of less than 100 parts per million by volume or such lesser oil content as is required by the Administration.

14.8 Training and equipment

Appropriate vessel and shore personnel shall receive training in responding to and cleaning up oil spillages. Appropriate equipment to deal with and clean up oil spills shall be available in locations designated by the Administration.

14.9 Contingency plans

A contingency plan shall be in place in each port and harbour located in a designated waterway to facilitate response to an accidental spillage of oil. The contingency plan shall:

(a) identify the authority designated to command and coordinate response to a spillage;

(b) be integrated, as appropriate, with any contingency plans in place in relation to pollution response on other waters;

(c) be approved by appropriate officials;

(e) contain a list of key response personnel and their contact information; and

(f) establish the procedures whereby, through the designated authority, all relevant government and industry agencies may contribute to an effective response to the spillage.

14.10 Information regarding marine pollution incidents

14.10.1 The master of a vessel shall immediately report to the Administration any marine pollution incident involving the vessel, or that is witnessed or observed, within an inland waterway or in coastal waters.

14.10.2 Any person responsible for causing a marine pollution incident, or who witnesses or observes such an incident, shall immediately report the incident to the Administration.

CHAPTER 15 - FISHING VESSELS

15.1 Fire protection

15.1.1 Fishing vessels less than 7.5m in length shall be equipped with:
(a) one fire bucket fitted with a lanyard no less than 2m in length; and
(b) one portable 4 litre chemical foam fire extinguisher.

15.1.2 Power-driven fishing vessels, in addition to the requirements of **15.1.1**, shall be equipped with one portable fire extinguisher suitable for extinguishing oil fires.

15.1.3 Fishing vessels 7.5m and above and less than 12.5m in length shall be equipped with:
(a) one portable 4 litre chemical foam fire extinguisher;
(b) one portable fire extinguisher suitable for extinguishing oil fires; and
(c) one hand fire pump and one fire bucket fitted with a lanyard no less than 2m in length, or two fire buckets, one fitted with a lanyard no less than 2m in length.

15.1.4 Fishing vessels 12.5m and above in length shall, as required by the Administration, be equipped with the fire-fighting equipment required by **Chapter 7** for a cargo vessel of equivalent length.

15.2 Life-saving arrangements and appliances

15.2.1 Fishing vessels less than 7.5m in length shall be equipped with:
(a) A life-jacket for each person on board, fitted with a whistle and retro-reflective tape;
(b) one lifebuoy fitted with no less than 18m of buoyant line;
(c) two hand flares; and
(d) one orange smoke signal.

15.2.2 Fishing vessels 7.5m and above and less than 12.5m in length shall be equipped with:
(a) A life-jacket for each person on board, fitted with a whistle and retro-reflective tape;
(b) two lifebuoys, each fitted with no less than 18m of buoyant line;
(c) three hand flares; and
(d) one orange smoke signal.

15.2.3 Fishing vessels 12.5m and above in length shall, as required by the Administration, be equipped with the life-saving arrangements and appliances required by **Chapter 8** for a cargo vessel of equivalent length.

15.2.4 Persons on board fishing vessels shall wear the lifejacket required by **Chapter 15** or **Chapter 8** at all times when so directed by the skipper or person in charge of a fishing vessel.

15.3 Safety of Navigation

15.3.1 Fishing vessels less than 7m in length that are not power-driven shall have ready at hand an electric torch or a lantern showing a white light that shall be displayed in sufficient time to avoid a collision.

15.3.2 Lights and shapes shall be displayed by fishing vessels 7m and above in length in compliance with **Chapter 10**.

15.3.3 In relation to the prevention of collisions, fishing vessels shall comply with **Chapter 10**.

15.4 Crews of fishing vessels and manning

15.4.1 Fishing vessels less than 12.5m in length shall carry sufficient, appropriately qualified crew to:

(a) navigate the vessel effectively;
(b) conduct fishing and related operations; and
(c) maintain a look out for other vessels.

15.5 Health and safety in the crew's accommodation and working stations

15.5.1 Fishing vessels on which a crew is engaged to perform work overnight shall be fitted with:

(a) a weatherproof shelter with adequate seating arrangements and storage space; and
(b) proper and adequate lavatory facilities providing for the storage, treatment and disposal of human wastes.

*****

ANNEX 1 - FORM OF AFRICAN INLAND WATERWAYS VESSEL CERTIFICATES

CERTIFICATE OF SEAWORTHINESS OF INLAND WATERWAYS VESSEL

The Record of Equipment and Vessel Information is required to be attached to this Certificate

(Official seal)
(Country)

Issued under the provisions of the {**Name of Regulations as enacted**} (the Regulations) under the authority of the Government of

{Name of Country}

by (person or organisation authorised) ……

Name of vessel	Type of vessel	Port of registry	Length	Date of build	Max[m] number of passengers	Ident number

Issued to the vessel as a new vessel/existing vessel[1]
Valid for: service in open waters/sheltered waters[1]

THIS IS TO CERTIFY:

That the vessel has been surveyed in accordance with the applicable provisions of the Regulations.

That the survey showed that the vessel complied with the relevant requirements of the Regulations in relation to:

1 Chapters 1 to 6 inclusive of the Regulations and that the condition of the structure, machinery and equipment was satisfactory.

2 Chapter 4 of the Regulations and that a freeboard of _____mm was assigned and loading marks placed on the vessel's side in accordance with 4.1 and 4.2 of the Regulations, equivalent to the carriage of a maximum load comprising ……..tonnes of cargo and/or[1]…… passengers.

3 Chapter 7 of the Regulations as regards fire safety systems and appliances and the fire control plan.

4 Chapter 8 of the Regulations and that the life-saving appliances and survival craft and their equipment were provided for a total number of ..... persons.

5 Chapter 9 of the Regulations and that the vessel was provided with communications installations and equipment.

6 Chapter 10 of the Regulations and that the vessel was provided with navigational equipment and nautical publications and with lights, shapes, means of making sound signals and distress signals.

7 Chapter 11 of the Regulations and that the vessel was equipped and fitted so as to maintain the health and safety of persons on board in the accommodation and working spaces.

8 Chapter 14 of the Regulations and that the vessel was equipped and fitted in relation to the prevention of pollution.

---

[1] Delete whichever is inapplicable
2 Insert the date of expiry as specified by the Administration in accordance with **2.2.5** of the Regulations

9 Chapter 2 of the Regulations in that the vessel complied with the Record of Equipment and Vessel Information.

10 all other respects of the vessel.

That exemptions have/[1] have not been granted as detailed below:

That the ship is, under the authority conferred by 1.3 of the Regulations exempted from the requirements of
……
…….. of the Regulations.
Conditions, if any, on which the exemption is granted:
……
……
……
……

This certificate is valid until ……..[2]

Issued at:……
(Place of issue of certificate)

on:
……
(Date of Issue)

……
(Signature of authorized official issuing the certificate)

(Seal of the issuing authority, as appropriate).
Place:……
Date:……

RECORD OF EQUIPMENT AND VESSEL INFORMATION

Name of vessel	Type of vessel	Port of registry	Length m	Date of build	Number of passengers	Identification number

Certificate	Date of issue	Date of expiry	Issuing authority
Class			
Registration			
Safe manning			

Fire fighting	Nº / Type	Condition	Location
Fire plan			
Fire pumps (hand)			
Fire pumps (mech)			
Portable extinguishers			
Fixed extinguishing system:			
Components			
Fire buckets			
Sand boxes			
Hydrants			
Hoses, fittings and nozzles			

Equipment	Number	Type/Condition	Location
Anchors			
Anchor cables/chains			
Bilge pumps			
Winches			
Cranes			
Derricks			
Towing equipment			
Ropes and lines			
Collision mat			
Gangway			
Fenders			
Boat hook			
First aid kit			
Binoculars			
Waste containers			
Heaving line			
Axe			
Torch			

Navigation Equipment	Number	Condition	Location
Navigation lights			
Sound signals			
Shapes			
Radar			
Compass			
GPS receiver			
Echo sounder			
EPIRB			
Communications equipment			
Nautical publications			
Log book			

Location of passengers on specific decks and spaces in maximum loaded condition						
Deck/Space						
Max^{m} number of passengers						

Freeboard determined in accordance with 4.1 of the Regulations				
Minimum freeboard, equivalent to:	…….			
Number of passengers				
Cargo (tonnes)				

Life-saving equipment	**Number**	**Type/Condition**	**Location**
Lifejackets			
Lifeboats			
Liferafts			
Launching arrangements			
Flotation devices			
Lifebuoys			
Flares – parachute			
Flares – hand-held			
Smoke signals			
Emergency communications			
Radar transponder/reflector			
Rescue boat			
Liferaft/lifeboat equipment			

Machinery/Electrical	**Power kW**	**Type/Condition**	**Location**
Main machinery			
Main generator			
Emergency generator			
Main steering gear			
Auxiliary steering gear			
Switchboard	-		
Shore connection			
Batteries			
Signal light switches			

Accommodation/Safety	**Condition**	**Comment**
Escape routes		
Washrooms		
Toilets		
Galley		
Messroom		
Water tanks		
Heating/cooling/ventilation		
Berth/locker		
Access to accommodation		
Lighting		
Machinery guards		
Guard rails		
Non-slip surfaces		
Ladders/companionways		
Noise insulation/protection/notices		
Foam flotation material: density		

Issued at:……
(Place of issue of certificate)

on:
……
(Date of Issue)

……
(Signature of authorized official issuing the certificate)

(Seal of the issuing authority, as appropriate).

FORM OF CERTIFICATE OF SAFE MANNING

CERTIFICATE OF SAFE MANNING

Name of vessel	Port of Registry	Length	Identification No.

The **{insert office within the Administration responsible for issuing the certificate}** certifies that, having regard to the principles and guidelines set out in **13.10** and **13.11** of the Regulations and in Annex 1 to IMO resolution A.890(21), the above vessel is considered to be safely manned if, whenever it proceeds on a voyage in {insert nature of service} service, it carries not less than the numbers and grades of personnel shown in the table below, subject to any special conditions stated.

Certificate	Grade	No of personnel	Conditions (if any) / comments
Master			
Navigation officer			
Chief Engineer			
Engineer officer			
Deck ratings			
ER ratings			
Cook			
Catering personnel			
Other personnel			

This certificate is valid until .....
Issued at
.....
(Place of issue of certificate)
.....
(Signature of authorized official issuing the certificate)

(Seal of the issuing authority, as appropriate).

Date: .....

ANNEX 2 – CONDUCT OF STABILITY PROOF TEST

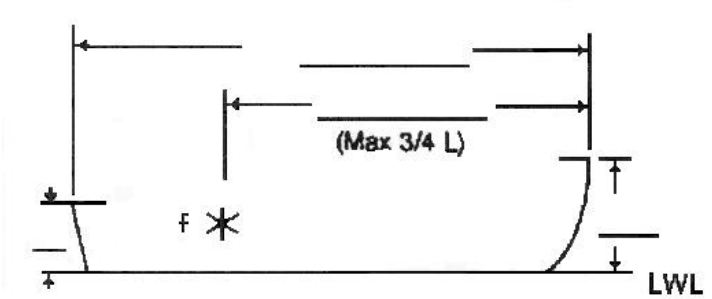
Name of Vessel ---------- Identification No. ---------- Date ----------

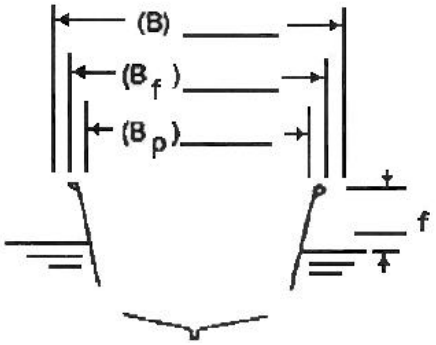
Owner/Representative ----------Surveyor/Inspector ----------

Location ---------- Wind: relative to bow ----------deg P/S velocity --------kts

Mooring Arrangement ----------

Area for which Certificate is valid----------(Tick relevant box) Open Sheltered





Indicate on above Sketch

1) Profile of weather deck or gunwale
2) Length overall (L)
3) Reference Station for measuring minimum freeboard (f) above load waterline (LWL), located in way of minimum freeboard or at a point ¾ (L) from the bow if the least freeboard is aft of this point
4) Freeboard at bow*
5) Freeboard at stern*

Indicate on above Sketch

1) Round or vee bottom
2) Maximum breadth (B) to outside of shell; greater than or equal to (B_f)
3) Maximum breadth (B_p) accessible to passengers
4) Maximum breadth (B_f) on deck in way of Reference Station
5) Minimum freeboard (f) (height of sheer line above the LWL) in way of Reference Station*

Height of weather deck (including cockpit deck, if any) above load waterline in way of Reference Station = _____m

All of the above measurements shall be taken in the loaded condition without heel (**regulation 4.6.7** and **4.6.8**). Measurements for (L), (B), and (B_f) shall exclude rubbing strips or strakes. If the vessel has a cockpit or well deck, indicate its height by a dotted line on the above sketches and show its length (L_N).

*Freeboard shall be measured as defined in **regulation 4.1.2**. That is:

the freeboard shall be taken as the vertical distance between the waterline at which the vessel is floating with maximum load on board and shall be measured as follows:

(a) For a flush deck or well deck vessel, to the top of the weather deck at the side of the vessel;

(b) For a half-decked vessel, to the top of the deck or to the top of the gunwale, whichever is the less; and

(c) For a cockpit vessel or for an open vessel, to the top of the gunwale.

Passenger numbers in these calculations shall be taken to include all crew members.

A2.1 WIND HEEL CALCULATION:

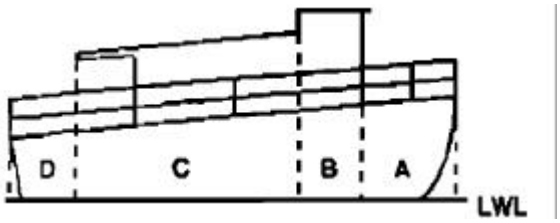
A2.1.1 Calculation method:

(a) With the vessel in the loaded condition, divide the profile of the vessel into rectangles using vertical lines starting at the load waterline, as shown below. Include all structures and superstructures.

(b) Measure, on the profile, the length (l) and height (h) of each rectangle and enter in A2.1.2.

(c) Complete the calculations in the table and add the products in the last column.

(d) Multiply the sum in A2.1.1(c) by the appropriate (P) value to obtain the Wind Heeling Moment (M_w) and enter the product in A2.2(b).



Value of (P)	k/m ^{2}
Open	73.2
Sheltered	36.6

Vessel profile

Show Load Waterline on profile Scale: 1 square = _____metres/mm

A2.1.2 Calculation of wind heeling moment

Rectangle	l_{rect}	h_{rect}	A (l_{rect} x h_{rect})	H (0.5 x h_{rect})	A x H
A					
B					
C					
D					
E					
F					
G					

Sum (A x H) = _____

A2.2 Maximum heeling moment

A2.2.1 Maximum heeling moment (**regulation 4.7.1**) shall be taken as the greater of:

(a) Passenger heeling moment calculated in accordance with **regulation 4.7.1 ……..**; and

(b) Wind heeling moment M_W from **A2.1.2 …… .**

A.2.2.2 Test weight required = Maximum heeling moment above / distance from the centreline of the position of the centre of gravity of the test weight

Notes:
"Test Weight" defines only the weight to be moved during the test. Weights used to represent cargo and unfitted equipment or stores shall be simulated as part of the "loaded condition"
The maximum number of passengers shall not exceed the number permitted in accordance with **regulation 4.8**. Passenger numbers and cargo quantities may need to be calculated iteratively as the test proceeds in order to ensure that the vessel meets the test criteria.
Weight per passenger shall be taken as
75kg for vessels operating on open waters; and
65kg for vessels operating on sheltered waters.

A2.3 Distribution of test weight:

a) Distribute the test weight fore and aft so as to obtain the normal operating trim.
b) Arrange the test weight so that its vertical center of gravity (CG) is approximately 800mm above the deck.
c) The vertical distribution of the test weight shall be such as to simulate the most unfavourable vertical CG likely to occur in service. On vessels having one upper deck above the main deck available to passengers, the vertical weight distribution shall not be less severe than the following:

Total test weight (W) …… = _____

Passenger capacity of upper deck (**regulation 4.6.10**):
Weight on upper deck = Number of passengers located on upper deck x weight per passenger x 1.33
Weight on upper deck = _____ x _____ x 1.33 = _____ kg/tonne

Weight on main deck = Total test weight – weight on upper deck
Weight on main deck = _____ - _____ = _____ kg/tonne

d) The athwartships position of the center of gravity of each of the weights comprising the total test weight shall be as close as is practicable to the edge of the deck

A2.4 Location of immersion mark (i) above load waterline prior to application of heeling moment:

A2.4.1 The Reference Freeboard (f) shall be measured at the Reference Station with the weight on board in accordance with **A2.2**. The height of the immersion mark (i) above the LWL shall be the lesser of the two values from:

A2.4.7; or

A2.4.3 to A2.4.6 inclusive, according to vessel type.

A2.4.2 A temporary mark representing the value of (i) shall be placed on the hull above the LWL at the Reference Station on the side of the vessel that is immersed during the test.

<table>
<tr><td>A2.4.3</td><td colspan="2">Flush deck type vessels, including all well deck vessels except those classified in (a) above
For well deck vessels, freeboard (f) to the lowest deck exposed to the weather must equal or exceed 250mm
If less than 250mm, use 4(d) Open-boat type formula

0.5 x _____ = _____
{Reference freeboard (f)} {Height of (i) above LWL}</td></tr>
<tr><td rowspan="2">A2.4.4</td><td rowspan="2">Cockpit Type Vessels
Freeboard to cockpit deck calculated for the relevant waters must equal or exceed 250mm
If this is less than 250mm, the formula in A2..4.5 relevant to open boat shall be used
Length overall ……..(L)
Length of cockpit ……..(L_N)
Reference freeboard ……...(f)
(measured to top of gunwale)
Height of immersion mark above LWL ……..(I)
All measurements shall be in metres</td><td>Open Waters:

(i) = f (2L – 1.5 L_N)/4L</td></tr>
<tr><td>Sheltered Waters

(i) = f (2L - L_N)/4L</td></tr>
<tr><td>A2.4.5</td><td colspan="2">Open-boat type vessels
Reference freeboard (f) is measured to top of gunwale

0.25 x _____ = _____
{Reference freeboard (f)} {Height of (i) above LWL}</td></tr>
<tr><td>A2.4.6</td><td colspan="2">Flush deck type sailing vessels and well deck vessels that operate on protected waters, have non return scuppers, and the reference freeboard is not more than one quarter of the distance from the waterline to the top of the gunwale:
Reference freeboard (f) is measured to the top of the weather deck at the side of the vessel.

_____ = _____
{Reference freeboard (f)} {Height of (i) above LWL}</td></tr>
<tr><td>A2.4.7</td><td colspan="2">All vessel types
To limit the final angle of list to 14^0 for any type of vessel, the height of the immersion mark (I) shall in no case exceed a value of 1/8 of the breadth at the vessel at the Reference Station. If this value is less than that calculated from A2.4.3 to A2.4.6 inclusive, whichever is applicable, the value used in place of that calculated shall be:

0.125 x _____ = _____
{Breadth at Reference Station} {Max height of (i) above LWL for any type of vessel}</td></tr>
</table>

A2.5 Weight movement:

(a) The maximum heeling moment required by **A2.2** shall be obtained by a transverse movement of the test weights, in approximately four stages, to the position(s) defined in **A2.3**.
(b) The test shall be conducted with all tanks ¾ full, ballast aboard and securely in place, all portlights closed, and any non-return valves or flaps on scuppers and deck drains secured in the open position.
(c) The vessel shall be fully afloat and all mooring slack during the test.
(d) During the loading and moving of test weights, care should be taken to ascertain whether there is any evidence of low stability. This may be assumed to be the case whenever the effect of any added or shifted weight increment is noted to be more than that of the preceding increment of the same size, or when the chine or bilge amidships comes out of the water as a result of the heel.
(e) Care shall be taken that the vessel does not heel excessively either due to weight movement or superimposed roll which could cause the test weights to topple or the vessel's gear to move.
(f) While the vessel is heeled, check for open seams, loose hull fittings, etc., that are not normally immersed and which could cause flooding of the vessel.

Quantity (units)	Weight per Unit tonne	Distance Moved m	Moment tonne-m

Maximum heeling moment _____tonne-m

A2.6 Height of immersion mark (i) above waterline after weight movement equivalent to maximum heeling moment:

Enter (i) = _____mm

a) If the vessel lists to the immersion mark (i) before the maximum heeling moment is applied, the test shall be stopped and the vessel fails the test (refer to **regulation 4.7.4** in such a case).
b) When the moment required by **A2.2** has been developed, measure the resulting height of the immersion mark (i) above the waterline.
c) If any portlights are located at a vertical distance above the waterline of 100mm or less following the application of the required heeling moment, such portlights on each side shall be closed in a permanent manner. An appropriate notice shall be fixed inside the relevant compartment, close to each such portlight (**regulation 4.7.5**).
d) If any scuppers or drains are found to be below the waterline following the application of the required heeling moment so as to permit entry of water into the vessel or onto the deck, such openings on each side shall be fitted with automatic non-return valves(**regulation 4.7.6**).

A2.7 General stability information (for documentation purposes only)

Solid ballast

Material	Weight (tonnes)	Approximate Location of CG (m)	
		Aft of bow	Above Top of Keel

Liquid cargo or ballast

Tank	Capacity (tonnes)	Approximate location of CG @ 100% capacity (m)	
		Aft of bow	Above top of keel

Dry cargo

Hold or location	Weight (tonnes)	Approximate Location of CG (m)	
		Aft of bow	Above top of keel

A2.8 Procedure for twenty-five percent test

A2.8.1 This test is not a required part of the stability proof test but may be used as a preliminary check when the stability is believed to be marginal.

A2.8.2. After the total test weight (W) has been placed on board and the Reference freeboard (f) has been measured, rig a pendulum free to swing athwartships at any convenient location on the vessel. The plumb bob should be approximately 3mm above the deck. Place a chalk mark on the deck directly beneath the plumb bob. Measure the pendulum length (p_l) as the distance from the pivot to the deck.

A2.8.3. Move the test weight to obtain a heeling moment equal to one-quarter of the required heeling moment in **A2.2**. The weights having the longest levers may be moved so as to minimize the amount of weight handled.

One – quarter
Heeling Moment = 0.25 x _____ = _____tonne-m
{required heeling moment (**4.2.2**)}

A2.8.4. After the weight has been moved, place a chalk mark on the deck directly beneath the pendulum plumb bob. Measure the pendulum deflection (p_d) as the distance between chalk marks.

A2.8.5. Before proceeding with the stability proof test, the following calculation may be carried out to provide a forecast of the likely results:

Approximation to the maximum allowable heeling moment is given by:

¼maximum heeling moment x p_l / p_d x 2 x (i) / (B_f)

or:

2 x {¼ max heel mt} x {p_l} x {Height of immersion mark (i)} = _____tonne-m
{p_d.} {Breadth at Ref Station (B_f)}

If the maximum allowable heeling moment is LESS than the maximum heeling moment in **A2.4**, the vessel will probably fail the test by the difference indicated below.

Required Heeling Moment = _____tonne-m
Allowable Heeling Moment = _____tonne-m
Difference = _____tonne-m

If such is the case, the amount of cargo or the number of passengers should be reduced as provided in regulation **4.7.4**.

ANNEX 3 - SUBDIVISION CALCULATION

Sheet 1 of 5

Name of Vessel _____Identification No. _____Route _____

Owner or Representative
Present at Measurement_____Inspector_____Date _____

Location of Vessel at
Time of Measurement No. of W.T. Bulkheads. No. of Passengers

GUIDANCE NOTES (references to regulations are shown in bold font)

1. The vessel shall be in maximum load condition (**4.6.7**) except that the fuel and water tanks are to be three-quarters full (**4.6.6**). Ballast, if required, shall be on board and in place (**4.6.5** and **4.10**). A capacity load of passengers, crew, cargo, vehicles, stores, etc., shall be on board (or the weight equivalent thereto) in the proper locations (**4.6.7**).

2. The vessel shall be afloat in water of a density not greater than that of the route and service for which it is to be certificated, i.e., salt water or fresh water for a vessel that is to be certificated for service on coastal or inland waters respectively (**4.6.3**).

3. The vessel shall be at its normal trim, i.e., at a waterline established by the normal distribution of the weight on board (**4.6.7**). The vessel shall be upright. Any list greater than 2^{o} shall be corrected by transverse movement of some of the weight on board so that the vessel is upright in the water, or nearly so (**4.6.8**).

4. The measurements required for the calculation in Table A3-1 shall be taken carefully as applicable to the type of vessel and recorded. The length (L) (**4.9.3**) is the length of the hull, measured over the bulkhead deck, and shall not include fishing platforms, bowsprits, guards, rails, etc. The depth (D) (**4.9.3**) is especially important and should be double-checked. If the depth cannot be measured amidships, as required, due to obstructions, etc., it shall be measured at points fore and aft of, and equidistant from, amidships and the mean thereof recorded as (D). The breadth (B) as defined in **1.2** shall be measured amidships to the outside of the hull and shall not include any rubbing strakes or guards. The freeboards (f) at the position of each bulkhead shall be measured from the load waterline to the top of the bulkhead deck at side. The distance from the bow to each bulkhead shall be indicated on the profile in **Figure A3-1** in the same manner as indicated for bulkheads “A” and “B”.

5. Where a vessel has no scuttles or portlights that can be opened and is flush decked with normal sheer or no sheer, the dimensions shall be recorded on **Figure A3-1** and the calculations completed as shown in **Figure A3-1**.

6. Where a vessel has scuttles, portholes or portlights that can be opened, or if it is flush decked with reverse sheer, or has a raised deck forward (as in the case of the typical cockpit boat), the profile on **Figure A3-1** shall not be used. Instead, an accurately scaled profile of the vessel shall be prepared, on which the locations of the bulkheads, and the scuttles, portholes or portlights, if any, shall be indicated. The “corrected bulkhead deck line” shall be drawn on the profile as shown under the heading “Special cases” in **Figure A3-2** to **Figure A3-5** inclusive (sheets 4 or 5), and the calculations completed as shown in **Figure A3-1**.

7. The actual compartment lengths in Column 10 of **Table A3-1** shall not exceed the calculated permissible lengths or 0.333L, whichever is the lesser (**4.9.3**).

8. If the actual compartment lengths exceed the permissible lengths or 0.333L, remedial action shall be taken as required by the Administration(**4.9.6**).

Name of Vessel _____ Official No. _____

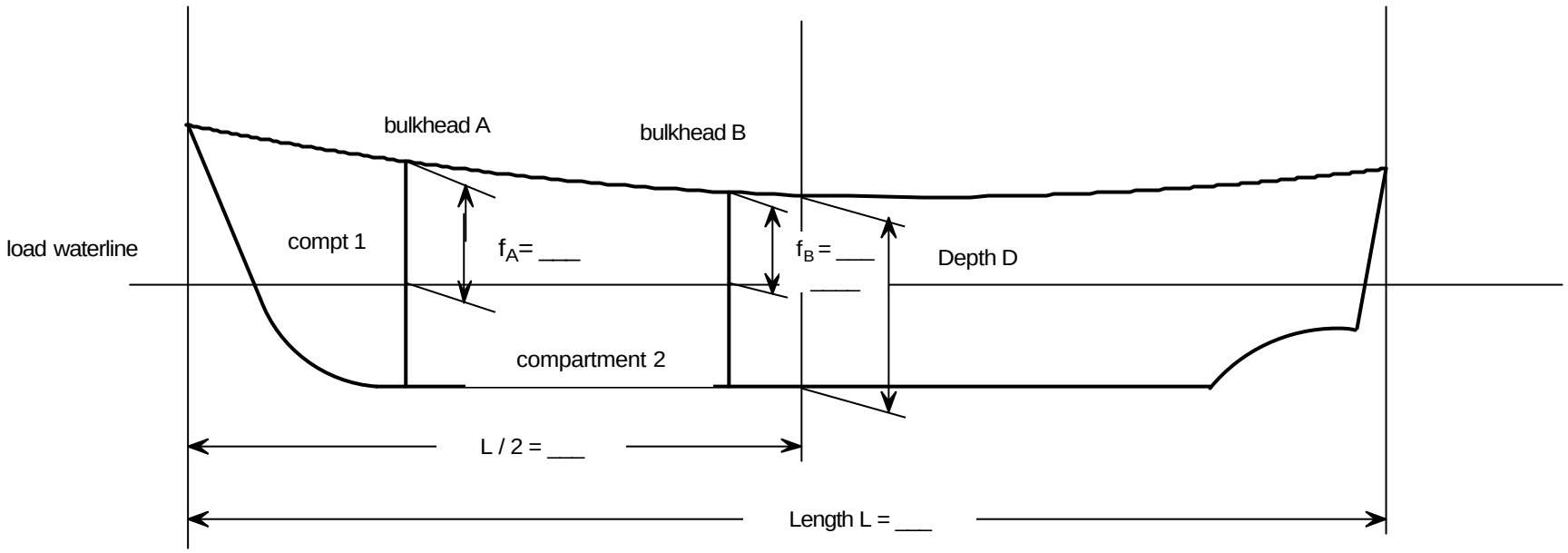


Figure A3-1 – Profile of vessel

(a) Enter here the type of water for which the vessel is to be certificated and enter also the density of the water at the location of the measurement: [ ] Salt [ ] Brackish [ ] Fresh

(b) Measure L and D (in metres) as required by **4.9.3** and enter on **Figure A3-1** or the alternative profile as provided in Note 6 on Sheet 1

(c) Draw on the profile the positions of the watertight bulkheads. Indicate the distance from the bow and the freeboard at each, as shown in **Figure A3-1** for bulkheads A and B of compartment 2and enter the values in **Table A3-1**.

(d) Complete the calculations in **Table A3-1**.

(e) Compare the permissible length with 0.333L (_____m)

Name of Vessel _____ Official No. _____

Table A3–1: Calculation of compartment lengths

1	2	3	4	5	6	7	8	9	10	11
Compt no.	Boundary bhd number.	Distance bow-bhd (measured) *Sheet 2*	Dist. Bow-bhd (as % L) col. 3x100 / L	Freeboard (f) (measured) *Sheet 2*	Midpoint of compt. (as % L) (average of fwd &aft in col. 4)	Floodable Length Factor ***Table A3-2 (regulation 4.9.3)***	Effective Freeboard (average freeboard at fwd &aft bulkheads in col. 5) ***(regulation 4.9.4)***	L / D *Sheet 2 See note 1 below*	Permissible compartment length cols. 7 x 8 x 9 **NOT** to exceed L/3 =------m *See note 2 below*	Actual compartment. length fwd – aft position in col. 3
1	fwd	0	0							
	aft									
	fwd									
	aft									
	fwd									
	aft									
	fwd									
	aft									
	fwd									
	aft									
	fwd									
	aft									

Tested and proven watertight

(signed) Marine Surveyor

Notes to Table A3-1

Note 1: D shall be corrected, if applicable, as shown in **Figure A3-2** to **Figure A3-5** inclusive.

Note 2 permissible compartment length is given in Column 10 or 0.333L, as required by **4.9.3(b)**, whichever is the lesser

Measured and computed by

(signed) Marine Surveyor

Table A3–2: Floodable length factors

Midpoint of Compartment in Percent (L) from Bow	Floodable Length Factor	Midpoint of Compartment in Percent (L) from Bow	Floodable Length Factor
0-15%	.33	55	.63
20	.34	60	.58
25	.36	65	.53
30	.38	70	.48
35	.43	75	.44
40	.48	80	.40
45	.54	85	.37
50	.61	90-100	.34

TREATMENT OF SPECIAL VESSEL TYPES

Figure A3–2: Vessels having reverse sheer:
Draw a straight line from the bow (at the top of the bulkhead deck) to the stern (at the top of the bulkhead deck at the side) to establish the "corrected bulkhead deck line".

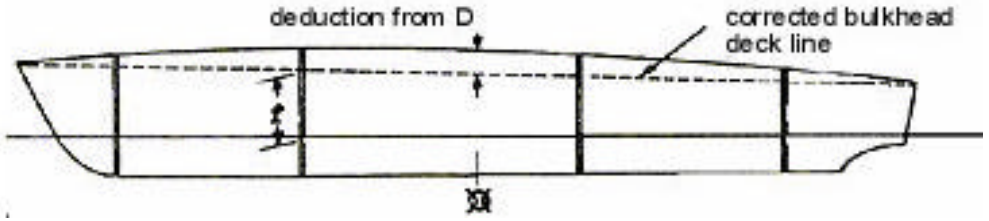
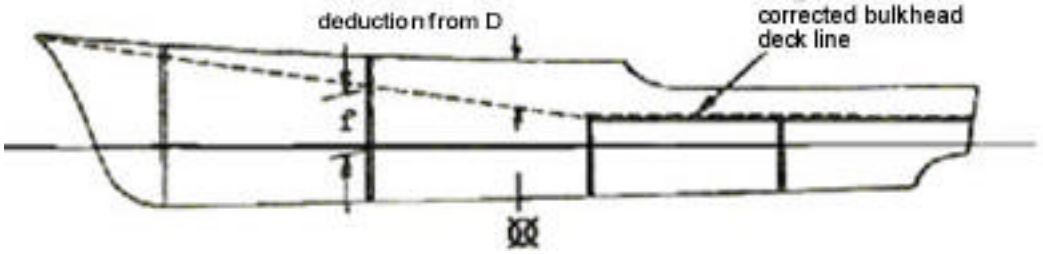


Figure A3-3: Vessels having a raised deck:
Draw a straight line from the bulkhead deck at the bow to the top of the foremost of the bulkheads which extend to the lower bulkhead deck, to establish the "corrected bulkhead deck line".



Notes to Figure A3–2 and Figure A3-3: For the vessel types shown in these figures, freeboard at each bulkhead shall be measured to the corrected bulkhead deck line. To obtain the correct (D) for such types , deduct the distance measured from this line to the top of the actual bulkhead deck at side at amidships from the depth (D), as shown.

.

Figure A3–4: Flush deck vessel

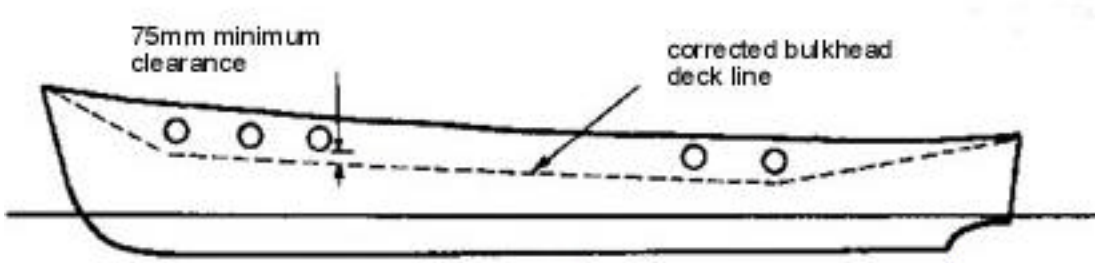
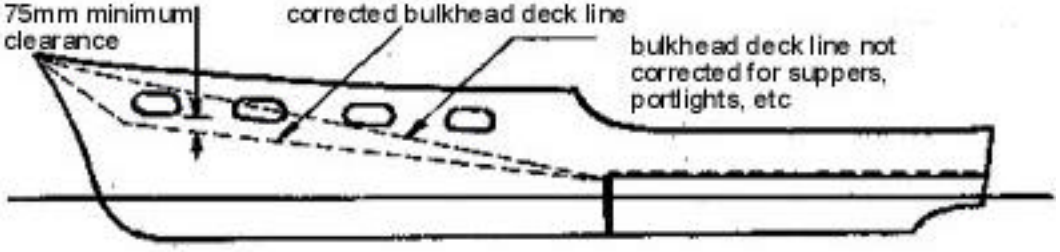


Figure A3–5: Raised deck vessel



Notes to Figures A3-4 and A3-5:

For a vessel of any type having scuttles or portlights that open, the “corrected bulkhead deck line” shall be a line as shown in **Figure A3–4** or **Figure A3–5** that extends from the bow at the actual bulkhead deck, passes not less than 75mm below the scuttles or portlights and thence to the stern at the actual bulkhead deck. This line shall not, at any point, lie above the corrected bulkhead deck line of a hull of the same configuration if scuttles or portlights were not fitted.

ANNEX 4 - STABILITY INFORMATION TO BE CARRIED ABOARD CERTAIN VESSELS

A4.1 Stability data and associated plans should be drawn up in the official language or languages of the issuing country and the language of the master. If the languages used are neither English nor French the text should include a translation into one of these languages.

A4.2 Each vessel should be provided with a stability booklet, approved by the Administration, which contains sufficient information to enable the master to operate the ship safely.

A4.3 The format of the stability booklet and the information included will vary depending on the ship type and operation. In developing the stability booklet, consideration should be given to including the following information:
a table of contents and index;
a general description of the vessel;
instructions on the use of the booklet;
general arrangement plans showing watertight compartments, closures, vents, downflooding angles, permanent ballast, allowable deck loadings and freeboard requirements;
hydrostatic curves or tables and cross-curves of stability calculated on a free-trimming basis, for the ranges of displacement and trim anticipated in normal operating conditions, where available;
capacity plan or tables showing capacities and centres of gravity for each cargo stowage space, where available;
tank sounding tables showing capacities, centres of gravity, and free surface data for each tank, where available;
information on loading restrictions, such as maximum KG or minimum GM curve or table that can be used to determine compliance with applicable stability criteria, where available;.
standard operating conditions and examples for developing other acceptable loading conditions using the information contained in the stability booklet, where available;
general precautions for preventing unintentional flooding;
any other necessary guidance for the safe operation of the ship under normal and emergency conditions; and
stability proof test report for the vessel or inclining report.

ANNEX 5 - CARRIAGE OF LIVESTOCK

A5.1 General

A5.1.1 Livestock shall not be carried or loaded for carriage on or in any part of a vessel where the livestock, livestock fittings, livestock equipment or carrying arrangements would:

(a) obstruct access to any accommodation space or working space necessary for the safe running of the vessel, or the means of egress from any hold or underdeck space;
(b) interfere with life-saving or fire-fighting appliances;
(c) interfere with the sounding of tanks or bilges;
(d) interfere with the operation of closing appliances;
(e) interfere with the operation of freeing ports;
(f) interfere with the lighting or ventilation of other parts of the vessel; or
(g) interfere with the proper navigation of the vessel.

A5.1.2 If the casing or bulkhead of an engine room, boiler room or heated fuel tank forms the boundary of a space in which livestock is to be carried, that casing or bulkhead shall be effectively insulated.

A5.1.3 Subject to A5.1.4, livestock shall not be carried in more than one tier on any deck.

A5.1.4 Sheep, goats and pigs may be carried in more than one tier on any one deck.

A5.1.5 Livestock shall not be carried over a hatchway unless the hatchway is protected against consequent damage and the hatchway covers are secured against movement.

A5.1.6 Livestock shall not be carried unless contained in pens, stalls or other similar fittings or in portable equipment complying with A5.6.

A5.1.7 The space provided for livestock shall be in accordance with the guidance provided in A5.7.

A5.2 Protective arrangements

A5.2.1 A vessel to be used for the carriage of livestock shall be provided with durable fittings that will protect the livestock from injury and avoidable suffering.

A5.2.2 All fittings, fixtures and objects on a vessel that are likely to come into contact with livestock shall be manufactured, assembled and positioned so as to prevent injury to the livestock.

A5.2.3 If more than one species of livestock is carried, the livestock shall, wherever practicable, be segregated according to species.

5.2.4 Pens containing cattle or buffalo shall, wherever practicable, be separated from pens containing other species by:
(a) a passageway or an empty pen; or
(b) an effective, impermeable barrier.

A5.2.5 If competitive behaviour may arise between livestock of the same species, the livestock when loaded shall, wherever practicable, be segregated according to size, sex, age, breed or any other characteristic, to avoid such behaviour.

A5.3 Drainage

A5.3.1 Provision shall be made for effectively draining fluids from each pen in which livestock is to be carried, except that drainage is not required from the upper tier of sheep pens.

A5.3.2 Drainage pipes or channels shall be fitted to carry the fluids drained from a pen as far as practicable clear of other pens.

A5.3.3 A pump or eductor for a drainage tank or well shall be capable of handling semi-solid matter and shall evacuate the tank or well by lines other than the vessel's bilge lines.

A5.3.4 Essential drainage tanks, wells and the top of drainage pipes in a vessel shall be accessible from outside livestock pens for the purpose of inspection and cleaning.

A5.3.5 A drainage channel and the top of a drainage pipe shall be covered by a strainer plate if:
(a) it is located inside a pen and could, if uncovered, cause injury to an animal; or
(b) it is located in a passageway and could, if uncovered, cause injury to a person.

A5.3.6 Effluent or effluent contaminated water shall be discharged from vessels in accordance with the provisions of **Chapter 14**.

A5.4 Fire precautions

If hay or straw is carried or used in a space where livestock is located, there shall be provided:
(a) a portable fire extinguisher that uses water as the extinguishing medium, for every 18 metres or part thereof of the space, one of which shall be placed adjacent to an entrance to the space; or
(b) a fixed fire-fighting installation that uses water as the extinguishing medium provided the installation and its location have been approved.

A5.5 Fodder and water

A5.5.1 For each head of livestock to be carried, there shall be provided sufficient fodder and water of a suitable quality:

(a) for the expected period of the voyage; and

(b) to provide a reserve of a further 25 per cent or one days' requirements, whichever is the less.

A5.5.2 Fodder and water shall, unless otherwise determined by a veterinary officer appointed by the Administration, be supplied to livestock daily while on a vessel, in the quantities specified by the Table below, or by **A5.5.3**.

Species	Fodder per head per day	Water per head per day
Sheep and goats	2 per cent of live body weight of good quality hay	4 litres, except that when the maximum ambient temperature during any day of the voyage exceeds 35°C, the minimum daily water requirement for sheep shall be 6 litres
Cattle and horses	2 per cent of live body weight of good quality hay	45 litres
Pigs	3 per cent of live body weight of prepared feed containing at least 16 per cent protein	10 litres

A5.5.3 Fodder in pelletised or other concentrated form acceptable to the Administration may be substituted for the hay ration specified by **A5.5.1**.

A5.6 Livestock carried in portable equipment

A5.6.1 Portable equipment containing livestock shall:

(a) be stowed in a position:

(i) that enables the livestock to be suitably protected from the weather and not subject to the machinery exhausts;

(ii) that ensures suitable access to the equipment and livestock;

(b) be secured to prevent movement;

(c) be:

(i) adequately lit and ventilated;

(ii) have adequate provision for cleaning and drainage;

(iii) have adequate provision for feeding and watering; and

(d) have access to the equipment not less than 1.2m along the length of the equipment and at least 1.0m end clearance, when the equipment is end loaded.

A5.6.2 Portable equipment containing horses shall be positioned so that the horses will stand facing athwartships.

A5.6.3 If livestock is contained in portable equipment, such equipment shall be constructed or arranged so as to minimise:

(a) the possibility of livestock projecting their heads and limbs out of the equipment; and

(b) spillage of excrement to the deck of the vessel and, when the livestock is carried in more than one tier, to lower tiers.

A5.6.4 Livestock shall be provided with adequate flow-through ventilation in close proximity above and/or below the containment unit.

A5.7 Stocking density

The following approximate stocking densities may be used as a guide for the carriage of livestock.

Cattle

Average mass of cattle (kg)	Floor area per head of cattle ($m^{2)}$
100	0.34
125	0.39
150	0.47
175	0.55
200	0.61
250	0.70
300	0.74
350	0.78
400	0.87
450	0.99
500	1.06
550	1.14
600	1.22
650	1.35

Note: The above is for cattle with horns or tipped horns. For cattle without horns, the space allowance may be decreased by five per cent.

Sheep

Average mass of sheep(kg)	Floor area per head of sheep ($m^{2)}$
20	0.17
30	0.19
40	0.22
50	0.27
60	0.29

Pigs

Average mass of pigs(kg)	Floor area per head of pigs ($m^{2)}$
50	0.22
75	0.29
100	0.35
125	0.42
150	0.48
175	0.55
200	0.61

Use the above table when the temperature is below 25°C. Pigs should preferably be allocated about 10 per cent more floor area when the temperature is over 25°C.

Goats

Recommendations for domesticated goats are similar to those for sheep.

Deer

As a guide for journeys over two hours duration, the minimum floor space allocated for adult male deer in transport crates should be:

Species	Floor area per head of deer ($m^{2)}$
Fallow	0.5
Rusa	0.7
Red	1.0

Female deer should be allocated at least 75 per cent of the area required by males.

ANNEX 6 – CASUALTY AND INCIDENT REPORTING

The report of a casualty or incident required by **1.9** of the Regulations shall contain, where relevant to the circumstances of the accident or occurrence:

A6.1 Information generally required in all cases

A6.1.1 Particulars of the vessel
Name, official number, nationality, port of registry, call sign
Name and address of Company
Type of vessel and when, where and by whom built
Deadweight, tonnage, and principal dimensions
Means of propulsion; particulars of engines
Any relevant structural peculiarities and features
Amount of fuel carried, and position of fuel tanks
Radio (type, make)
Radar (number, type, make)
Compass (make, model)
Automatic pilot (make, model)
Electronic positioning equipment (make, model) (GPS, etc.)
Life saving equipment (dates of survey/expiry).

A6.1.2 Documents to be produced
Certificate of seaworthiness
Certificate of safe manning
Classification society or survey authority certificates
Official log book
Crew list
Crew qualifications
Echo sounder chart
Master's/Chief Engineer's Standing Orders
Company Standing Orders/Operations Manual
Company Safety Manual
Compass error book or records
Passenger list
Charts and record of chart corrections
manufacturer's operational/maintenance manuals for equipment and machinery
Any other documentation relevant to the inquiry.

A6.1.3 Particulars of voyage
Port at which voyage commenced and port at which it was to have ended, with dates
Draughts (forward, aft and midships) and any list
Any incident or unusual occurrence during the voyage that may have a material bearing on the incident
Plan view of vessel’s layout including cargo spaces, bunker/fuel lube oil tanks
Details of cargo, bunkers, fresh water and ballast and consumption.

A6.1.4 Particulars of master, chief engineer and personnel involved in or killed or injured in the incident

Full name
Age
Function on board
Certificate of Competency/Licence and grade
Date of issue and identifying number
Issuing country/authority;
Other Certificates of Competency held
Time spent on vessel concerned
Experience on similar vessels
Experience on other types of vessels
Experience in current capacity
Experience in other grades
Alcohol consumption immediately prior to incident and in the previous 24 hours
Whether under prescribed medication or there is evidence of any ingested non-prescribed drugs
Records of drug and alcohol tests
Description of accident
Details of injury or fatality
First aid or other action on board.

A6.1.5 Particulars of weather and tide
Direction and force of wind
Direction and state of waves
Atmospheric conditions and visibility
Direction and strength of tidal and other currents, bearing in mind local conditions
Weather forecasts available prior to the incident and how used.

A6.1.6 Particulars of the incident
Type of incident
Date, time, place of incident and nearest town or city
Details of incident and of the events leading up to it and following it
Details of the performance of relevant equipment with special regard to any malfunction
Persons on bridge
Persons in engine-room
Whereabouts of the master and chief engineer
Mode of steering (auto or manual)
Extracts from all relevant vessel and, if applicable, shore documents including details of entries in official log book, records of steering and engine-room orders
Details of communications made between vessel and radio stations.

A6.1.7 Assistance after the incident
If assistance was summoned, what form and by what means
If assistance was offered or given, by whom and of what nature, and whether it was effective and competent
If assistance was offered and refused, the reason for refusal.

A6.1.8 Authentication of documents

The master should be asked to authenticate all documents and to sign all copies taken of documents as being true copies, also to authenticate relevant dates and times.

A6.1.9 External sources of information

Independent corroborating information available from external sources

Names, addresses and telephone numbers of all witnesses to the incident.

A6.1.10 Damage to property

Identification of the owners of property damaged or lost in the accident or occurrence

Description of damage or loss.

A6.1.11 Person preparing the report

The name(s), address(es) and telephone number(s) of the person(s) preparing the report, together with:

their age or date of birth
position in Company
certificate of competency or other certificate or qualification held
vessel operating experience
training in vessel operation.

A6.2 Additional information required in specific types of incident

Note: information listed under more than one heading may be relevant to a particular incident and should be provided in the report.

A6.2.1 Fire and explosion

How was the fire alarm given and how was the individual alerted to the fire?

Where and how did it start?

What was the immediate action taken?

Condition of fire-fighting equipment, dates of survey/examination of equipment

Extinguishers available:

Type available in the vicinity and otherwise on the vessel;

Types used

Hoses available/used

Pumps available/used

Was water immediately available?

Were air vents closed off to the space?

What was the nature of the material on fire and surrounding the fire?

Restrictions caused by (a) smoke, (b) heat, (c) fumes

Freedom of access to fire and access availability for fire fighting equipment

Preparedness of crew - frequency, duration, content and locations of fire musters and drills

Response by land-based fire-fighting authorities.

A6.2.2 Collision

Local or other special rules for navigation

Obstructions, if any, to manoeuvring, e.g. by a third vessel, shallow or narrow waters, beacon, buoy, etc.

Circumstances affecting visibility and audibility, e.g. state of the sun, dazzle of shore lights, strength of wind, ship-board noise and whether any door or window could obstruct look-out and/or audibility

Geographical plot

Possibilities of interaction between vessels

Name, official number, nationality, Company, personnel and other details of other vessel(s)

For each vessel:

Time, position, course and speed (and method by which established), when presence of other vessel first became known

Details of all subsequent alterations of course and speed up to collision by own vessel

Bearing, distance and heading of other vessel, if sighted visually, time of sighting, and subsequent alterations of bearing

If other vessel was plotted and by what method

Performance of navigational equipment

Lights or day signals carried and operated in vessel, and those seen in other vessel

Sound signals, including fog signals, made by vessel and when, and those heard from other vessel and when

If a listening watch was kept on VHF radio channel 16, or other frequency, and any messages sent, received or overheard

Whether radar(s) carried on vessel and radar ranges used

Whether steering by hand or automatic and whether steering was operating correctly

Details of look-out

Parts of each vessel which first came into contact and the angle between vessels at that time

Nature and extent of damage.

A6.2.3 Grounding

(Note: information as in cases of foundering may also be required)

Last accurate position and how obtained

Subsequent opportunities for fixing position or position lines, by celestial or terrestrial observations, GPS, radio, radar or otherwise, or by lines of soundings and, if not taken, why not

Subsequent weather and tidal or other currents experienced

Radar(s) in use, respective ranges used, and evidence of radar performance monitoring and logging

Charts, sailing directions and relevant notices to mariners held, if corrected to date, and if any warnings they contain had been observed

Depth sounding taken, when and by what means

Tank soundings taken, when and by what means

Draught of vessel before grounding and how determined

Position of grounding and how determined

Cause and nature of any engine or steering failure before the grounding

Readiness of anchors, their use and effectiveness

Nature and extent of damage

Action taken, and movements of vessel, after grounding.

A6.2.4 Foundering

Freeboard (assigned and actual)

Loading and location of cargo

Particulars of any alterations to hull or equipment, since survey, and by whom such alterations sanctioned

Condition of vessel, possible effects on seaworthiness

Stability data and when determined

Factors affecting stability, e.g. structural alterations, nature, weight, distribution and shift of any cargo and ballast, free surface in tanks or of loose water in vessel

Subdivision by watertight bulkheads

Position of, and watertight integrity of, hatches, scuttles, ports and other openings

Number and capacity of pumps and position of suctions

Cause and nature of water first entering vessel

Other circumstances leading up to foundering

Measures taken to prevent foundering

Position where vessel foundered and how established.

A6.2.5 Evacuation

Type and number of personal floatation devices available on board and used, and any difficulties experienced in their use

Type and number of life-saving appliances available on board, and used and any difficulties experienced in their use

Operation of float-free devices, if applicable

Accidents to persons arising from evacuation as opposed to initial cause of incident.

A6.2.5 Pollution resulting from an incident

Type of pollutant.

UN number/IMO hazard class of dangerous goods on board (if applicable).

Type of packaging (if applicable).

Quantity originally on board and quantity lost.

Method of stowage and securing and where stowed.

Tanks/spaces breached.

Action taken to prevent further loss.

Action taken to mitigate pollution.

Dispersant/neutraliser used, if any.

Restricting boom used, if any.

ANNEX 7 – AVOIDANCE OF COLLISIONS

A7.1 Definitions

A7.1.1 In this Annex, unless inconsistent with the context:
engaged in fishing means fishing with nets, long lines or trawls, but does not include fishing with trolling-lines;
length of tow means the length of tow measured from the stern of the towing vessel to the stern of the last vessel towed;
power-driven vessel means any vessel propelled by machinery;
prolonged blast means a blast of from four to six seconds' duration:
sailing vessel means any vessel that is propelled only by means of the wind and its sails. If a vessel is propelled by machinery and sails, the vessel is to be considered as a power-driven vessel;
short blast means a blast of about one second's duration;
under way means when a vessel is not at anchor or made fast to the shore or aground; and
whistle includes a siren.

A7.1.2 In **Annex 7** in relation to lights, unless inconsistent with the context:
all round light means a light showing an unbroken light over an arc of the horizon of 360 degrees;
flashing light means a light flashing at regular intervals at a frequency of 120 flashes or more per minute;
masthead light means a white light placed over the fore and aft centreline of the vessel showing an unbroken light over an arc of the horizon of 225 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on either side of the vessel;
sidelights means a green light on the starboard side and a red light on the port side each showing an unbroken light over an arc of the horizon of 112.5 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on its respective side. In a vessel less than 20m in length the sidelights may be combined in one lantern carried on the fore and aft centreline of the vessel;
stern light means a white light placed as nearly as practicable at the stern showing an unbroken light over an arc of the horizon of 135 degrees and so fixed as to show the light 67.5 degrees from right aft on each side of the vessel;
towing light means a yellow light having the same characteristics as the stern light defined in **A7.1.2**; and
visible means visible on a dark night with a clear atmosphere.

A7.2 Conduct of vessels - general

Look out
A7.2.1 Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

Safe speed
A7.2.2 Every vessel shall at all times proceed at a safe speed so that it can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions. In determining a safe speed the following factors shall be among those taken into account:

(a) the state of visibility;
(b) the traffic density, including concentrations of fishing vessels or any other vessels;
(c) the manoeuvrability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions;
(d) at night the presence of background light such as from shore lights or from back scatter of its own lights;
(e) the state of wind and current, and the proximity of navigational hazards;
(f) the draught in relation to the available depth of water; and
(g) by vessels with operational radar, any factors relating to the circumstances relevant to the characteristics of the radar in use.

Risk of collision

A7.2.3 Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist. Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

Action to avoid collision

A7.2.4 Any action taken to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship. Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.

A7.2.5 Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear. If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken its speed or take all way off by stopping or reversing the means of propulsion.

Narrow channels

A7.2.6 In a narrow channel:

(a) a vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway that lies on its starboard side as is safe and practicable;

(b) a vessel less than 20m in length or a sailing vessel shall not impede the passage of a vessel that can safely navigate only within a narrow channel or fairway; and

(c) a vessel engaged in fishing shall not impede the passage of any other vessel navigating within a narrow channel or fairway.

A7.3 Conduct of vessels in sight of one another

Sailing vessels

A7.3.1 When two sailing vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other as follows:

(a) when each has the wind on a different side, the vessel that has the wind on the port side shall keep out of the way of the other;

(b) when both have the wind on the same side, the vessel that is to windward shall keep out of the way of the vessel that is to leeward;

(c) if a vessel with the wind on the port side sees a vessel to windward and cannot determine with certainty whether the other vessel has the wind on the port or on the starboard side, it shall keep out of the way of the other.

A7.3.2 In **A7.3.1** the windward side shall be deemed to be the side opposite to that on which the mainsail is carried or, in the case of a square-rigged vessel, the side opposite to that on which the largest fore-and-aft sail is carried.

Overtaking

A7.3.3 Notwithstanding anything contained in **Chapter 10** or **Annex 7**, any vessel overtaking any other shall keep out of the way of the vessel being overtaken. A vessel shall be deemed to be overtaking when coming up with another vessel from a direction more than 22.5 degrees abaft the beam, that is, in such a position with reference to the vessel it is overtaking, that at night it would be able to see only the sternlight of that vessel but neither of its sidelights. When a vessel is in any doubt as to whether it is overtaking another, it shall assume that this is the case and act accordingly. Any subsequent alteration of the bearing between the two vessels shall not make the overtaking vessel a crossing vessel within the meaning of the Regulations or relieve it of the duty of keeping clear of the overtaken vessel until it is finally past and clear.

Head-on situation

A7.3.4 When two power-driven vessels are meeting on reciprocal or nearly reciprocal courses so as to involve risk of head-on collision each shall alter course to starboard so that

each shall pass on the port side of the other. Such a situation shall be deemed to exist when a vessel sees the other ahead or nearly ahead and by night the masthead lights of the other may be seen in a line or nearly in a line and/or both sidelights and by day the corresponding aspect of the other vessel is observed. When a vessel is in any doubt as to whether such a situation exists it shall be assumed that the situation does exist and action taken accordingly.

Crossing situation

A7.3.5 When two power-driven vessels are crossing so as to involve risk of collision, the vessel that has the other on its own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel.

Action by give-way vessel

A7.3.6 Every vessel that is required by **Chapter 10** or **Annex 7** to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.

Action by stand-on vessel

A7.3.7 Where in accordance with the provisions of **Chapter 10** or **Annex 7** one of two vessels is required to keep out of the way, the other shall keep its course and speed. The latter vessel may however take action to avoid collision by its manoeuvre alone, as soon as it becomes apparent that the vessel required to keep out of the way is not taking appropriate action in compliance with **Chapter 10** or **Annex 7**. When, from any cause, the vessel required to keep its course and speed finds itself so close that collision cannot be avoided by the action of the give-way vessel alone, such action shall be taken as will best aid to avoid collision. A power-driven vessel that takes action in a crossing situation in accordance with **A7.3.7** to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on its own port side. Compliance with **A7.3.7** does not relieve the give-way vessel of its obligation to keep out of the way.

Responsibilities between vessels

A7.3.8 Except where otherwise required by **A7.2.6** and **A7.3.3**:

(a) a power-driven vessel underway shall keep out of the way of:
  (i) a vessel not under command;
  (ii) a vessel restricted in its ability to manoeuvre;
  (iii) a vessel engaged in fishing; and
  (iv) a sailing vessel;

(b) a sailing vessel underway shall keep out of the way of:
  (i) a vessel not under command;
  (ii) a vessel restricted in its ability to manoeuvre; and
  (iii) a vessel engaged in fishing.

(c) a vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:
  (i) a vessel not under command; and
  (ii) a vessel restricted in its ability to manoeuvre.

(d) a vessel other than a vessel not under command or a vessel restricted in its ability to manoeuvre shall, if the circumstances of the case admit, avoid impeding the safe passage of a vessel constrained by its draught that is exhibiting the signals in **A7.6.4**.

(e) A vessel constrained by its draught shall navigate with particular caution having full regard to its special condition.

Conduct of vessels in restricted visibility

A7.3.9 When vessels are navigating in or near an area of restricted visibility and are not in sight of one another:

(a) vessels shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have its engines ready for immediate manoeuvre;

(b) vessels shall have due regard to the prevailing circumstances and conditions of restricted visibility when complying with **Chapter 10** or **Annex 7**;

(c) a vessel that detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so, avoiding action shall be taken in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:

(i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken;

(ii) an alteration of course towards a vessel abeam or abaft the beam; and

(d) except where it has been determined that a risk of collision does not exist, vessels that hear apparently forward of the beam the fog signal of another vessel, or that cannot avoid a close-quarters situation with another vessel forward of the beam, shall reduce speed to the minimum at which the vessel can be kept on course. If necessary all way shall be taken off and extreme caution be exercised until danger of collision is over.

A7.4 Lights and shapes

A7.4.1 **A7.4** to **A7.7** inclusive shall be complied with in all weathers.

A7.4.2 **A7.4** to **A7.7** inclusive shall be complied with from sunset to sunrise, and during such times no other lights shall be exhibited, except such lights as cannot be mistaken for the lights specified in **A7.4** or do not impair their visibility or distinctive character, or interfere with the keeping of a proper look-out.

A7.4.3 The lights prescribed by **A7.4** shall, if carried, also be exhibited from sunrise to sunset in restricted visibility and may be exhibited in all other circumstances when it is deemed necessary.

A7.4.4 The requirements of **A7.4** concerning shapes shall be complied with by day.

A7.4.5 The lights and shapes specified in **A7.4** shall comply with recognized standards[16].

Visibility of lights

A7.4.6 The lights prescribed in **A7.4** shall have an intensity so as to be visible at the following minimum ranges:

(a) in vessels 50m and above in length:
- (i) a masthead light, 6 miles;
- (ii) a sidelight, 3 miles;
- (iii) a sternlight, 3 miles;
- (iv) a towing light, 3 miles;
- (v) a white, red, green or yellow all-round light, 3 miles.

(b) in vessels 12m and above and less than 50m in length:
- (i) a masthead light, 5 miles; except that where the length of a vessel is less than 20m, 3 miles;
- (ii) a sidelight, 2 miles;
- (iii) a sternlight, 2 miles;
- (iv) a towing light, 2 miles;
- (v) a white, red, green or yellow all-round light, 2 miles.

(c) In vessels less than 12m in length:
- (i) a masthead light, 2 miles;
- (ii) a sidelight, 1 mile;
- (iii) a sternlight, 2 miles;
- (iv) a towing light, 2 miles;
- (v) a white, red, green or yellow all-round light, 2 miles.

(d) In inconspicuous, partly submerged vessels or objects being towed, a white all-round light, 3 miles.

Power-driven vessels underway

A7.4.7 Power-driven vessels underway shall exhibit:

(a) a masthead light forward;

(b) a second masthead light abaft of and higher than the forward one; except that a vessel less than 50m in length shall not be obliged to exhibit such light but may do so;

(c) sidelights;

[16] refer as appropriate to Annex I of The International Regulations for Preventing Collisions at Sea (COLREG), 1972, as amended

(d) a sternlight.

A7.4.8 Air-cushion vessels when operating in the non-displacement mode shall, in addition to the lights prescribed in **A7.4.7**, exhibit an all-round flashing yellow light.

A7.4.9 Power-driven vessels less than 12m in length may in lieu of the lights prescribed in **A7.4.7** exhibit an all-round white light and sidelights. Power-driven vessels less than 7m in length, the maximum speed of which do not exceed 7 knots may in lieu of the lights prescribed in **A7.4.7** exhibit an all-round white light and shall, if practicable, also exhibit sidelights.

A7.4.10 The masthead light or all-round white light on power-driven vessels less than 12m in length may be displaced from the fore and aft centreline of a vessel if centreline fitting is not practicable, provided that the sidelights are combined in one lantern that shall be carried on the fore and aft centreline of the vessel or located as nearly as practicable in the same fore and aft line as the masthead light or the all-round white light.

Towing and pushing

A7.4.11 A power-driven vessel when towing shall exhibit:

(a) instead of the light prescribed in **A7.4.7(a)** or **A7.4.7(b)**, two masthead lights in a vertical line. When the length of the tow, measuring from the stern of the towing vessel to the after end of the tow exceeds 200m, three such lights in a vertical line;
(b) sidelights;
(c) a sternlight;
(d) a towing light in a vertical line above the sternlight;
(e) when the length of the tow exceeds 200m, a diamond shape where it can best be seen.

Vessel or objects being towed

A7.4.12 Vessel or objects being towed shall, subject to any number of vessels being towed or pushed in a group being lighted as one vessel, exhibit:

(a) sidelights;
(b) a sternlight;
(c) when the length of the tow exceeds 200m, a diamond shape where it can best be seen.

Sailing vessels underway and vessels under oars

A7.4.13 Sailing vessels underway shall exhibit:

(a) sidelights;
(b) a sternlight.

In sailing vessels less than 20m in length the lights may be combined in one lantern carried at or near the top of the mast where it can best be seen. Vessels proceeding under sail when also being propelled by machinery shall exhibit forward where it can best be seen a conical shape, apex downwards.

A7.4.14 Sailing vessels underway may, in addition to the lights prescribed in **A7.4.13**, exhibit at or near the top of the mast, where they can best be seen, two all-round lights in a vertical line, the upper being red and the lower green, but these lights shall not be exhibited in conjunction with the combined lantern permitted by **A7.4.13**.

A7.4.15 Sailing vessels less than 7m in length shall, if practicable, exhibit the lights prescribed in **A7.4.13** but, if they do not, they shall have ready at hand an electric torch or lighted lantern showing a white light that shall be exhibited in sufficient time to prevent collision.

A7.4.16 Vessels under oars may exhibit the lights prescribed in **A7.4.13**, **A7.4.14** or **A7.4.15** for sailing vessels, but if they do not, they shall have ready at hand an electric torch or lighted lantern showing a white light that shall be exhibited in sufficient time to prevent collision.

A7.5 Fishing vessels

A7.5.1 A vessel engaged in fishing, whether underway or at anchor, shall exhibit only the lights and shapes prescribed in **A7.5**.

A7.5.2 A vessel when engaged in trawling, by which is meant the dragging through the water of a dredge net or other apparatus used as a fishing appliance, shall exhibit:

(a) two all-round lights in a vertical line, the upper being green and the lower white, or a shape consisting of two cones with their apexes together in a vertical line one above the other; a vessel less than 20m in length may instead of this shape exhibit a basket;

(b) a masthead light abaft of and higher than the all-round green light; a vessel less than 50m in length shall not be obliged to exhibit such a light but may do so; and

(c) when making way through the water, in addition to the lights prescribed in **7.5.2**, sidelights and a sternlight.

A7.5.3 A vessel engaged in fishing, other than trawling, shall exhibit:

(a) two all-round lights in a vertical line, the upper being red and the lower white, or a shape consisting of two cones with apexes together in a vertical line one above the other; a vessel less than 20m in length may instead of this shape exhibit a basket;

(b) when there is outlying gear extending more than 150m horizontally from the vessel, an all-round white light or a cone apex upwards in the direction of the gear;

(c) when making way through the water, in addition to the lights prescribed in **A7.5.3(a) and (b)**, sidelights and a sternlight.

A7.5.4 A vessel when not engaged in fishing shall not exhibit the lights or shapes prescribed in **A7.5**, but only those prescribed for a vessel of equivalent length.

A7.6 Vessels not under command or restricted in their ability to manoeuvre

A7.6.1 A vessel not under command shall exhibit:

(a) two all-round red lights in a vertical line where they can best be seen;

(b) two balls or similar shapes in a vertical line where they can best be seen; and

(c) when making way through the water, in addition to the lights prescribed in **A7.6.1(a)**, sidelights and a sternlight.

A7.6.2 A vessel restricted in its ability to manoeuvre shall exhibit:

(a) three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white;

(b) three shapes in a vertical line where they can best be seen. The highest and lowest of these shapes shall be balls and the middle one a diamond;

(c) when making way through the water, a masthead light or lights, sidelights and a sternlight, in addition to the lights prescribed in **A7.6.2(a)**; and

(d) when at anchor, in addition to the lights or shapes prescribed in **A7.6.2(a)** and **A7.6.2(b)**, the light, lights or shape prescribed in **A7.7**.

A7.6.3 A power-driven vessel engaged in a towing operation such as severely restricts the towing vessel and the tow in their ability to deviate from their course shall, in addition to the lights or shapes prescribed in **A7.4.11**, exhibit the lights or shapes prescribed in **A7.6.2(a)** and **A7.6.2(b)**.

Vessels constrained by their draught

A7.6.4 A vessel constrained by its draught may, in addition to the lights prescribed for power-driven vessels in **A7.4.7** to **A7.4.10** inclusive, exhibit where they can best be seen three all-round red lights in a vertical line, or a cylinder.

A7.7 Anchored vessels and vessels aground

A7.7.1 A vessel at anchor shall exhibit where it can best be seen:

(a) in the fore part, an all-round white light or one ball; and

(b) at or near the stern and at a lower level than the light prescribed in **A7.7.1(a)**, an all-round white light.

A7.7.2 A vessel less than 50m in length may exhibit an all-round white light where it can best be seen instead of the lights prescribed in **A7.7.1**.

A7.7.3 A vessel at anchor may, and a vessel 100m and above in length shall, also use the available working or equivalent lights to illuminate its decks.

A7.7.4 A vessel aground shall exhibit the lights prescribed in **A7.7.1** and **7.7.2** and in addition, where they can best be seen:
(a) two all-round red lights in a vertical line;
(b) three balls in a vertical line.

A7.7.5 A vessel less than 7m in length, when at anchor, not in or near a narrow channel, fairway or anchorage, or where other vessels normally navigate, shall not be required to exhibit the lights or shape prescribed in **A7.7.1** and **7.7.2**.

A7.7.5 A vessel less than 12m in length, when aground, shall not be required to exhibit the lights or shapes prescribed in **A7.7.4(a)** and **A7.7.4(b)**.

A7.8 Equipment for sound signals

A7.8.1 Vessels 12m and above in length shall be fitted with:
(a) an efficient bell;
(b) a Klaxon horn; or
(c) an efficient hand-, power- or mouth-operated whistle audible at a distance of 1 nautical mile.

A7.8.2 Vessels less than 12m in length shall be fitted with an efficient hand-, power- or mouth-operated whistle audible at a distance of 1 nautical mile.

A7.9 Manoeuvring and warning signals

A7.9.1 When vessels are in sight of one another, a power-driven vessel underway, when manoeuvring as authorized or required by **Chapter 10** and **Annex 7**, shall indicate that manoeuvre by the following signals by whistle and may supplement the sound signals by light signals:
(a) one short blast and one flash to mean "I am altering my course to starboard";
(b) two short blasts and two flashes to mean "I am altering my course to port"; and
(c) three short blasts and three flashes to mean "I am operating astern propulsion".
(d) When vessels in sight of one another are approaching each other and from any cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. Such signal may be supplemented by a light signal of at least five short and rapid flashes.

Sound signals in restricted visibility
A7.9.2 In or near an area of restricted visibility, whether by day or night, the signals prescribed by **Chapter 10** and **Annex 7** shall be used as follows:
(a) a power-driven vessel making way through the water shall sound at intervals of not more than 2 minutes one prolonged blast.
(b) a power-driven vessel underway but stopped and making no way through the water shall sound at intervals of not more than 2 minutes two prolonged blasts in succession with an interval of about 2 seconds between them.
(c) a vessel not under command, a vessel restricted in its ability to manoeuvre, a vessel constrained by its draught, a sailing vessel, a vessel engaged in fishing and a vessel engaged in towing or pushing another vessel shall, instead of the signals prescribed in **7.9.2(a)** or **(b)** , sound at intervals of not more than 2 minutes three blasts in succession, namely one prolonged followed by two short blasts.

(d) A vessel engaged in fishing, when at anchor, and a vessel restricted in its ability to manoeuvre when carrying out work at anchor, shall sound the signal prescribed in **A7.9.2(c)**.

A7.10 Signals to attract attention

If necessary to attract the attention of another vessel vessels may make light or sound signals that cannot be mistaken for any signal authorized elsewhere in **Annex 7**, or may direct the beam of a searchlight in the direction of the danger, in such a way as not to embarrass any vessel. Any light to attract the attention of another vessel shall be such that it cannot be mistaken for any aid to navigation. The use of high intensity intermittent or revolving lights, such as strobe lights, for this purpose shall be avoided.

A7.11 Distress signals

When a vessel is in distress and requires assistance it shall use or exhibit all or any of:

(a) a gun or other explosive signal fired at intervals of about a minute;
(b) a continuous sounding with any fog-signalling apparatus;
(c) rockets or shells, throwing red stars fired one at a time at short intervals;
(d) a signal made by radiotelegraphy or by any other signalling method consisting of the group **. . . - - - . . .** (SOS) in the Morse Code;
(e) a signal sent by radiotelephony consisting of the spoken word "Mayday";
(f) the International Code Signal of distress indicated by N.C.;
(g) a signal consisting of a square flag having above or below it a ball or anything resembling a ball;
(h) flames on the vessel (as from a burning tar barrel, oil barrel, etc.);
(i) a rocket parachute flare or a hand flare showing a red light;
(j) a smoke signal giving off orange-coloured smoke;
(k) slowly and repeatedly raising and lowering arms outstretched to each side;
(l) a radiotelegraph alarm signal;
(m) a radiotelephone alarm signal;
(n) signals transmitted by emergency position-indicating radio beacons;
(o) signals transmitted by radiocommunication systems, including survival craft radar transponders;
(p) a piece of orange-coloured canvas with either a black square and circle or other appropriate symbol (for identification from the air);
(q) the orange flag required by **3.6.1(l)**; or
(r) a dye marker.

.

ANNEX 8 – SPECIFICATION OF STANDARDS OF COMPETENCE

A8.1 Purpose of Annex

This Annex provides necessary information for determining the standards of competence for persons serving on all vessels to which the Regulations apply. The Annex is based on the equivalent provisions of the STCW Code.

A8.2 Definitions and clarifications

A8.2.1 The definitions and clarifications contained in **Chapter 13** apply equally to the terms used in the regulations and this Annex. In addition, the following supplementary definitions apply only to this Annex:

evaluation criteria are the entries appearing in column 4 of the tables detailing the Specifications of Minimum Standards of Competence and provide the means for an assessor to judge whether or not a candidate can perform the related tasks, duties and responsibilities;

management level means the level of responsibility associated with serving as master, chief mate, chief engineer officer or second engineer officer on board a vessel to which the Regulations apply, and ensuring that all functions within the designated area of responsibility are properly performed;

operational level means the level of responsibility associated with serving as officer in charge of a navigational or engineering watch or as designated duty engineer for periodically unmanned machinery spaces on board a vessel to which the Regulations apply, and maintaining direct control over the performance of all functions within the designated area of responsibility in accordance with proper procedures and under the direction of an individual serving in the management level for that area of responsibility;

standard of competence means the level of proficiency to be achieved for the proper performance of functions on board a vessel in accordance with the criteria as set forth herein and incorporating prescribed standards or levels of knowledge, understanding and demonstrated skill; and

support level means the level of responsibility associated with performing assigned tasks, duties or responsibilities on board a vessel under the direction of an individual serving in the operational or management level;

Table A8-1: Specification of minimum standards of competence for masters Class 3
Function: Navigation at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Plan and conduct a passage and determine position	*Navigation* Ability to determine the vessel's position by the use of: .1 landmarks .2 aids to navigation, including lighthouses, beacons and buoys .3 dead reckoning, taking into account winds, tides, currents and estimated speed Thorough knowledge of and ability to use navigational charts and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings *Navigation aids and equipment* Ability to operate safely and determine the vessel's position by use of all navigation aids and equipment commonly fitted on board the vessels concerned	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training using: chart catalogues, charts, navigational publications, radio navigational warnings, azimuth mirror, electronic navigation equipment, echo sounding equipment, compass	Information obtained from navigational charts and publications is relevant, interpreted correctly and properly applied The primary method of fixing the vessel's position is the most appropriate to the prevailing circumstances and conditions The position is determined within the limits of acceptable instrument/system errors The reliability of the information obtained from the primary method of position fixing is checked at appropriate intervals Calculations and measurements of navigational information are accurate Charts and publications selected are the largest scale on board suitable for the area of navigation and charts are corrected in accordance with the latest information available Performance checks and tests of navigation systems comply with manufacturer's recommendations, good navigational practice and IMO resolutions on performance standards for navigational equipment Interpretation and analysis of information obtained from radar is in accordance with accepted navigational practice and takes account of the limits and accuracy levels of radar

Table A8-1 (continued) - Function: Navigation at the operational level (continued)

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Plan and conduct a passage and determine position (continued)	*Compasses* Knowledge of the errors and corrections of magnetic compasses Ability to determine errors of the compass using terrestrial means, and to allow for such errors *Meteorology* Ability to apply the meteorological information available		Errors in magnetic compasses are determined and applied correctly to courses and bearings Meteorological information is evaluated and applied to maintain the safe passage of the vessel
Maintain a safe navigational watch	*Watchkeeping* Thorough knowledge of content, application and intent of the Rules of the Road as set out in **Chapter 10** and **Annex 7** of the Regulations Knowledge of content of the principles to be observed in keeping a navigational watch	Examination and assessment of evidence obtained from approved in-service experience	The conduct, handover and relief of the watch conforms with accepted principles and procedures A proper look-out is maintained at all times and in conformity with accepted principles and procedures Lights, shapes and sound signals conform with the requirements contained in the Regulations and are correctly recognized The frequency and extent of monitoring of traffic, the vessel and the environment conform with accepted principles and procedures Action to avoid close encounters and collision with other vessels is in accordance with the Regulations Decisions to adjust course and/or speed are both timely and in accordance with accepted navigation procedures A proper record is maintained of movements and activities relating to the navigation of the vessel Responsibility for safe navigation is clearly defined at all times, including periods when the master is on the bridge and when under pilotage

Table A8-1 (continued) - Function: Navigation at the operational level (continued)

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Respond to emergencies	Emergency procedures, including: .1 precautions for the protection and safety of passengers in emergency situations .2 initial assessment of damage and damage control .3 action to be taken following a collision .4 action to be taken following a grounding In addition, the following material should be included for certification as master: .1 emergency steering .2 arrangements for towing and for being taken in tow .3 rescuing persons from the water .4 assisting a vessel in distress .5 appreciation of the action to be taken when emergencies arise in port	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 practical instruction	The type and scale of the emergency is promptly identified Initial actions and, if appropriate manoeuvring are in accordance with contingency plans and are appropriate to the urgency of the situation and the nature of the emergency
Respond to a distress signal	Distress and Emergency signal	Examination and assessment of evidence obtained from practical instruction	The distress or emergency signal immediately recognized and acted upon in accordance with instructions and standing orders
Manoeuvre the vessel and operate small vessel power plants	*Vessel manoeuvring and handling* Knowledge of factors affecting safe manoeuvring and handling The operation of small vessel power plants and auxiliaries Proper procedures for anchoring and mooring	Examination and assessment of evidence obtained from approved in-service experience	Safe operating limits of vessel propulsion, steering and power systems are not exceeded in normal manoeuvre Adjustments made to the vessel course and speed maintain safety navigation Plant, auxiliary machinery and equipment is operated in accordance with technical specifications and within safe operating limits at all times

Table A8-1 (continued) - Function: Cargo handling and stowage at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Monitor the loading, stowage, securing and unloading of cargoes and their care during the voyage	*Cargo handling, stowage and securing* Knowledge of safe handling, stowage and securing of cargoes including dangerous, hazardous and harmful cargoes and their effect on the safety of life and of the vessel Use of the International Maritime Dangerous Goods (IMDG) Code	Examination and assessment of evidence obtained from approved in-service experience	Cargo operations are carried out in accordance with the cargo plan or other documents and established safety onboard stowage limitations The handling of dangerous, hazardous and harmful cargoes complies with international regulations and recognized standards and codes of safe practice

Function: Communications at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Communication with shore radio stations and other vessels using VHF and/or HF radiocommunications appropriate to the vessels concerned and the operations on which they are engaged	Basic knowledge of the International Code of Signals and local signals Knowledge of radio operations procedures appropriate to the vessels concerned and the operations on which they are engaged	[Examination and]assessment of evidence obtained from approved training and in-service experience	Operational and emergency communications are carried out in accordance with operational instructions and emergency or contingency plans

Table A8-1 (continued) - Function: Controlling the operation of the vessel and care for persons on board at the operational level

1. Competence	2. Knowledge, understanding and proficiency	Methods for demonstrating competence	4. Criteria for evaluating competence
Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment and anti-pollution procedures* Knowledge of the precautions to be taken to prevent pollution of the marine environment and anti-pollution procedures Anti-pollution procedures and all associated equipment	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring onboard operations and ensuring compliance with anti-pollution requirements are fully observed
Maintain seaworthiness of the vessel	*Vessel stability* Working knowledge of factors that affect stability and trim Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy Understanding of the fundamentals of watertight integrity *Vessel construction* General knowledge of the principal structural members of a vessel and the proper names for the various parts	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Actions to ensure and maintain the stability and watertight integrity of the vessel are in accordance with accepted practice
Prevent, control and fight fires on board	*Fire prevention and fire-fighting appliances* Knowledge of fire prevention Ability to organize fire drills Knowledge of classes and chemistry of fire Knowledge of fire-fighting systems Understanding of action to be taken in the event of fire, including fires involving oil systems	Assessment of evidence obtained from approved fire-fighting training and experience	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedures and contingency plans for the vessel Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem

Table A8-1 (continued) - Function: Controlling the operation of the vessel and care for persons on board at the operational level (continued)

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Operate life-saving appliances	*Life-saving* Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment Knowledge of survival techniques appropriate to the areas of operation of the vessel	Assessment of evidence obtained from approved training and experience	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board	*Medical aid* Practical application of medical guides, including the ability to take effective action based on such knowledge in the case of accidents that are likely to occur on board	Assessment of evidence obtained from approved training	The identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life

Table A8-2: Specification of minimum standard of competence for masters Class 4
Function: Navigation at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Steer the vessel and give and comply with helm orders in the English language and other languages appropriate to the operation of the vessel	Use of magnetic and gyro-compasses Helm orders Changeover from automatic pilot to hand steering and vice versa	Assessment of evidence obtained from a practical test, or approved in-service experience	A steady course is steered within acceptable limits having regard to the area of navigation and prevailing sea state. Alterations of course are smooth and controlled Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner
Keep a proper look-out by sight and hearing	Responsibilities of a look-out, including assessing the implications of a sound signal, light or other object	Assessment of evidence obtained from a practical test, or approved in-service experience	Sound signals, lights and other objects are promptly detected and their appropriate bearing in degrees or points are appropriately acted upon
Monitor and control a safe watch	Shipboard terms and definitions Use of appropriate internal communication and alarm system Ability to give orders and to communicate with personnel in the watch in matters relevant to watchkeeping duties Procedures for the relief, maintenance and handover of a watch Information required to maintain a safe watch	Assessment of evidence obtained from approved in-service experience	Communications are clear and concise and standing orders or instructions are clearly understood and followed Maintenance, handover and relief of the watch is in conformity with accepted practices and procedures
Operate emergency equipment and apply emergency procedures	Knowledge of emergency duties and alarm signals Knowledge of pyrotechnic distress signals: satellite EPIRBs and SARTs Avoidance of false distress alerts and action to be taken in event of accidental activation	Assessment of evidence obtained from demonstration and approved in-service experience	Initial action on becoming aware of an emergency or abnormal situation is in conformity with established practices and procedures Communications are clear and concise at all times The integrity of emergency and distress alerting systems is maintained at all times

Table A8-2 (continued) - Controlling the operation of the vessel at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Operate and handle a small vessel, launch or boat	Ability to determine the vessel's position by the use of: .1 landmarks .2 aids to navigation, including lighthouses, beacons and buoys .3 dead reckoning, taking into account winds, tides, currents and estimated speed Basic knowledge of content and application of the Rules of the Road as set out in **Chapter 10** and **Annex 7** of the Regulations Proper and safe procedures for manoeuvring the vessel during passage, anchoring and at the berth	Examination or Practical test as appropriate and assessment of evidence obtained from approved in-service experience	The primary method of fixing the vessel's position is the most appropriate to the prevailing circumstances and conditions The position is determined within the limits of acceptable errors Action to avoid close encounters and collision with other vessels is in accordance with the Regulations Decisions to adjust course and/or speed are both timely and in accordance with accepted navigation procedures A proper record is maintained of movements and activities relating to the navigation of the vessel Plant, auxiliary machinery and equipment is operated in accordance with technical specifications and within safe operating limits at all times
Comply with pollution prevention requirements	Prevention of pollution of the marine environment and anti-pollution procedures Knowledge of the precautions to be taken to prevent pollution of the marine environment and anti-pollution procedures Anti-pollution procedures and all associated equipment	Examination or Practical test as appropriate and assessment of evidence obtained from approved in-service experience	Procedures for monitoring onboard operations and ensuring compliance with anti-pollution requirements are fully observed

Table A8-3: Specification of minimum standard of competence for engineers Class 3 - officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room

Function: Marine engineering at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Use appropriate tools for fabrication and repair operations typically performed on vessels	.1 Characteristics and limitations of materials used in construction and repair of vessels and equipment .2 Characteristics and limitations of processes used for fabrication and repair .3 Properties and parameters considered in the fabrication and repair of systems and components .4 Application of safe working practices in the workshop environment	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Identification of important parameters for fabrication of typical vessel related components is appropriate Selection of material is appropriate Fabrication is to designated tolerances Use of equipment and machine tools is appropriate and safe
Use hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of onboard plant and equipment	Design characteristics and selection of materials in construction of equipment Interpretation of machinery drawings and handbooks Operational characteristics of equipment and systems	Assessment of evidence obtained from one or more of the following: .1 approved workshop skill training .2 approved practical experience and tests	Safety procedures followed are appropriate Selection of tools and spare gear is appropriate Dismantling, inspecting, repairing and reassembling equipment is in accordance with manuals and good practice Re-commissioning and performance testing is in accordance with manuals and good practice
Use hand tools, electrical and electronic measuring and test equipment for fault finding, maintenance and repair operations	Safety requirements for working on onboard electrical systems Construction and operational characteristics of onboard AC and DC electrical systems and equipment Construction and operation of electrical test and measuring equipment	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Implementation of safety procedures is satisfactory Selection and use of test equipment is appropriate and interpretation of results is accurate Selection of procedures for the conduct of repair and maintenance is in accordance with manuals and good practice Commissioning and performance testing of equipment and systems brought back into service after repair is in accordance with manuals and good practice

Table A8-3 (continued) - Function: Marine engineering at the operational level (continued)

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Maintain a safe engineering watch	Thorough knowledge of principles to be observed in keeping an engineering watch including: .1 duties associated with taking over and accepting a watch .2 routine duties undertaken during a watch .3 maintenance of the machinery space log book and the significance of the readings taken .4 duties associated with handing over a watch Safety and emergency procedures; changeover of remote/automatic to local control of all systems Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil systems	Examination or assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	The conduct, handover and relief of the watch conforms with accepted principles and procedures The frequency and extent of monitoring of engineering equipment and systems conforms to manufacturers' recommendations and accepted principles and procedures, including principles to be observed in keeping an engineering watch A proper record is maintained of the movements and activities relating to the vessel's engineering systems
Use English in written and oral form	Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties	Examination and assessment of evidence obtained from practical instruction	English language publications relevant to engineering duties are correctly interpreted Communications are clear and understood

Table A8-3 (continued) - Function: Marine engineering at the operational level (continued)

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Operate main and auxiliary machinery and associated control systems	Main and auxiliary machinery: .1 preparation of main machinery and preparation of auxiliary machinery for operation .2 location of common faults in machinery and plant in engine and boiler rooms and action necessary to prevent damage	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment The output of plant and engineering systems consistently meets requirements including bridge orders relating to changes in speed and direction The causes of machinery malfunctions are promptly identified and actions are designed to ensure the overall safety of the vessel and the plant having regard to the prevailing circumstances and conditions
Operate pumping systems and associated control systems	Pumping systems: .1 routine pumping operations .2 operation of bilge, ballast and cargo pumping systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment

Function: Electrical engineering at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Operate alternators, generators and control systems	*Generating plant*: Appropriate basic electrical knowledge and skills Preparing, starting, coupling and changing over alternators or generators Location of common faults and action to prevent damage *Control systems*: Location of common faults and action to prevent damage	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations

Table A8-3 (continued) - Function: Maintenance and repair at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Maintain marine engineering systems including control systems	*Marine engineering systems* Appropriate basic mechanical knowledge and skills *Safety and emergency procedures*: Safe isolation of electrical and other types of plant and equipment required before personnel are permitted to work on such plant or equipment Undertake maintenance and repair to plant and equipment	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Isolation, dismantling and reassembly of plant and equipment is in accordance with accepted practices and procedures. Action taken leads to the restoration of plant by the method most suitable and appropriate to the prevailing circumstances and conditions

Function: Controlling the operation of the vessel and care for persons on board at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment* Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring onboard operations and ensuring compliance with local requirements are fully observed
Prevent, control and fight fires on board	*Fire prevention and fire-fighting appliances* Knowledge of fire prevention and classes and chemistry of fire Ability to organize fire drills Knowledge of fire-fighting systems And action to be taken in the event of fire, including fires involving oil systems	Assessment of evidence obtained from approved fire-fighting training and experience	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem

Table A8-3 (continued) - Function: Controlling the operation of the vessel and care for persons on board at the operational level (continued)

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Maintain seaworthiness of the vessel	*Vessel stability* Working knowledge of factors affecting stability and trim Understanding of the fundamentals of watertight integrity Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy *Vessel construction* General knowledge of the principal structural members of a vessel and the proper names for the various parts	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Actions to ensure and maintain the watertight integrity of the vessel are in accordance with accepted practice
Operate life-saving appliances	*Life-saving* Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment Knowledge of survival at sea techniques	Assessment of evidence obtained from approved training and experience	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board	*Medical aid* Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board	Assessment of evidence obtained from approved training	Identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life

Table A8-4: Specification of minimum standard of competence for engineers Class 4
Function: Marine engineering at the operational level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Maintain a safe engineering watch routine appropriate to the characteristics of the vessels concerned and the propulsion power Understand orders and be understood in matters relevant to watchkeeping duties	Terms used in machinery spaces and names of machinery and equipment Engine-room watchkeeping procedures, including starting, stopping and manoeuvring the machinery Safe working practices as related to engine-room operations Basic environmental protection procedures Use of appropriate internal communication system Engine-room alarm systems and ability to distinguish between the various alarms, with special reference to fire-extinguishing gas alarms	Assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 practical test	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations Communications are clear and concise and a watch information or instructions are clearly understandable Maintenance, handover and relief of the watch is in conformity with accepted principles and procedures
Operate emergency equipment and apply emergency procedures	Knowledge of emergency duties Escape routes from machinery spaces Familiarity with the location and use of fire-fighting equipment in the machinery spaces	Assessment of evidence obtained from demonstration and approved in-service experience	Initial action on becoming aware of an emergency or abnormal situation conforms with established procedures
Operate pumping systems and associated control systems	Pumping systems: .1 routine bilge, ballast and cargo pumping operations .2 operation of systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment

Table A8-4 (continued) - Function: Marine engineering at the operational level (continued)

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Undertake routine servicing and maintenance operations	Basic procedures for servicing and maintaining main and auxiliary machinery appropriate to the characteristics of the machinery on the vessels concerned	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	The frequency and extent of servicing and monitoring engineering equipment a conforms to manufacturers' recommendations and accepted principles and procedures

Table A8-5 - Specification of minimum additional standard of competence for persons serving as masters
Function: Controlling the operation of the ship and care for persons on board at the management level

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Monitor and control compliance with legislative requirements and measures to ensure safety of life and the protection of the marine environment	Knowledge of the Regulations and other relevant legislation	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring operations and maintenance comply with legislative requirements Potential non-compliance is promptly and fully identified Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment
Organize and manage the crew	A knowledge of personnel management, organization and training on board ship A knowledge of national legislation related to personnel matters	Examination and assessment of evidence obtained from approved in-service training and experience	The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned Training objectives and activities are based on an assessment of current competence and capabilities and operational requirements

Table A8-6 - Specification of minimum additional standard of competence for persons serving as chief engineers
Function: Controlling the operation of the ship and care for persons on board at the management level

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Monitor and control compliance with legislative requirements and measures to ensure safety of life and the protection of the marine environment	Knowledge of the Regulations and other relevant legislation	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring operations and maintenance comply with legislative requirements Potential non-compliance is promptly and fully identified Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment
Maintain safety of engine equipment, systems and services		Examination and assessment of approved in-service experience	Arrangements for ensuring the safe and efficient operation and condition of the machinery installation are suitable for all modes of operation
Manage fuel and ballast operations	Operation and maintenance of machinery including pumps and piping systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved simulator training, where appropriate	Fuel and ballast operations meet operational requirements and are carried out so as to prevent pollution of the marine environment

Table A8-7 - Specification of minimum standard of competence for ratings forming part of a navigational watch
Function: Navigation at the support level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Steer the ship and comply with helm orders in relevant national and the English languages	Use of magnetic and gyro compasses Helm orders Change-over from automatic pilot to hand steering and vice-versa	Assessment of evidence obtained from: .1 practical test, or .2 approved in-service experience	A steady course is steered within acceptable limits having regard to the area of navigation and prevailing sea state. Alterations of course are smooth and controlled Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner
Keep a proper look-out by sight and hearing	Responsibilities of a look-out, including reporting the approximate bearing of a sound signal, light or other object in degrees or points	Assessment of evidence obtained from: .1 practical test, or .2 approved in-service experience	Sound signals, lights and other objects are promptly detected and their appropriate bearing in degrees or points is reported to the officer of the watch
Contribute to monitoring and controlling a safe watch	Shipboard terms and definitions Use of appropriate internal communication and alarm systems Ability to understand orders and to communicate with the officer of the watch in matters relevant to watchkeeping duties Procedures for the relief, maintenance and hand-over of a watch Information required to maintain a safe watch Basic environmental protection procedure	Assessment of evidence obtained from approved in-service experience	Communications are clear and concise and advice/clarification is sought from the officer on watch where watch information or instructions are not clearly understood Maintenance, hand-over and relief of the watch is in conformity with accepted practices and procedures

Table A8-7 (continued) - Function: Navigation at the support level (continued)

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Operate emergency equipment and apply emergency procedures	Knowledge of emergency duties and alarm signals Knowledge of pyrotechnic distress signals; satellite EPIRBs and SARTs Avoidance of false distress alerts and action to be taken in event of accidental activation	Assessment of evidence obtained from demonstration and approved in-service experience	Initial action on becoming aware of an emergency or abnormal situation is in conformity with established practices and procedures Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner The integrity of emergency and distress alerting systems is maintained at all times

Table A8-8 - Specification of minimum standard of competence for ratings forming part of an engineering watch
Function: Marine engineering at the support level

1. Competence	2. Knowledge, understanding and proficiency	3. Methods for demonstrating competence	4. Criteria for evaluating competence
Carry out a watch routine appropriate to the duties of a rating forming part of an engine-room watch Understand orders and be understood in matters relevant to watchkeeping duties	Terms used in machinery spaces and names of machinery and equipment Engine-room watchkeeping procedures Safe working practices as related to engine-room operations Basic environmental protection procedures Use of appropriate internal communication system Engine-room alarm systems and ability to distinguish between the various alarms, with special reference to fire-extinguishing gas alarms	Assessment of evidence obtained from one or more of the following: .1 approved in-service experience; or .2 practical test	Communications are clear and concise and advice or clarification is sought from the officer of the watch where watch information or instructions are not clearly understood Maintenance, hand-over and relief of the watch is in conformity with accepted principles and procedures
Operate emergency equipment and apply emergency procedures	Knowledge of emergency duties Escape routes from machinery spaces Familiarity with the location and use of fire-fighting equipment in the machinery spaces	Assessment of evidence obtained from demonstration and approved in-service experience	Initial action on becoming aware of an emergency or abnormal situation conforms with established procedures Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner

ANNEX 9 - WATCHKEEPING ARRANGEMENTS AND PRINCIPLES TO BE OBSERVED[17]

Part 1 - Certification

1 The officer in charge of the navigational or deck watch shall be duly qualified in accordance with the provisions of chapter II, or chapter VII appropriate to the duties related to navigational or deck watchkeeping.

2 The officer in charge of the engineering watch shall be duly qualified in accordance with the provisions of chapter III, or chapter VII appropriate to the duties related to engineering watchkeeping.

Part 2 - Voyage planning

General requirements

3 The intended voyage shall be planned in advance taking into consideration all pertinent information and any course laid down shall be checked before the voyage commences.

4 The chief engineer officer shall, in consultation with the master, determine in advance the needs of the intended voyage, taking into consideration the requirements for fuel, water, lubricants, chemicals, expendable and other spare parts, tools, supplies and any other requirements.

Planning prior to each voyage

5 Prior to each voyage the master of every ship shall ensure that the intended route from the port of departure to the first port of call is planned using adequate and appropriate charts and other nautical publications necessary for the intended voyage, containing accurate, complete and up-to-date information regarding those navigational limitations and hazards which are of a permanent or predictable nature, and which are relevant to the safe navigation of the ship.

Verification and display of planned route

6 When the route planning is verified taking into consideration all pertinent information, the planned route shall be clearly displayed on appropriate charts, and shall be continuously available to the officer in charge of the watch who shall verify each course to be followed prior to using it during the voyage.

Deviation from planned route

7 If a decision is made, during a voyage, to change the next port of call of the planned route , or if it is necessary for the ship to deviate substantially from the planned route for other reasons, then an amended route shall be planned prior to deviating substantially from the route originally planned.

Part 3 - Watchkeeping at sea

Principles applying to watchkeeping generally

8 Parties shall direct the attention of companies, masters, chief engineer officers and watchkeeping personnel to the following principles which shall be observed to ensure that safe watches are maintained at all times.

---

[17] **Annex 9** reproduces the text of Section A - VIII/2, *Watchkeeping arrangements and principles to be observed*, of the STCW Code. The principles, in accordance with **13.3.1** of the Regulations, form a basis for the level of theoretical knowledge, understanding and proficiency to meet the standards of competence set out in the Regulations. Provisions 1-7 inclusive of Section A - VIII/2 set out in this Annex are not directly relevant to the intention of **13.3.1**. However, these provisions have been duplicated here in order to maintain the nexus between the requirements of the Regulations and those of the STCW Code and to maintain the identity of the relevant numerical references within the STCW Code and Annex 9.

9 The master of every ship is bound to ensure that watchkeeping arrangements are adequate for maintaining a safe navigational watch. Under the master's general direction, the officers of the navigational watch are responsible for navigating the ship safely during their periods of duty, when they will be particularly concerned with avoiding collision and stranding.

10 The chief engineer officer of every ship is bound, in consultation with the master, to ensure that watchkeeping arrangements are adequate to maintain a safe engineering watch.

Protection of marine environment

11 The master, officers and ratings shall be aware of the serious effects of operational or accidental pollution of the marine environment and shall take all possible precautions to prevent such pollution, particularly within the framework of relevant international and port regulations.

Part 3-1 - Principles to be observed in keeping a navigational watch

12 The officer in charge of the navigational watch is the master's representative and is primarily responsible at all times for the safe navigation of the ship and for complying with the International Regulations for Preventing Collisions at Sea, 1972.

Look-out

13 A proper look-out shall be maintained at all times in compliance with rule 5 of the International Regulations for Preventing Collisions at Sea, 1972 and shall serve the purpose of:

.1 maintaining a continuous state of vigilance by sight and hearing as well as by all other available means, with regard to any significant change in the operating environment;

.2 fully appraising the situation and the risk of collision, stranding and other dangers to navigation; and

.3 detecting ships or aircraft in distress, shipwrecked persons, wrecks, debris and other hazards to safe navigation.

14 The look-out must be able to give full attention to the keeping of a proper look-out and no other duties shall be undertaken or assigned which could interfere with that task.

15 The duties of the look-out and helmsperson are separate and the helmsperson shall not be considered to be the look-out while steering, except in small ships where an unobstructed all-round view is provided at the steering position and there is no impairment of night vision or other impediment to the keeping of a proper look-out. The officer in charge of the navigational watch may be the sole look-out in daylight provided that on each such occasion:

.1 the situation has been carefully assessed and it has been established without doubt that it is safe to do so;

.2 full account has been taken of all relevant factors including, but not limited to:

- state of weather,
- visibility,
- traffic density,
- proximity of dangers to navigation, and
- the attention necessary when navigating in or near traffic separation schemes; and

.3 assistance is immediately available to be summoned to the bridge when any change in the situation so requires.

16 In determining that the composition of the navigational watch is adequate to ensure that a proper look-out can continuously be maintained, the master shall take into account all relevant factors, including those described in this section of the Code, as well as the following factors:

.1 visibility, state of weather and sea;

.2 traffic density, and other activities occurring in the area in which the vessel is navigating;

.3 the attention necessary when navigating in or near traffic separation schemes or other routeing measures;

.4 the additional workload caused by the nature of the ship's functions, immediate operating requirements and anticipated manoeuvres;

.5 the fitness for duty of any crew members on call who are assigned as members of the watch;

.6 knowledge of and confidence in the professional competence of the ship's officers and crew;
.7 the experience of each officer of the navigational watch, and the familiarity of that officer with the ship's equipment, procedures, and manoeuvring capability;
.8 activities taking place on board the ship at any particular time, including radiocommunication activities and the availability of assistance to be summoned immediately to the bridge when necessary;
.9 the operational status of bridge instrumentation and controls, including alarm systems;
.10 rudder and propeller control and ship manoeuvring characteristics;
.11 the size of the ship and the field of vision available from the conning position;
.12 the configuration of the bridge, to the extent such configuration might inhibit a member of the watch from detecting by sight or hearing any external development; and
.13 any other relevant standard, procedure or guidance relating to watchkeeping arrangements and fitness for duty which has been adopted by the Organization.

Watch arrangements

17 When deciding the composition of the watch on the bridge, which may include appropriately qualified ratings, the following factors, *inter alia*, shall be taken into account:
.1 at no time shall the bridge be left unattended;
.2 weather conditions, visibility and whether there is daylight or darkness;
.3 proximity of navigational hazards which may make it necessary for the officer in charge of the watch to carry out additional navigational duties;
.4 use and operational condition of navigational aids such as radar or electronic position-indicating devices and any other equipment affecting the safe navigation of the ship;
.5 whether the ship is fitted with automatic steering;
.6 whether there are radio duties to be performed;
.7 unmanned machinery space (UMS) controls, alarms and indicators provided on the bridge, procedures for their use and limitations; and
.8 any unusual demands on the navigational watch that may arise as a result of special operational circumstances.

Taking over the watch

18 The officer in charge of the navigational watch shall not hand over the watch to the relieving officer if there is reason to believe that the latter is not capable of carrying out the watchkeeping duties effectively, in which case the master shall be notified.

19 The relieving officer shall ensure that the members of the relieving watch are fully capable of performing their duties, particularly as regards their adjustment to night vision. Relieving officers shall not take over the watch until their vision is fully adjusted to the light conditions.

20 Prior to taking over the watch relieving officers shall satisfy themselves as to the ship's estimated or true position and confirm its intended track, course and speed, and UMS controls as appropriate and shall note any dangers to navigation expected to be encountered during their watch.

21 Relieving officers shall personally satisfy themselves regarding the:
.1 standing orders and other special instructions of the master relating to navigation of the ship;
.2 position, course, speed and draught of the ship;
.3 prevailing and predicted tides, currents, weather, visibility and the effect of these factors upon course and speed;
.4 procedures for the use of main engines to manoeuvre when the main engines are on bridge control; and
.5 navigational situation, including but not limited to:
.5.1 the operational condition of all navigational and safety equipment being used or likely to be used during the watch,
.5.2 the errors of gyro and magnetic compasses,
.5.3 the presence and movement of ships in sight or known to be in the vicinity,
.5.4 the conditions and hazards likely to be encountered during the watch, and

.5.5 the possible effects of heel, trim, water density and squat on under keel clearance.

22 If at any time the officer in charge of the navigational watch is to be relieved when a manoeuvre or other action to avoid any hazard is taking place, the relief of that officer shall be deferred until such action has been completed.

Performing the navigational watch

23 The officer in charge of the navigational watch shall:

.1 keep the watch on the bridge;

.2 in no circumstances leave the bridge until properly relieved;

.3 continue to be responsible for the safe navigation of the ship, despite the presence of the master on the bridge, until informed specifically that the master has assumed that responsibility and this is mutually understood; and

.4 notify the master when in any doubt as to what action to take in the interest of safety.

24 During the watch the course steered, position and speed shall be checked at sufficiently frequent intervals, using any available navigational aids necessary, to ensure that the ship follows the planned course.

25 The officer in charge of the navigational watch shall have full knowledge of the location and operation of all safety and navigational equipment on board the ship and shall be aware and take account of the operating limitations of such equipment.

26 The officer in charge of the navigational watch shall not be assigned or undertake any duties which would interfere with the safe navigation of the ship.

27 Officers of the navigational watch shall make the most effective use of all navigational equipment at their disposal.

28 When using radar, the officer in charge of the navigational watch shall bear in mind the necessity to comply at all times with the provisions on the use of radar contained in the International Regulations for Preventing Collisions at Sea, in force.

29 In cases of need the officer in charge of the navigational watch shall not hesitate to use the helm, engines and sound signalling apparatus. However, timely notice of intended variations of engine speed shall be given where possible or effective use made of UMS engine controls provided on the bridge in accordance with the applicable procedures.

30 Officers of the navigational watch shall know the handling characteristics of their ship, including its stopping distances, and should appreciate that other ships may have different handling characteristics.

31 A proper record shall be kept during the watch of the movements and activities relating to the navigation of the ship.

32 It is of special importance that at all times the officer in charge of the navigational watch ensures that a proper look-out is maintained. In a ship with a separate chart room the officer in charge of the navigational watch may visit the chart room, when essential, for a short period for the necessary performance of navigational duties, but shall first ensure that it is safe to do so and that proper look-out is maintained.

33 Operational tests of shipboard navigational equipment shall be carried out at sea as frequently as practicable and as circumstances permit, in particular before hazardous conditions affecting navigation are expected. Whenever appropriate, these tests shall be recorded. Such tests shall also be carried out prior to port arrival and departure.

34 The officer in charge of the navigational watch shall make regular checks to ensure that:

.1 the person steering the ship or the automatic pilot is steering the correct course;

.2 the standard compass error is determined at least once a watch and, when possible, after any major alteration of course; the standard and gyro-compasses are frequently compared and repeaters are synchronized with their master compass;

.3 the automatic pilot is tested manually at least once a watch;

.4 the navigation and signal lights and other navigational equipment are functioning properly;
.5 the radio equipment is functioning properly in accordance with paragraph 86 of this section; and
.6 the UMS controls, alarms and indicators are functioning properly.

35 The officer in charge of the navigational watch shall bear in mind the necessity to comply at all times with the requirements in force of the International Convention for the Safety of Life at Sea, (SOLAS) 1974. The officer of the navigational watch shall take into account:

.1 the need to station a person to steer the ship and to put the steering into manual control in good time to allow any potentially hazardous situation to be dealt with in a safe manner; and
.2 that with a ship under automatic steering it is highly dangerous to allow a situation to develop to the point where the officer in charge of the navigational watch is without assistance and has to break the continuity of the look-out in order to take emergency action.

36 Officers of the navigational watch shall be thoroughly familiar with the use of all electronic navigational aids carried, including their capabilities and limitations, and shall use each of these aids when appropriate and shall bear in mind that the echo-sounder is a valuable navigational aid.

37 The officer in charge of the navigational watch shall use the radar whenever restricted visibility is encountered or expected, and at all times in congested waters having due regard to its limitations.

38 The officer in charge of the navigational watch shall ensure that range scales employed are changed at sufficiently frequent intervals so that echoes are detected as early as possible. It shall be borne in mind that small or poor echoes may escape detection.

39 Whenever radar is in use, the officer in charge of the navigational watch shall select an appropriate range scale and observe the display carefully, and shall ensure that plotting or systematic analysis is commenced in ample time.

40 The officer in charge of the navigational watch shall notify the master immediately:

.1 if restricted visibility is encountered or expected;
.2 if the traffic conditions or the movements of other ships are causing concern;
.3 if difficulty is experienced in maintaining course;
.4 on failure to sight land, a navigation mark or to obtain soundings by the expected time;
.5 if, unexpectedly, land or a navigation mark is sighted or a change in soundings occurs;
.6 on breakdown of the engines, propulsion machinery remote control, steering gear or any essential navigational equipment, alarm or indicator;
.7 if the radio equipment malfunctions;
.8 in heavy weather, if in any doubt about the possibility of weather damage;
.9 if the ship meets any hazard to navigation, such as ice or a derelict; and
.10 in any other emergency or if in any doubt.

41 Despite the requirement to notify the master immediately in the foregoing circumstances, the officer in charge of the navigational watch shall in addition not hesitate to take immediate action for the safety of the ship, where circumstances so require.

42 The officer in charge of the navigational watch shall give watchkeeping personnel all appropriate instructions and information which will ensure the keeping of a safe watch, including a proper look-out.

Watchkeeping under different conditions and in different areas

Clear weather

43 The officer in charge of the navigational watch shall take frequent and accurate compass bearings of approaching ships as a means of early detection of risk of collision and bear in mind that such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large ship or a tow or when approaching a ship at close range. The officer in charge of the navigational watch shall also take early and positive

action in compliance with the applicable International Regulations for Preventing Collisions at Sea, 1972 and subsequently check that such action is having the desired effect.

44 In clear weather, whenever possible, the officer in charge of the navigational watch shall carry out radar practice.

Restricted visibility

45 When restricted visibility is encountered or expected, the first responsibility of the officer in charge of the navigational watch is to comply with the relevant rules of the International Regulations for Preventing Collisions at Sea, 1972 with particular regard to the sounding of fog signals, proceeding at a safe speed and having the engines ready for immediate manoeuvre. In addition, the officer in charge of the navigational watch shall:

.1 inform the master;
.2 post a proper look-out;
.3 exhibit navigation lights; and
.4 operate and use the radar.

In hours of darkness

46 The master and the officer in charge of the navigational watch when arranging look-out duty shall have due regard to the bridge equipment and navigational aids available for use, their limitations; procedures and safeguards implemented.

Coastal and congested waters

47 The largest scale chart on board, suitable for the area and corrected with the latest available information, shall be used. Fixes shall be taken at frequent intervals, and shall be carried out by more than one method whenever circumstances allow.

48 The officer in charge of the navigational watch shall positively identify all relevant navigation marks.

Navigation with pilot on board

49 Despite the duties and obligations of pilots, their presence on board does not relieve the master or officer in charge of the navigational watch from their duties and obligations for the safety of the ship. The master and the pilot shall exchange information regarding navigation procedures, local conditions and the ship's characteristics. The master and/or the officer in charge of the navigational watch shall co-operate closely with the pilot and maintain an accurate check on the ship's position and movement.

50 If in any doubt as to the pilot's actions or intentions, the officer in charge of the navigational watch shall seek clarification from the pilot and, if doubt still exists, shall notify the master immediately and take whatever action is necessary before the master arrives.

Ship at anchor

51 If the master considers it necessary, a continuous navigational watch shall be maintained at anchor. While at anchor, the officer in charge of the navigational watch shall:

.1 determine and plot the ship's position on the appropriate chart as soon as practicable;
.2 when circumstances permit, check at sufficiently frequent intervals whether the ship is remaining securely at anchor by taking bearings of fixed navigation marks or readily identifiable shore objects;
.3 ensure that proper look-out is maintained;
.4 ensure that inspection rounds of the ship are made periodically;
.5 observe meteorological and tidal conditions and the state of the sea;
.6 notify the master and undertake all necessary measures if the ship drags anchor;
.7 ensure that the state of readiness of the main engines and other machinery is in accordance with the master's instructions;
.8 if visibility deteriorates, notify the master;
.9 ensure that the ship exhibits the appropriate lights and shapes and that appropriate sound signals are made in accordance with all applicable regulations; and

.10 take measures to protect the environment from pollution by the ship and comply with applicable pollution regulations.

Part 3-2 - Principles to be observed in keeping an engineering watch

52 The term "engineering watch" as used in parts 3-2, 4-2 and 4-4 of this section means either a person or a group of personnel comprising the watch or a period of responsibility for an officer during which the physical presence in machinery spaces of that officer may or may not be required.

53 The 'officer in charge of the engineering watch' is the chief engineer officer's representative and is primarily responsible, at all times, for the safe and efficient operation and upkeep of machinery affecting the safety of the ship and is responsible for the inspection, operation and testing, as required, of all machinery and equipment under the responsibility of the engineering watch.

Watch arrangements

54 The composition of the engineering watch shall, at all times, be adequate to ensure the safe operation of all machinery affecting the operation of the ship, in either automated or manual mode and be appropriate to the prevailing circumstances and conditions.

55 When deciding the composition of the engineering watch, which may include appropriately qualified ratings, the following criteria, *inter alia*, shall be taken into account:

.1 the type of ship and the type and condition of the machinery;
.2 the adequate supervision, at all times, of machinery affecting the safe operation of the ship;
.3 any special modes of operation dictated by conditions such as weather, ice, contaminated water, shallow water, emergency conditions, damage containment or pollution abatement;
.4 the qualifications and experience of the engineering watch;
.5 the safety of life, ship, cargo and port, and protection of the environment;
.6 the observance of international, national and local regulations; and
.7 maintaining the normal operations of the ship.

Taking over the watch

56 The officer in charge of the engineering watch shall not hand over the watch to the relieving officer if there is reason to believe that the latter is obviously not capable of carrying out the watchkeeping duties effectively, in which case the chief engineer officer shall be notified.

57 The relieving officer of the engineering watch shall ensure that the members of the relieving engineering watch are apparently fully capable of performing their duties effectively.

58 Prior to taking over the engineering watch, relieving officers shall satisfy themselves regarding at least the following:

.1 the standing orders and special instructions of the chief engineer officer relating to the operation of the ship's systems and machinery;
.2 the nature of all work being performed on machinery and systems, the personnel involved and potential hazards.
.3 the level and, where applicable, the condition of water or residues in bilges, ballast tanks, slop tanks, reserve tanks, fresh water tanks, sewage tanks and any special requirements for use or disposal of the contents thereof;
.4 the condition and level of fuel in the reserve tanks, settling tank, day tank and other fuel storage facilities;
.5 any special requirements relating to sanitary system disposals;
.6 condition and mode of operation of the various main and auxiliary systems, including the electrical power distribution system;
.7 where applicable, the condition of monitoring and control console equipment, and which equipment is being operated manually;
.8 where applicable, the condition and mode of operation of automatic boiler controls such as flame safeguard control systems, limit control systems, combustion control systems, fuel-supply control systems and other equipment related to the operation of steam boilers;

.9 any potentially adverse conditions resulting from bad weather, ice, contaminated or shallow water;
.10 any special modes of operation dictated by equipment failure or adverse ship conditions;
.11 the reports of engine-room ratings relating to their assigned duties;
.12 the availability of fire-fighting appliances; and
.13 the state of completion of engine-room log.

Performing the engineering watch

59 The officer in charge of the engineering watch shall ensure that the established watchkeeping arrangements are maintained and that under direction, engine-room ratings, if forming part of the engineering watch, assist in the safe and efficient operation of the propulsion machinery and auxiliary equipment.

60 The officer in charge of the engineering watch shall continue to be responsible for machinery-space operations, despite the presence of the chief engineer officer in the machinery spaces, until specifically informed that the chief engineer officer has assumed that responsibility and this is mutually understood.

61 All members of the engineering watch shall be familiar with their assigned watchkeeping duties. In addition, every member shall with respect to the ship they are serving in have knowledge of:

.1 the use of appropriate internal communication systems;
.2 the escape routes from machinery spaces;
.3 the engine-room alarm systems and be able to distinguish between the various alarms with special reference to the fire extinguishing media alarm; and
.4 the number location and types of fire-fighting equipment and damage control gear in the machinery spaces, together with their use and the various safety precautions to be observed.

62 Any machinery not functioning properly, expected to malfunction or requiring special service, shall be noted along with any action already taken. Plans shall be made for any further action if required.

63 When the machinery spaces are in the manned condition, the officer in charge of the engineering watch shall at all times be readily capable of operating the propulsion equipment in response to needs for changes in direction or speed.

64 When the machinery spaces are in the periodic unmanned condition, the designated duty officer in charge of the engineering watch shall be immediately available and on call to attend the machinery spaces.

65 All bridge orders shall be promptly executed. Changes in direction or speed of the main propulsion units shall be recorded, except where an Administration has determined that the size or characteristics of a particular ship make such recording impracticable. The officer in charge of the engineering watch shall ensure that the main propulsion unit controls, when in the manual mode of operation, are continuously attended under stand-by or manoeuvring conditions.

66 Due attention shall be paid to the ongoing maintenance and support of all machinery, including mechanical, electrical, electronic, hydraulic and pneumatic systems, their control apparatus and associated safety equipment, all accommodation service systems equipment and the recording of stores and spare gear usage.

67 The chief engineer officer shall ensure that the officer in charge of the engineering watch is informed of all preventive maintenance, damage control, or repair operations to be performed during the engineering watch. The officer in charge of the engineering watch shall be responsible for the isolation, by-passing and adjustment of all machinery under the responsibility of the engineering watch that is to be worked on, and shall record all work carried out.

68 When the engine-room is put in a stand-by condition, the officer in charge of the engineering watch shall ensure that all machinery and equipment which may be used during manoeuvring is in a state of immediate readiness and that an adequate reserve of power is available for steering gear and other requirements.

69 Officers in charge of an engineering watch shall not be assigned or undertake any duties which would interfere with their supervisory duties in respect of the main propulsion system and ancillary equipment. They shall keep the main propulsion plant and auxiliary systems under constant supervision until properly relieved, and shall periodically inspect the machinery in their charge. They shall also ensure that adequate rounds of the machinery and steering gear spaces are made for the purpose of observing and reporting equipment malfunctions or breakdowns, performing or directing routine adjustments, required upkeep and any other necessary tasks.

70 Officers in charge of an engineering watch shall direct any other member of the engineering watch to inform them of potentially hazardous conditions which may adversely affect the machinery or jeopardize the safety of life or of the ship.

71 The officer in charge of the engineering watch shall ensure that the machinery space watch is supervised, and shall arrange for substitute personnel in the event of the incapacity of any engineering watch personnel. The engineering watch shall not leave the machinery spaces unsupervised in a manner that would prevent the manual operation of the engine-room plant or throttles.

72 The officer in charge of the engineering watch shall take the action necessary to contain the effects of damage resulting from equipment breakdown, fire, flooding, rupture, collision, stranding, or other cause.

73 Before going off duty, the officer in charge of the engineering watch shall ensure that all events related to the main and auxiliary machinery which have occurred during the engineering watch are suitably recorded.

74 The officer in charge of the engineering watch shall co-operate with any engineer in charge of maintenance work during all preventive maintenance, damage control or repairs. This shall include but not necessarily be limited to:

.1 isolating and bypassing machinery to be worked on;

.2 adjusting the remaining plant to function adequately and safely during the maintenance period;

.3 recording, in the engine-room log or other suitable document, the equipment worked on and the personnel involved, and which safety steps have been taken and by whom, for the benefit of relieving officers and for record purposes; and

.4 testing and putting into service, when necessary, the repaired machinery or equipment.

75 The officer in charge of the engineering watch shall ensure that any engine-room ratings who perform maintenance duties are available to assist in the manual operation of machinery in the event of automatic equipment failure.

76 The officer in charge of the engineering watch shall bear in mind that changes in speed, resulting from machinery malfunction, or any loss of steering, may imperil the safety of the ship and life at sea. The bridge shall be immediately notified, in the event of fire, and of any impending action in machinery spaces that may cause reduction in the ship's speed, imminent steering failure, stoppage of the ship's propulsion system or any alteration in the generation of electric power or similar threat to safety. This notification, where possible, shall be accomplished before changes are made, in order to afford the bridge the maximum available time to take whatever action is possible to avoid a potential marine casualty.

77 The officer in charge of the engineering watch shall notify the chief engineer officer without delay:

.1 when engine damage or a malfunction occurs which may be such as to endanger the safe operation of the ship;

.2 when any malfunction occurs which, it is believed, may cause damage or breakdown of propulsion machinery, auxiliary machinery or monitoring and governing systems; and

.3 in any emergency or if in any doubt as to what decision or measures to take.

78 Despite the requirement to notify the chief engineer officer in the foregoing circumstances, the officer in charge of the engineering watch shall not hesitate to take immediate action for the safety of the ship, its machinery and crew where circumstances require.

79 The officer in charge of the engineering watch shall give the watchkeeping personnel all appropriate instructions and information which will ensure the keeping of a safe engineering watch. Routine machinery upkeep, performed as incidental tasks as a part of keeping a safe watch, shall be set up as an integral part of the watch routine. Detailed repair maintenance involving repairs to electrical, mechanical, hydraulic, pneumatic or applicable electronic equipment throughout the ship shall be performed with the cognizance of the officer in charge of the engineering watch and chief engineer officer. These repairs shall be recorded.

Engineering watchkeeping under different conditions and in different areas

Restricted visibility

80 The officer in charge of the engineering watch shall ensure that permanent air or steam pressure is available for sound signals and that at all times bridge orders relating to changes in speed or direction of operation are immediately implemented and, in addition, that auxiliary machinery used for manoeuvring is readily available.

Coastal and congested waters

81 The officer in charge of the engineering watch shall ensure that all machinery involved with the manoeuvring of the ship can immediately be placed in the manual mode of operation when notified that the ship is in congested waters. The officer in charge of the engineering watch shall also ensure that an adequate reserve of power is available for steering and other manoeuvring requirements. Emergency steering and other auxiliary equipment shall be ready for immediate operation.

Ship at anchor

82 At an unsheltered anchorage the chief engineer officer shall consult with the master whether or not to maintain the same engineering watch as when underway.

83 When a ship is at anchor in an open roadstead or any other virtually "at sea" condition, the engineer officer in charge of the engineering watch shall ensure that:

.1 an efficient engineering watch is kept;
.2 periodic inspection is made of all operating and stand-by machinery;
.3 main and auxiliary machinery is maintained in a state of readiness in accordance with orders from the bridge;
.4 measures are taken to protect the environment from pollution by the ship, and that applicable pollution prevention regulations are complied with; and
.5 all damage control and fire-fighting systems are in readiness.