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Attached are annexes 18 to 32 to the report of the Maritime Safety Committee on its ninety-third session (MSC 93/22).

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ANNEX 18

RESOLUTION MSC.379(93)

(adopted on 16 May 2014)

PERFORMANCE STANDARDS FOR SHIPBORNE BEIDOU SATELLITE NAVIGATION SYSTEM (BDS) RECEIVER EQUIPMENT

THE MARITIME SAFETY COMMITTEE,

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

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the function of adopting performance standards and technical specifications, as well as amendments thereto shall be performed by the Maritime Safety Committee and/or the Marine Environment Protection Committee, as appropriate, on behalf of the Organization,

RECALLING FURTHER that, in accordance with resolution A.1046(27), containing the IMO policy for the recognition and acceptance of suitable radionavigation systems intended for international use, the "Revised Report on the Study of a Worldwide Radionavigation System", the BDS satellite navigation system may be recognized as a possible component of the world-wide radionavigation system,

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

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

HAVING CONSIDERED the recommendation made by the Sub-Committee on Safety of Navigation, at its fifty-ninth session,

1 ADOPTS the performance standards for shipborne BDS receiver equipment, set out in the annex to the present resolution;

2 RECOMMENDS Governments to ensure that BDS receiver equipment installed on or after 1 July 2016 conform to performance standards not inferior to those specified in the annex to the present resolution.

ANNEX

PERFORMANCE STANDARDS FOR SHIPBORNE BEIDOU SATELLITE NAVIGATION SYSTEM (BDS) RECEIVER EQUIPMENT

1 Introduction

1.1 As a global navigation satellite system compatible with other navigation satellite systems worldwide, the BDS is a system independently developed and operated by China and is comprised of three major components: space constellation, ground control segment and user terminals. The space constellation consists of five geosynchronous earth orbit (GEO) satellites and 27 medium-earth orbit (MEO) satellites and three inclined geosynchronous satellite orbit (IGSO) satellites. The GEO satellites are positioned at longitudes of 058.75° E, 080° E, 110.5° E, 140° E and 160° E, respectively. The MEO satellites are operating in an orbit with an altitude of 21,500 km and an inclination of 55°, which are evenly distributed in three orbital planes. The IGSO satellites are operating in an orbit with an altitude of 36,000 km and an inclination of 55°, which are evenly distributed in three inclined geosynchronous orbital planes. The subsatellite track for the three IGSO satellites are coincided while the longitude of the intersection point is at 118° E. This geometry ensures that a minimum of four satellites are visible to users worldwide with a position dilution of precision (PDOP) ≤ 6. Each satellite transmits open service signal B1I on "L" bands with carrier frequency as 1561.098 MHz. B1I signal includes ranging code which could provide the open service. A navigation data message is superimposed on this code. BDS satellites are identified by Code Division Multiple Access (CDMA).

1.2 The BDS Open Service (OS) provides positioning, navigation and timing services, free of direct user charges. The BDS receiver equipment should be capable of receiving and processing the open service signal.

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

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

2 BDS receiver equipment

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

.1 antenna capable of receiving BDS signals;

.2 BDS receiver and processor;

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

[1] Refer to publication IEC 60945.

.4 data control and interface; and

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

If BDS forms part of an approved Integrated Navigation System (INS), requirements of 2.1.3, 2.1.4, 2.1.5 may be provided within the INS.

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

3 Performance standards for BDS receiver equipment

The BDS receiver equipment should:

.1 be capable of receiving and processing the BDS positioning and velocity, and timing signals, and should use the ionospheric model broadcast to the receiver by the constellation to generate ionospheric corrections;

.2 provide position information in latitude and longitude in degrees, minutes and thousandths of minutes[2];

.3 provide time referenced to universal time coordinated UTC (NTSC)[3];

.4 be provided with at least two outputs from which position information, UTC, course over ground (COG), speed over ground (SOG) and alarms can be supplied to other equipment. The output of position information should be based on the WGS 84 datum and should be in accordance with international standards[4]. The output of UTC, course over ground (COG), speed over ground (SOG) and alarms should be consistent with the requirements of 3.15 and 3.17;

.5 have static accuracy such that the position of the antenna is determined to be within 25 m horizontally (95%) and 30 m vertically (95%);

.6 have dynamic accuracy equivalent to the static accuracy specified in .5 above under the normal sea states and motion experienced in ships[5];

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

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

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2 BeiDou uses China Geodetic Coordinate System (CGCS) 2000 which is a realization of the International Terrestrial Reference Frame (ITRF) system and differs from WGS 84 by less than 5 cm worldwide. Conversion to WGS 84 is not needed for maritime navigation.

3 China National Time Service Centre.

4 Publication IEC 61162.

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

.9 be capable of acquiring satellite signals with input signals having carrier levels in the range of -130dBm to -120dBm. Once the satellite signals have been acquired, the equipment should continue to operate satisfactorily with satellite signals having carrier levels down to -133dBm;

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

.11 be capable of acquiring position, velocity and time to the required accuracy within 12 min where there is no valid almanac data;

.12 be capable of acquiring position, velocity and time to the required accuracy within 1 min where there is valid almanac data;

.13 be capable of reacquiring position, velocity and time to the required accuracy within 1 min when there has been a service interruption of 60 s or less;

.14 generate and output to a display and digital interface[6] a new position solution at least once every 1 s for conventional craft and at least once every 0.5 s for high-speed craft;

.15 provide the COG, SOG and UTC outputs, with a validity mark aligned with that on the position output. The accuracy requirements for COG and SOG should not be inferior to the relevant performance standards for heading[7] and speed and distance measuring equipment (SDME)[8] and the accuracy should be obtained under the various dynamic conditions that could be experienced on board ships;

.16 provide at least one normally closed contact, which should indicate failure of the BDS receiver equipment;

.17 have a bidirectional interface to facilitate communication so that alarms can be transferred to external systems and so that audible alarms from the BDS receiver can be acknowledged from external systems; the interface should comply with the relevant international standards[6]; and

.18 have the facilities to process differential BDS (DBDS) data fed to it in accordance with the standards of ITU-R[9] and the appropriate RTCM standard and provide indication of the reception of DBDS signals and whether they are being applied to the ship's position. When a BDS receiver is equipped with a differential receiver, performance standards for static and dynamic accuracies (paragraphs 3.5 and 3.6 above) should be 10 m (95%).

4 Integrity checking, failure warnings and status indications

4.1 The BDS receiver equipment should also indicate whether the performance of BDS is outside the bounds of requirements for general navigation in the ocean, coastal, port approach and restricted waters, and inland waterway phases of the voyage as specified in either resolution A.1046(27) or appendix 2 to resolution A.915(22) and any subsequent amendments, as appropriate.

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6 Publication IEC 61162.

7 Resolution A.424(XI) for conventional craft and resolution A.821(19) for high-speed craft.

8 Resolution A.824(19), as amended by resolution MSC.96(72).

9 ITU-R Recommendation M.823.

4.2 The BDS receiver equipment should, as a minimum:

.1 provide a warning within 5 s of loss of position or if a new position based on the information provided by the BDS constellation has not been calculated for more than 1 s for conventional craft and 0.5 s for high-speed craft. Under such conditions the last known position and the time of last valid fix, with the explicit indication of the state allowing for no ambiguity, should be output until normal operation is resumed;

.2 use Receiver Autonomous Integrity Monitoring (RAIM) to provide integrity performance appropriate to the operation being undertaken; and

.3 provide a self-test function.

5 Protection

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

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ANNEX 19

DRAFT AMENDMENTS TO SOLAS REGULATION VI/2

CHAPTER VI
CARRIAGE OF CARGOES AND OIL FUELS

Part A
General Provisions

Regulation 2 – Cargo information

1 The new paragraphs 4 to 6 are added after the existing paragraph 3, as follows:

"4 In the case of cargo carried in a container*, except for containers carried on a chassis or a trailer when such containers are driven on or off a ro-ro ship engaged in short international voyages as defined in regulation III/3, the gross mass according to paragraph 2.1 of this regulation shall be verified by the shipper, either by:

.1 weighing the packed container using calibrated and certified equipment; or

.2 weighing all packages and cargo items, including the mass of pallets, dunnage and other securing material to be packed in the container and adding the tare mass of the container to the sum of the single masses, using a certified method approved by the competent authority of the State in which packing of the container was completed.

5 The shipper of a container shall ensure the verified gross mass** is stated in the shipping document. The shipping document shall be:

.1 signed by a person duly authorized by the shipper; and

.2 submitted to the master or his representative and to the terminal representative sufficiently in advance, as required by the master or his representative, to be used in the preparation of the ship stowage plan***.

6 If the shipping document, with regard to a packed container, does not provide the verified gross mass and the master or his representative and the terminal representative have not obtained the verified gross mass of the packed container, it shall not be loaded on to the ship.

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* The term "container" has the same meaning as that term is defined and applied in the International Convention for Safe Containers (CSC), 1972, as amended, taking into account the *Guidelines for the approval of offshore containers handled in open seas* (MSC.1/Circ.860) and the *Revised recommendations on harmonized interpretation and implementation of the International Convention for Safe Containers, 1972, as amended* (CSC.1/Circ.138/Rev.1).

** Refer to the *Guidelines regarding the verified gross mass of a container carrying cargo* (MSC.1/Circ.1475).

*** This document may be presented by means of EDP or EDI transmission techniques. The signature may be electronic signature or may be replaced by the name in capitals of the person authorized to sign."

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ANNEX 20

IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units

(CTU Code)

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Annex 7 Packing and securing cargo into CTUs

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- Appendix 2 Friction factors
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- Appendix 4 Specific packing and securing calculations
- Appendix 5 Practical inclination test for determination of the efficiency of cargo securing arrangements

Annex 8 Access to tank and bulk tops, working at height

Annex 9 Fumigation

Annex 10 Topics for consideration in a training programme

Preamble

The use of freight containers, swap bodies, vehicles or other cargo transport units substantially reduces the physical hazards to which cargoes are exposed. However, improper or careless packing of cargoes into/onto such units, or lack of proper blocking, bracing and lashing, may be the cause of personnel injury when they are handled or transported. In addition, serious and costly damage may occur to the cargo or to the equipment.

The types of cargoes carried in freight containers has expanded over many years and innovations such as use of flexitanks and developments allow heavy, bulky items which were traditionally loaded directly into the ships' hold (e.g. stone, steel, wastes and project cargoes), to be carried in cargo transport units.

The person who packs and secures cargo into/onto the cargo transport unit (CTU) may be the last person to look inside the unit until it is opened at its final destination. Consequently, a great many people in the transport chain will rely on the skill of such persons, including:

- road vehicle drivers and other road users when the unit is transported by road;
- rail workers, and others, when the unit is transported by rail;
- crew members of inland waterway vessels when the unit is transported on inland waterways;
- handling staff at terminals when the unit is transferred from one transport mode to another;
- dock workers when the unit is loaded or unloaded;
- crew members of a seagoing ship during the transport operation;
- those who have a statutory duty to inspect cargoes; and
- those who unpack the unit.

All persons, such as the above, passengers and the public, may be at risk from a poorly packed freight container, swap body or vehicle.

Chapter 1. Introduction

1.1 Scope

1.1.1 The aim of this IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code) is to give advice on the safe packing of cargo transport units (CTUs) to those responsible for the packing and securing of the cargo and by those whose task it is to train people to pack such units. The aim is also to outline theoretical details for packing and securing as well as to give practical measures to ensure the safe packing of cargo onto or into CTUs.

1.1.2 In addition to advice to the packer, the CTU Code also provides information and advice for all parties in the supply chain up to and including those involved in unpacking the CTU.

1.1.3 The CTU Code is not intended to conflict with, or to replace or supersede, any existing national or international regulations which may refer to the packing and securing of cargo in CTUs, in particular existing regulations which apply to one mode of transport only, e.g. for transport of cargo in railway wagons by rail only.

1.2 Safety

1.2.1 Improperly packed and secured cargo, the use of unsuitable CTUs and the overloading of CTUs may endanger persons during handling and transport operations. Improper declaration of the cargo may also cause dangerous situations. The misdeclaration of the CTU's gross mass may result in the overloading of a road vehicle or a rail wagon or in the allocation of an unsuitable stowage position on board a ship thus compromising the safety of the ship.

1.2.2 Insufficient control of humidity may cause severe damages to and collapse of the cargo and cause also the loss of the stability of the CTU.

1.3 Security

1.3.1 It is important that all personnel involved in the packing, security sealing, handling, transport and processing of cargo are made aware of the need for vigilance and the diligent application of practical procedures to enhance security, in accordance with national legislation and international agreements.

1.3.2 Guidance on the security aspects of the movement of CTUs intended for carriage by sea may be found in a variety of documents including the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended; the International Ship and Port Facility Security (ISPS) Code; the ILO/IMO Code of Practice on Security in Ports; and the Standards and the Publicly Available Specifications developed or being developed by the International Organization for Standardization (ISO) to address cargo security management and other aspects of supply chain security. Furthermore, the World Customs Organization (WCO) has developed a SAFE Framework of standards to secure and facilitate global trade.

1.4 How to use the CTU Code

1.4.1 This Code comprises 13 chapters. Most of them refer to one or more annexes which is highlighted in the text where applicable. Further practical guidance and

background information are available as informative material[1], which does not constitute part of this Code. Table 1 at the end of this chapter provides a summary of contents.

1.4.2 More information on the consequences of improper packing procedures is provided in informative material IM1.

1.4.3 Following the introduction in chapter 1, chapter 2 lists definitions of terms which are used throughout the Code. Chapter 3 provides an overview of basic safety issues related to the packing of CTUs, briefly described as "dos and don'ts". Detailed information on how to comply with these "dos" and how to avoid the "don'ts" are contained in the following chapters and in the related annexes.

1.4.4 Chapter 4 identifies the chains of responsibility and communication for the principle parties in the supply chain and is supplemented with annex 1 on information flow and, particularly for terminal operators, with annex 2 on the safe handling of CTUs. Information on typical documents related to transport may be obtained from informative material IM2.

1.4.5 Chapter 5 (general transport conditions) describes the acceleration forces and the climatic conditions to which a CTU is exposed during transport. Annex 3 provides additional guidance on the prevention of condensation damages.

1.4.6 Chapter 6 (CTU properties), chapter 7 (CTU suitability) and chapter 8 (arrival, checking and positioning of CTUs) should be considered to select the appropriate CTU for the cargo to be carried and to ensure that the CTU is fit for its intended purpose. Additional guidance to these topics is provided in annex 4 (approval plates), annex 5 (receiving CTUs) and annex 6 (minimizing the risk of recontamination). More information on the properties of the various CTU types is provided in informative material IM3, more information on species of concern regarding recontamination may be obtained from informative material IM4.

1.4.7 Chapter 9 (packing cargo into CTUs) is the core chapter of this Code dealing with the actual packing operation. This chapter directs the user to the related provisions in annex 7, where detailed information on load distribution, securing arrangements, capacity of securing devices and methods for the evaluation of the efficiency of a certain securing arrangement are provided. This annex is supplemented with appendices on packaging marks, friction factors and on calculations for load distribution and cargo securing. Guidance for working on the top of tank CTUs or solid bulk CTUs is provided in annex 8. To facilitate the evaluation of the efficiency of cargo securing arrangements, one sound practical tool is the "quick lashing guide" provided in informative material IM5. In addition, very detailed information on intermodal load distribution is provided in informative material IM6. Information on manual handling of cargo is provided in informative material IM7. Information on the transport of perishable cargo is provided in informative material IM8.

1.4.8 Chapter 10 provides additional advice on the packing of dangerous goods. Chapter 11 describes the actions required on the completion of packing. Information on CTU seals is provided in informative material IM9.

[1] Available at www.unece.org/trans/wp24/guidelinespackingctus/intro.html.

1.4.9 Chapter 12 contains advice on the receipt and unpacking of CTUs and is supplemented with annex 5 (receiving CTUs) and annex 9 (fumigation). Additional information on the testing of gases is provided in informative material IM10.

1.4.10 Chapter 13 outlines the required qualification of personnel engaged in the packing of CTUs. The topics for consideration in a training programme are listed in annex 10.

1.5 Standards

Throughout this Code and in its annexes and appendices, any national or regional standards are referenced for information only. Administrations may substitute other standards that are considered equivalent.

Table 1: Summary of contents

Chapter	Referenced annexes	Related informative material[1]
1 Introduction		IM1 Consequences of improper packing procedures
2 Definitions		
3 Key requirements		
4 Chains of responsibility and information	A1 Information flow A2 Safe handling of CTUs	IM2 Typical documents related to transport
5 General transport conditions	A3 Prevention of condensation damages	
6 CTU properties	A4 Approval plates	IM3 CTU types
7 CTU suitability	A4 Approval plates	
8 Arrival, checking and positioning of CTUs	A4 Approval plates A5 Receiving CTUs A6 Minimizing the risk of recontamination	IM4 Species of concern regarding recontamination
9 Packing cargo into CTUs	A7 Packing and securing cargo into CTUs (supplemented with appendices 1 to 5) A8 Access to tank and bulk tops, working at height	IM5 Quick lashing guides IM6 Intermodal load distribution IM7 Manual handling IM8 Transport of perishable cargo
10 Additional advice on the packing of dangerous goods		
11 On completion of packing		IM9 CTU seals
12 Advice on receipt and unpacking of CTUs	A5 Receiving CTUs A9 Fumigation	IM10 Testing CTUs for hazardous gases
13 Training in packing of CTUs	A10 Topics for consideration in a training programme	

[1] Available at www.unece.org/trans/wp24/guidelinespackingctus/intro.html.

Chapter 2. Definitions

For the purpose of this Code, the following is defined:

Absolute humidity of air	Actual amount of water vapour in the air, measured in g/m^3 or g/kg.
Boundary	Refers to the edges or walls of the CTU, and surrounds the cargo deck.
Cargo deck	The area within the CTU boundaries onto which packages may be placed and secured.
Cargo transport unit (CTU)	A freight container, swap body, vehicle, railway wagon or any other similar unit in particular when used in intermodal transport.
Carrier	The party who, in a contract of carriage, undertakes to perform or to procure the performance of carriage by rail, road, sea, inland waterway or by a combination of such modes. Can be further classified as: • Road haulier; • Rail operator; • Shipping line.
Clean CTU	A CTU free from: • Any previous cargo residues; • Any securing materials used from previous consignments; • Any marks, placards or signs associated with previous consignments; • Any detritus (waste) that may have accumulated in the CTU; • Visible pests and other living or dead organisms, including any part, gametes, seeds, eggs or propagules of such species that may survive and subsequently reproduce; soil; organic matter; • All other items covered by contamination, infestation and invasive alien species that can be discovered upon visible inspection.
Closed CTU	A CTU which totally encloses the contents by permanent structures with complete and rigid surfaces. CTUs with fabric sides or tops are not considered as closed cargo transport units.
Condensation	Conversion of water vapour into a liquid state. Condensation usually starts when air is cooled down to its dew point in contact with cold surfaces.
Consignee	The party to whom a cargo is consigned under a contract of carriage or a transport document or electronic transport record. Also known as the receiver.
Consignor	The party who prepares a consignment for transport. If the consignor contracts the transport operation with the carrier, the consignor will undertake the function of the shipper and may also be known as: • The shipper (maritime); • The sender (road transport).
Consolidator	The party performing a consolidation service for others.

Contamination	Visible forms of animals, insects or other invertebrates (alive or dead, in any lifecycle stage, including egg casings or rafts), or any organic material of animal origin (including blood, bones, hair, flesh, secretions, excretions); viable or non-viable plants or plant products (including fruit, seeds, leaves, twigs, roots, bark); or other organic material, including fungi; or soil, or water; where such products are not the manifested cargo within the CTU.
Corrosion threshold	A relative humidity of 40% or more will lead to an increasing risk of corrosion of ferrous metals.
Crypto climate in the CTU	State of relative humidity of the air in a closed CTU, which depends on the water content of the cargo or materials in the CTU and on the ambient temperature.
CTU Code	IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTUs).
CTU operator	The party who owns or operates the CTU and provides empty CTUs to the consignor/shipper/packer.
Daily temperature variation in the CTU	Rise and fall of temperature in accordance with the times of day and often exaggerated by radiation or other weather influences.
Dew point of air	Temperature below the actual temperature at which a given relative humidity would reach 100%.
Flexitank	Bladder used for the transport and/or storage of a non-regulated liquid inside a CTU.
Form locking	A method for cargo securing and means that the cargo is completely stowed against the boundaries of a CTU. The empty space between the cargo units and between the cargo and the boundaries should be minimized. The boundaries should be strong enough to absorb the normal forces that occur during transport.
Freight container	An article of transport equipment that is of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the transport of goods, by one or other modes of transport, without intermediate reloading: designed to be secured and/or readily handled, having fittings for these purposes, and approved in accordance with the International Convention for Safe Containers (CSC), 1972, as amended. The term "freight container" includes neither vehicle nor packaging; however a freight container that is carried on a chassis is included.
Freight forwarder	The party who organizes shipments for individuals or other companies and may also act as a carrier. When the freight forwarder is not acting as a carrier, it acts only as an agent, in other words as a third-party logistics provider who dispatches shipments via carriers and that books or otherwise arranges space for these shipments.
Grappler arms	Hydraulically operated arms attached to a spreader device or frame that can be used to lift CTUs using specially designed grapple arm sockets built into the base frame of the CTU.
Hygroscopicity of cargo	Property of certain cargoes or materials to absorb water vapour (adsorption) or emit water vapour (desorption) depending on the relative humidity of the ambient air.
Infestation	Presence in a package or CTU of a visible living pest that may cause harm to the recipient environment. Infestation includes pathogens, (virus, bacterium, prion or fungus) that may cause infection of plants and/or animals and which can be discovered upon visible inspection.

Intermodal operator	The party who provides a service to transfer and/or stow CTUs. May be subdivided into: • Maritime terminal operator; • Rail terminal; • Inland waterway port.
Invasive alien species	An alien (non-native) species whose introduction and/or spread threatens biological diversity "Alien species" refers to a species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce. It includes pests and quarantine pests of non-native origin. Invasive alien species may be carried within and on a wide range of substrates, both organic and inorganic.
Misdeclared cargo	A cargo transported in a CTU which is different from that declared on the transport documents.
Misdeclared gross mass	A CTU where the combined mass of the cargo and the CTU is different from the mass declared on the transport/shipping documents. See also *overloaded* and *overweight*.
Mould growth threshold	A relative humidity of 75% or more will lead to an increasing risk of mould growth on substances of organic origin like foodstuff, textiles, leather, wood, ore substances of non-organic origin such as pottery.
Non-regulated goods	Substances and articles that are not covered by the applicable dangerous goods transport regulations.
Overloaded	A CTU where the combined mass of the cargo and the CTU is greater than the maximum permitted gross mass.
Overpack	An enclosure used by a single shipper to contain one or more packages and to form one unit for convenience of handling and stowage during transport. Examples of overpacks are a number of *packages* either: • Placed or stacked on to a load board such as a pallet and secured by strapping, shrink-wrapping, stretch-wrapping or other suitable means; or • Placed in a protective outer packaging such as a box or crate.
Overweight	A CTU where the combined mass of the cargo and the CTU is less than the maximum permitted gross mass but exceeds either: • The maximum gross mass shown on the transport/shipping documents; or • The road or rail maximum masses when combined with the tare of the container carrying vehicle.
Package	The complete product of the packing operation, consisting of the *packaging* and its contents as prepared for transport;
Packaging	Receptacles and any other components or materials necessary for the receptacle to perform its containment function.
Packer	The party that loads, places or fills the cargo within or on the CTU; the packer may be contracted either by the consignor, by the shipper, by the freight forwarder or by the carrier; if the consignor or the shipper packs a CTU within his own premises, the consignor or the shipper is also the packer.

Packing	The placing, loading and filling cargo into and onto a CTU.
Pest	Any visible species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products.
Quarantine pest	A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially approved.
Recontamination	The result of pests and other living organisms (including their nests, eggs, egg sacks, and body parts) being found in or on a clean CTU.
Reinforced vehicle body	Vehicle body, having a reinforced structure (in Europe, complies with European standard EN 12642, paragraph 5.3).
Relative humidity of air	Actual absolute humidity expressed as percentage of the saturation humidity at a given temperature.
Roll-on/roll-off ship (ro-ro)	A method of maritime cargo service using a vessel with ramps which allows wheeled vehicles to be loaded and discharged without cranes. Also refers to any specialized vessel designed to carry ro-ro cargo.
Saturation humidity of air	Maximum possible humidity content in the air depending on the air temperature.
Scantling	A piece of sawn timber, such as a batten, that has a small cross section.
Set point	Temperature setting on the controller of the refrigeration unit.
Shelf life	The recommended period that a perishable product may be retained in a saleable condition during which the defined quality of a specified proportion of the goods remains acceptable under expected (or specified) conditions of distribution, storage and display.
Shipper	The party named on the bill of lading or waybill as shipper and/or who concludes a contract of carriage (or in whose name or on whose behalf a contract of carriage has been concluded) with a carrier. Also known as the sender.
Solebar	Main beam of a rail wagon/car.
Standard vehicle body	Vehicle body, without reinforced structure (in Europe, complies with European standard EN 12642, paragraph 5.2), which, depending on cargo weight and friction, requires additional securing of cargo using lashing equipment.
Storage life	The period that the product is kept at the lowest possible temperature starting soonest after picking/harvesting and ending at the time that the product is taken out the refrigerated conditions for delivery to consumers at which time the shelf life period starts.
Unit load	Palletized load or prepacked unit with a footprint conforming to pallet dimensions and suitable for loading into an CTU. See also *unitized cargo*.
Unitized cargo	A single item or a number of items packaged, packed, or arranged in a specified manner and capable of being handled as a unit. Unitization may be accomplished by placing the item or items in an *overpack* or by banding them securely together. Also known as a *unit load.*
Unpacking	The removal of cargo from a CTU.

Ventilated container	Closed type of container, similar to a general purpose freight container but designed to allow air exchange between its interior and the outside atmosphere. Has a ventilating system designed to accelerate and increase the natural convection of the atmosphere within the container as uniformly as possible, either by non-mechanical vents at both the upper and lower parts of their cargo space, or by internal or external mechanical means.
Water content of cargo	Latent water and water vapour in a hygroscopic cargo or associated material, usually stated as percentage of the wet mass of cargo.

Chapter 3. Key requirements

This chapter identify those actions and tasks that are key to the safe packing and transport of cargo.

3.1 General

- **Do** arrange for a safe working environment.
- **Do** use safe handling equipment.
- **Do** use appropriate personal protective equipment.
- **Do** check that the CTU and any cargo securing equipment are in sound condition.
- **Do not** smoke, eat or drink during packing, securing or unpacking.

3.2 Planning

- **Do** select the most suitable CTU type to accommodate the cargo for the intended transport.
- **Do** prepare a packing plan when deemed necessary.
- **Do** select the securing methods best adapted to the characteristics of the cargo, the mode of transport and the properties of the CTU.
- **Do not** exceed the permitted payload limits of the unit or the maximum allowed gross mass according to the CSC[2], national road and rail regulations.

3.3 Packing

- **Do** distribute heavy cargo appropriately over the floor area.
- **Do** observe all handling instructions and symbols on packages such as "this side up".
- **Do** load with the centre of gravity correctly located in the CTU.
- **Do not** concentrate heavy cargo on small areas of the floor.
- **Do not** load with eccentric load distribution.
- **Do not** build up irregular layers of packages if it can be avoided.
- **Do not** stow heavy goods on top of light goods.
- **Do not** stow goods with tainting odours together with sensitive merchandise.
- **Do not** pack wet and damp goods if it can be avoided.
- **Do not** use securing or protection equipment which is incompatible with the cargo.

3.4 Packing of dangerous goods

- **Do** check that all packages are properly marked and labelled.
- **Do** pack dangerous goods according to applicable dangerous goods regulations.
- **Do** pack dangerous goods near the door of the CTU where possible.
- **Do** affix required placards, marks and signs on the exterior of the CTU.

[2] International Convention for Safe Containers, 1972.

- **Do not** pack incompatible goods which should be segregated.
- **Do not** pack damaged packages.

3.5 Securing

- **Do** fill void spaces when necessary.
- **Do** use blocking or lashing or a combination of these methods to prevent the cargo from sliding and tipping in any direction.
- **Do** secure the cargo in a way that forces are distributed over an appropriate area of a unit.
- **Do** secure each single loaded item independently where necessary.
- **Do** use non-slip surface material to refrain packages from sliding where appropriate.
- **Do** use hooks or shackles to fasten lashings where applicable.
- **Do not** secure the cargo with devices overstressing the structure of the CTU or the cargo.
- **Do not** overstress securing devices.
- **Do not** over tighten securing devices so that the packaging or goods are damaged.
- **Do not** fasten web lashings by means of knots.

3.6 On completion of packing

- **Do** determine the correct gross mass of the CTU.
- **Do** affix a seal when required.
- **Do** include the CTU number, the correct gross mass and, when required, the seal number in the appropriate documents.
- **Do** provide a packing certificate when required.

3.7 Unpacking

- **Do** check that the identification number on the CTU and, when the CTU should be sealed, the seal serial number, are as shown on the transport documentation.
- **Do** check the exterior of the CTU for signs of leakage or infestation.
- **Do** use proper equipment to cut the seal if affixed.
- **Do** ensure the CTU is safe to enter. Be aware that the atmosphere in the CTU may be dangerous – ventilate before entering.
- **Do** open the CTU with caution as cargo might fall out.
- **Do** record every package as it is removed noting any markings and damages.
- **Do** remove all securing and protection material for reuse, recycling or disposal.
- **Do** clean the interior of the CTU to remove all traces of the cargo, especially loose powders, grains and noxious materials and fumigants, unless otherwise agreed with the CTU operator.
- **Do** remove all marks, placards and signs regarding the previous consignment from the exterior of the CTU once it has been cleaned.

Chapter 4. Chains of responsibility and information

Note: Definitions are given in chapter 2.

4.1 Chain of responsibility

4.1.1 In general, transport operations using CTUs in particular, involve various parties each of whom have a responsibility to ensure that the cargo is transported through the supply chain without incident. Notwithstanding any national legislation or contracts between the involved parties the chain of responsibility discussed below identifies functional responsibilities of the parties involved.

4.1.2 Although the carrier generally, in a contract of carriage is responsible under that contract to deliver the cargo in the same condition as received, it is the shipper who should deliver a cargo which is safe and suitable for transport. Thus, the shipper remains responsible for any deficiency of the CTU that is a result of poor packing and securing. However, when the shipper is neither the packer nor the consignor, the packer and the consignor should fulfil their obligation to the shipper ensuring that the CTU is safe for transport. If not the shipper may hold those parties responsible for any faults or deficiencies that can be attributed to poor packing, securing, handling or reporting procedures.

4.1.3 Within this chain of responsibilities, each party in the chain should comply with their individual responsibilities and in doing so increase safety and reduce the risk of injury to persons involved in the supply chain.

4.1.4 All persons involved in the movement of CTUs also have a duty to ensure, in accordance with their roles and responsibilities in the supply chain, that the CTU is not infested with plants, plant products, insects or other animals, or that the CTU is not carrying illegal goods or immigrants, contraband or undeclared or misdeclared cargoes.

4.1.5 The supply chain is a complex operation and individual modes of transport may have defined terms for parties within the supply chain which are not consistent with other modes of transport.

4.1.6 A single entity may undertake one or more of the functions listed below. The flow of information between the functions is discussed further in annex 1.

4.2 Functions within the supply chain

Between the different functions involved in an intermodal transport chain, the tasks are assigned as follows:

4.2.1 The CTU operator is responsible for providing CTUs that:

- Are fit for purpose;
- Comply with international structural integrity requirements;
- Comply with international or national safety regulations;
- Are clean, free of cargo residues, noxious materials, plants, plant products and visible pests.

4.2.2 The consignor is responsible for:

- Correctly describing the goods including the mass of the total payload;

- Notifying the packer/shipper of any unusual transport parameters of individual packages, for example, the offset of the centre of gravity or transport temperatures which should not be exceeded or undercut;
- Ensuring that packages and unit loads are suitable to withstand the stresses which are to be expected under normal transport conditions;
- Providing all the information that is required for proper packing;
- Ensuring that goods in packages and unit loads are adequately secured to prevent damage during transport;
- Ensuring that goods are ventilated so that any noxious or harmful gases are permitted to vent off before packing;
- Ensuring that dangerous goods are correctly classified, packed and labelled;
- Ensuring the dangerous goods transport document is completed, signed and transmitted to the packer, forwarder, shipper (if not the consignor) and carrier as applicable.

4.2.3 The packer is responsible for:

- Ensuring that the CTU is checked before packing and that the condition of the CTU is suitable for the cargo to be transported;
- Ensuring that the floor of the CTU is not overstressed during packing operations;
- Ensuring that the cargo is correctly distributed in the CTU and properly supported where necessary;
- Ensuring that the CTU is not overloaded;
- Ensuring that the cargo is sufficiently secured in the CTU;
- Ensuring that measures are put in place to prevent the movement of plants, plant products and visible pests, such as closing doors and tarpaulins once packing has started but not taking place and lights that minimize the attraction of insects;
- Properly closing the CTU and sealing it, when required, and reporting seal details to the shipper. CTUs used for international transport should be sealed;
- Fitting marks and placards to the CTU as required by dangerous goods regulations;
- Fitting the fumigation mark if any fumigant has been used as part of the packing process;
- Accurately determining the gross mass[3] of the CTU and transmitting it to the shipper;
- Ensuring that no incompatible dangerous goods are packed. Account should be taken of all dangerous goods legislations during the complete transport chain;
- Providing the container/vehicle packing certificate (new document or signed statement in the dangerous goods transport documentation as appropriate) and forwarding any documentation to the shipper.

[3] The gross mass of the CTU needs to be verified before any transport operation commences. Incorrect gross masses are a hazard for any mode of transport. Therefore, the gross mass verification should be carried out before the unit leaves the premises of the packer. If a certain transport mode deems it necessary that a reverification has to take place when the CTU is transferred from one mode to another, this is beyond the scope of this Code and may be regulated in the regulations of that mode. Where a cargo is to be transported by road or rail only, the packer need only provide the mass of the cargo and any packing and securing material to the carrier when the tare of the transport vehicle is not known.

The packer should also pass on information relating to any freight container with a reduced stacking capacity (less than 192,000 kg marked on the CSC safety approval plate)[4], to the shipper.

4.2.4 The shipper is responsible for ensuring that:

- The work distribution concerning packing and securing is clearly agreed and communicated to the consignor and carrier/carriers;
- A suitable CTU is used for the intended cargo for the intended transport;
- A CTU is requested which is safe for transport and is clean, free of cargo residues, noxious materials, plants, plant products and visible pests before being supplied to the consignor or packer;
- Suitable modes of transport are selected to minimize the risk of accidents and damages for the actual cargo;
- All required documents are received from the consignor and from the packer;
- The cargo inside the CTU is fully and accurately described;
- The gross mass of the CTU is accurately determined;
- The accurate description of the cargo[5] is communicated to the carrier as early as required by the carrier;
- The verified gross mass is communicated to the carrier as early as required by the carrier;
- In case of dangerous goods, the transport document and (for sea transport) the packing certificate is transmitted to the carrier before the transport commences respectively as early as required by the carrier;
- In the case of temperature controlled goods, the correct temperature set point is entered into the control unit and onto the transport/shipping documents;
- Ensuring that a seal, where required, is affixed immediately upon completion of the packing of the CTU;
- The seal number, where required, is communicated to the carrier;
- Any extraordinary properties such as reduced stacking capacity or out of gauge are communicated to the carrier;
- The shipper's declaration is accurate;
- Shipping instructions are despatched to the carrier on time and that the CTU meets the outbound delivery window;
- The CTU arrives at the terminal before the stated cargo cut off time;
- The information concerning the consignment, description of packages and, in the case of freight containers, the verified gross mass is transmitted to the consignee.

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4 As of January 1st 2012, all freight containers with reduced stacking or racking strength are required by the International Convention for Safe Containers (CSC) to be marked in accordance with the latest version of ISO 6346: Freight containers – Coding, identification and marking.

5 A description of the cargo should include a description of the goods and the packaging, for example wine in a flexitank, hard frozen hanging beef sides or the number and type of packages. However, national and/or regional regulations may impose additional requirements for the scope and level of detail of cargo descriptions, including usage of Harmonized System (HS) codes.

4.2.5 The road haulier is responsible for:

- Confirming that the gross mass, length, width and height of the vehicle are within the national road/highway regulations limits;
- Ensuring that the driver is able to get sufficient rest and does not drive when fatigued;
- Except when the CTU is a trailer, securing the CTU properly on the trailer or chassis;
- Moving the CTU in such a manner that there are no exceptional stresses placed on the CTU or the cargo.

4.2.6 The rail haulier is responsible for:

- Handling the CTU in a manner that would not cause damage to the cargo;
- Except when the CTU is a rail wagon, securing the CTU properly on the rail wagon.

4.2.7 The intermodal operator is responsible for:

- Ensuring that appropriate pest prevention methods are in place, which may include removal of muds and soils from the CTU;
- Complying with annex 2.

4.2.8 The carrier is responsible for:

- Monitoring agreed temperatures in the CTUs where applicable and reacting to changes as appropriate;
- Securing the CTU on the means of transport;
- Transporting the CTU in compliance with agreements and all applicable regulations;
- Providing trained personnel to deal with all cargo types (break-bulk, bulk wet and dry cargoes, dangerous goods, out of gauge, refrigerated, uncontainerized).

4.2.9 The consignee/receiver of CTUs is responsible for:

- Not overstressing the floor of the CTU during unpacking operations;
- Correctly ventilating the CTU before entering;
- Confirming that the atmosphere within the CTU is not hazardous before permitting persons to enter it;
- Detecting any damage to the CTU and to notify the carrier;
- Returning the CTU to the CTU operator completely empty and clean, unless otherwise agreed;
- Removing all marks, placards or signs regarding the previous consignments.

4.2.10 Shippers of empty CTUs and operators of empty CTUs are encouraged to have practices and arrangements in place to ensure that they are empty.

4.2.11 All parties identified within section 4.2 should minimize the risk of recontamination of CTUs when in their custody. This may include the following:

- Implementation of appropriate pest management programs;
- Removal of any plants, plant products or visible pests taking into account the roles and responsibilities of each party within the supply chain and, further, the impossibility of inspecting the interior of closed and sealed CTUs for recontamination.

For more information see annex 6.

4.2.12 All parties should ensure that the flow of information is transmitted to parties identified in the transport contract along the supply chain. The information should include:

- The identification, in accordance with a risk assessment[6], of risks to the integrity of the CTU that may be present for all or some part of the journey;
- CTU identification;
- Seal number (where required);
- Verified gross mass of the CTU;
- Accurate description of the cargo carried in the CTU;
- The correct description of dangerous goods;
- Correct and appropriate transport documentation;
- Any information required for safety, security, phytosanitary, veterinary, Customs or other regulatory purposes.

[6] For example, ISO 31000 Risk management – Principles and guidelines.

Chapter 5. General transport conditions

5.1 Within the supply transport chain, there are a number of different stresses acting on the cargo. These stresses may be grouped into mechanical and climatic stresses. Mechanical stresses are forces acting on the cargo under specific transport conditions. Climatic stresses are changes of climatic conditions including extremely low or high temperatures.

5.2 During transport various forces will act on the cargo. The force acting on the cargo is the mass of the cargo (m) which is measured in kg or ton, multiplied by the acceleration (a) which is measured in m/s² :

$$F = m \cdot a$$

Acceleration considered during transport are the gravitational acceleration (a = g = 9.81 m/s²) and acceleration caused by typical transport conditions such as by the braking or rapid change of traffic lanes by a road vehicle or by the motions of a ship in heavy sea. These accelerations are expressed as product of the gravitational acceleration (g) and a specific acceleration coefficient (c) e.g. a = 0.8 g.

5.3 The following tables provide the applicable acceleration coefficients for the different modes of transport and for the various securing directions. To prevent a cargo from movement, the cargo has to be secured in longitudinal and transverse direction according to the worst combination of horizontal and corresponding vertical accelerations. The securing arrangement has to be designed to withstand the forces due to accelerations in each horizontal direction (longitudinal and transverse) separately (see chapter 9 and annex 7).

Road transport				
Securing in	**Acceleration coefficients**			
	Longitudinally (c_x)		Transversely (c_y)	Minimum vertically down (c_z)
	forward	rearward		
Longitudinal direction	0.8	0.5	-	1.0
Transverse direction	-	-	0.5	1.0

Rail transport (combined transport)				
Securing in	**Acceleration coefficients**			
	Longitudinally (c_x)		Transversely (c_y)	Minimum vertically down (c_z)
	forward	rearward		
Longitudinal direction	0.5 (1.0)†	0.5 (1.0)†	-	1.0 (0.7)†
Transverse direction	-	-	0.5	1.0 (0.7)†
† **The values in brackets apply to shock loads only with short impacts of 150 milliseconds or shorter, and may be used, for example, for the design of packaging.**				

Sea transport					
Significant wave height in sea area		**Securing in**	**Acceleration coefficients**		
			Longitudinally (c_x)	Transversely (c_y)	Minimum vertically down (c_z)
A	$H_s \leq 8$ m	Longitudinal direction	0.3	-	0.5
		Transverse direction	-	0.5	1.0

Sea transport					
Significant wave height in sea area		**Securing in**	**Acceleration coefficients**		
			Longitudinally (c_x)	Transversely (c_y)	Minimum vertically down (c_z)
B	8 m < H_s ≤ 12 m	Longitudinal direction	0.3	-	0.3
		Transverse direction	-	0.7	1.0
C	H_s > 12 m	Longitudinal direction	0.4	-	0.2
		Transverse direction	-	0.8	1.0

5.4 The effect of short term impact or vibrations should always be considered. Therefore, whenever the cargo cannot be secured by blocking, lashing is required to prevent the cargo from being significantly displaced, taking into account the characteristics of the cargo and the mode of transport. The mass of the cargo alone, even when combined with a high friction coefficient (see appendix 2 to annex 7), does not sufficiently secure the cargo as the cargo can move due to vibrations.

5.5 The significant 20-years return wave height (H_s) is the average of the highest one-third of waves (measured from trough to crest) that is only exceeded once in 20 years. The allocation of geographic sea areas to the respective significant wave heights is shown in the following table:

A	B	C
H_s ≤ 8 m	8 m < H_s ≤ 12 m	H_s > 12 m
Baltic Sea (incl. Kattegat) Mediterranean Sea Black Sea Red Sea Persian Gulf Coastal or inter-island voyages in following areas: Central Atlantic Ocean (between 30°N and 35°S) Central Indian Ocean (down to 35°S) Central Pacific Ocean (between 30°N and 35°S)	North Sea Skagerak English Channel Sea of Japan Sea of Okhotsk Coastal or inter-island voyages in following areas: South-Central Atlantic Ocean (between 35°S and 40°S) South-Central Indian Ocean (between 35°S and 40°S) South-Central Pacific Ocean (between 35°S and 45°S)	unrestricted

Sources:

The Royal Netherlands Meteorological Institute (KNMI):
The KNMI/ERA-40 Wave Atlas, derived from 45 years of ECMWF reanalysis data
(ed. S.Caires, A.Stern, G.Komen and V.Swail), last updated 2011,
Hs 100-yr return values, 1958 – 2000

5.6 During longer voyages, climatic conditions (temperature, humidity) are likely to vary considerably. These may affect the internal conditions in a CTU which may give rise to condensation on cargo or internal surfaces (see annex 3).

5.7 Whenever a specific cargo might be damaged when exposed to high or low temperatures during transport, the use of a CTU specially equipped for keeping the cargo temperature within acceptable limits should be considered (see chapter 7).

Chapter 6. CTU properties

Note: Definitions are given in chapter 2.

6.1 Introduction

6.1.1 When planning a consignment for transport the shipper should ensure that the CTU best suited for the cargo and the probable route is selected. If the shipper is uncertain about which CTU to select, further information can be obtained by contacting the CTU operator.

6.1.2 Packers should acquaint themselves with the characteristics of the CTU with particular reference to:

- Net mass capacity;
- Flooring strength;
- Anchor and securing points;
- Thermal capabilities;
- Sealing;
- Weatherproofness.

6.2 Freight containers

6.2.1 The external and internal dimensions of most freight containers are standardized by ISO.

6.2.2 The maximum gross mass and the permitted payload of a freight container depend on standardized design parameters. The International Convention for Safe Containers requires each freight container to carry a CSC safety approval plate, where the maximum permitted gross mass is specified (see subsection 8.2.1 and annex 4, section 1). Additionally, the tare mass and the payload are marked in painted letters on the door or on the rear end of the freight container.

6.2.3 With the exception of platforms (a container deck without walls), packed freight containers are capable of being stacked. This feature is mainly used in land-based storage areas and on ships during a sea passage. The permissible stacking mass is displayed on the approval plate. Freight containers with a stacking mass equal to or greater than 192,000 kg may be transported without restriction. However, freight containers with a stacking mass value less than 192,000 kg do also exist and require special attention when used for intermodal transport, in particular for the stowage in stacks on seagoing vessels (see subsections 7.3.1 and 8.2.1).

6.2.4 General purpose freight containers are available as closed freight containers, ventilated containers and open top containers. The side walls are capable of withstanding a uniform load equal to 60% of the permitted payload. The front wall and the door end are capable of withstanding 40% of the permitted payload. These limitations are applicable for a homogenous load on the relevant wall area and do not exclude the capability of absorbing higher forces by the framework of the freight container. The container floor is primarily designed to sustain the total payload homogeneously distributed over the bottom structure. This results in limitations for concentrated loads (see annex 7, section 3).

6.2.5 Most general purpose freight containers have a limited number of lashing rings or bars. When lashing rings are fitted, the anchor points at the bottom have a maximum securing load (MSL) of at least 10 kN in any direction. Recently built freight containers have, in many cases, anchor points with a MSL of 20 kN. The lashing points at the top side rails have a MSL of at least 5 kN[7].

6.2.6 Floors on freight containers covered by the CSC are only required to withstand an axle load of 5,460 kg or 2,730 kg per wheel[8] although they may be built to withstand a greater axle load. The CTU operator can provide more precise information.

6.2.7 Closed freight containers generally have labyrinth protected openings for venting (pressure compensation), but these openings do not measurably support air exchange with the ambient atmosphere. Special type "ventilated containers" have weatherproof ventilation grills built into the top and bottom side rails and the front top rail and bottom sill, through which the natural convection inside the freight container is intensified and a limited exchange of air and humidity with the ambient atmosphere is established.

6.2.8 An open top container is similar to a closed freight container in all respects except that it has no permanent rigid roof. It may have a flexible and movable or removable cover, e.g. of canvas, plastic or reinforced plastic material. The cover is normally supported by movable or removable roof bows. In some cases the removable roof is a compact steel construction suitable to be lifted off in one piece. The header (transverse top rail above the doors) is generally movable or removable (known as swinging headers). The headers are part of the container strength and should be fitted to have full strength of the freight container.

6.2.9 Open side containers have a curtain or canvas on one or both sides, a rigid roof and rear doors. While the strength of the end walls is similar to that of closed freight containers, the side curtain provides limited or no restraint capability. Open side containers are not covered by ISO standards.

6.2.10 Platforms and platform based containers are characterized by having no side superstructure except either fixed or collapsible end walls (flatracks) or are designed without any superstructure (platforms). The benefit of collapsible end walls is that the flatrack may be efficiently stacked when transported in empty condition for repositioning.

6.2.11 Flatracks and platforms have a bottom structure consisting of at least two strong longitudinal H-beam girders, connected by transverse stiffeners and lined by solid wooden boards. For securing of cargo units, strong lashing brackets are welded to the outer sides of the longitudinal bottom girders with a MSL of at least 30 kN according to the standard. In many cases the lashing points have a MSL of 50 kN. Cargo may also be secured in longitudinal direction by shoring to the end walls of flatracks. These end walls may be additionally equipped with lashing points of at least 10 kN MSL.

6.2.12 Thermal containers, commonly referred to as reefer containers, are designed for the transport of cargo under temperature control. Such cargo is generally homogeneously packed and tightly stowed from wall to wall. Therefore, the side and end wall strength is similar to that of general purpose freight containers. However,

7 See ISO 1496-1:2013 Freight containers – Specification and testing – Part 1: General cargo containers for general purposes, Annex C.

8 International Convention for Safe Containers, 1972, Annex II.

thermal containers are generally not equipped with anchor and lashing points. When a cargo needs to be secured by lashings, specific fittings may be affixed to the "T" section gratings, thus providing the required anchor points.

6.2.13 A tank container comprises two basic elements, the tank shell (or shells in case of a multiple-compartment tank container) and the framework. The framework is equipped with corner fittings and renders the tank suitable for intermodal transport. The frame should comply with the requirements of the CSC. If dangerous goods are intended to be carried in the tank, the shell and all fittings such as valves and pressure relief devices should comply with the applicable dangerous goods regulations.

6.2.14 A non-pressurized dry bulk container is a container especially designed for the transport of dry solids, capable of withstanding the loads resulting from filling, transport motions and discharging of non-packaged dry bulk solids, having filling and discharging apertures and fittings. There are freight containers for tipping discharge, having filling and discharge openings and also a door. A variant is the hopper type for horizontal discharge, having filling and discharge openings but no doors. The front and rear end walls of solid bulk containers are reinforced and so constructed to bear a load equal to 60% of the payload. The strength of the side walls is similar to that of general purpose freight containers.

6.3 Regional and domestic containers

Regional and domestic containers are designed and manufactured to meet the needs of local transport operations. They may have the appearance of a freight container, but unless fitted with valid CSC safety approval plates they should not be used in international transport.

6.4 Swap bodies

6.4.1 A swap body is a regional transport containment of a permanent character designed for road and rail transport within Europe and complying with European standards. Swap bodies are generally 2.5 m or 2.55 m wide and are subdivided into three length categories:

- Class A: 12.2 to 13.6 m long (maximum gross mass 34 tons);
- Class B: 30ft (9.125 m long);
- Class C: 7.15, 7.45 or 7.82 m long (maximum gross mass 16 tons).

6.4.2 Swap bodies are fixed and secured to the vehicles with the same devices as freight containers, but owing to the size difference, these fittings are not always located at the swap body corners.

6.4.3 Stackable swap bodies have top fittings enabling the handling with standard freight container handling equipment. Alternatively, the swap body may be handled using grappler arms, inserted into the four recesses in the bottom structure. Swap bodies not suitable for stacking can only be handled with grappler arms. Class C swap bodies can be transferred from the road vehicle to their supporting legs and returned to the vehicle by lowering or raising the carrier vehicle on its wheels.

6.4.4 The standard box type swap body has a roof, side walls and end walls, and a floor and has at least one of its end walls or side walls equipped with doors. Class C swap bodies complying with standard EN 283 have a defined boundary strength: the front and the rear end are capable to withstand a load equal to 40% of the permitted

payload, the sides are capable to withstand 30% of the permitted payload. For a cover-stake body the drop sides are designed to withstand a force equal to 24% of the maximum permitted payload and the remaining part of the side is designed to withstand 6% of the maximum permitted payload. The sides in a curtain sided swap body may not be used for cargo securing unless purposely designed to do so.

6.4.5 Floors of swap bodies are built to withstand corresponding axle loads of 4,400 kg and wheel loads of 2,200 kg (reference: EN 283). Such axle loads are typical for forklift trucks with a lifting capacity of 2.5 tons.

6.4.6 The curtain-sided swap body is designed similarly to a standard curtain side semi-trailer. It has an enclosed structure with rigid roof and end walls and a floor. The sides consist of removable canvas or plastic material. The side boundary may be enforced by battens.

6.4.7 A thermal swap body is a swap body that has insulating walls, doors, floor and roof. Thermal swap bodies may be insulated, but not necessarily equipped with mechanical device for cooling. A variant is the mechanically refrigerated swap reefer.

6.4.8 A swap tank is a swap body that consists of two basic elements, the tank or tanks, and the framework. The tank shell of a swap tank is not always fully enclosed by the frame work.

6.4.9 A swap bulker is a swap body that consists of the containment for dry solids in bulk without packaging. It may be fitted with one or more round or rectangular loading hatches in the roof and "cat flap" or "letter box" discharge hatches in the rear and/or front ends.

6.5 Roll trailers

6.5.1 Roll trailers are exclusively used for the transport of goods in ro-ro ships and are loaded or unloaded and moved in port areas only. They present a rigid platform with strong securing points at the sides, and occasionally brackets for the attachment of cargo stanchions. The trailer rests on one or two sets of low solid rubber tyres at about one third of the length and on a solid socket at the other end. This end contains a recess for attaching a heavy adapter, the so-called gooseneck. This adapter has the king-pin for coupling the trailer to the fifth wheel of an articulated truck.

6.5.2 The packing of a roll trailer with cargo or cargo units should be planned and conducted under the conception that the cargo should be secured entirely by lashings. However, roll trailers are available equipped with standardized locking devices for the securing of freight containers and swap bodies.

6.6 Road vehicles

6.6.1 Road vehicles are available in a number of different formats and designs.

6.6.2 Most vehicles have a strong front wall integrated into the closed superstructure. Closed superstructures of road vehicles may be provided with arrangements for applying approved seals.

6.6.3 Semi-trailers suitable for combined road/rail transport are generally equipped with standardized recesses for being lifted by suitable cranes, stackers or forklift trucks, to enable the lifting transfer from road to rail or vice versa.

6.6.4 Road vehicles are allocated a specific maximum payload. For road trucks and full trailers the maximum payload is a constant value for a given vehicle and should be documented in the registration papers. However, the maximum allowed gross mass of a semi-trailer may vary to some extent with the carrying capacity of the employed articulated truck as well as in which country it is operating. The total gross combination mass, documented with the articulated truck, should never be exceeded.

6.6.5 The actual permissible payload of any road vehicle depends distinctly on the longitudinal position of the centre of gravity of the cargo carried. In general, the actual payload should be reduced if the centre of gravity of the cargo is conspicuously off the centre of the loading area. The reduction should be determined from the vehicle specific load distribution diagram (see annex 7, subsection 3.1.7). Applicable national regulations on this matter should be observed. In particular closed freight containers transported on semi-trailers with the doors at the rear of the vehicle quite often tend to have their centre of gravity forward of the central position. This may lead to an overloading of the articulated truck if the container is packed toward its full payload.

6.6.6 The boundaries of the loading platform of road vehicles may be designed and made available in a strength that would be sufficient – together with adequate friction – to retain the cargo under the specified external loads of the intended mode of transport. Such advanced boundaries may be specified by national or regional industry standards. However, a large number of road vehicles are equipped with boundaries of less resistivity in longitudinal and transverse direction, so that any loaded cargo should be additionally secured by lashings and/or friction increasing material. The rating of the confinement capacity of such weak boundaries may be improved if the resistance capacity is marked and certified for the distinguished boundary elements of the vehicle.

6.6.7 In Europe, European standard EN 12642 would apply. According to this, there are two levels of requirements of vehicle sides and ends: Code L and Code XL. The strength requirements of the side walls for the Code L vehicles are similar to the requirements for sides of swap bodies according to the standard EN 283 (see paragraph 6.4.4). The side walls of Code XL vehicles are designed to withstand a force equal to 40% of the permitted payload uniformly distributed over the side up to 75% of the height of the side, independently of the type of vehicle. The front wall of Code L vehicles is designed to take up a force equal to 40% of the permitted payload, the maximum however is 50 kN. For Code XL vehicles the front wall is designed to withstand a force equivalent to 50% of the payload without any further limit. The rear wall of Code L vehicles is designed to withstand a force equal to 30% of the permitted payload, the maximum however is 31 kN. For Code XL vehicles the rear wall is designed to withstand a force equivalent to 40% of the payload without any further limit.

6.6.8 Road vehicles are generally equipped with securing points along both sides of the loading platform. These points may consist of flush arranged clamps, securing rails or insertable brackets and should be designed for attaching the hooks of web lashings and chains. The lashing capacity of securing points varies with the maximum gross mass of the vehicle. The majority of vehicles is fitted with points of a lashing capacity (LC) or maximum securing load (MSL) of 20 kN. Another type of variable securing devices are pluck-in posts, which may be inserted into pockets at certain locations for providing intermediate barriers to the cargo. The rating of the lashing capacity of the securing points may be improved if their capacity is marked and certified. Modern vehicles are often equipped with continuous connecting points for lashing bars on each side, thus to enable the affixing of the lashing bars exactly in the required positions to block the cargo against movement towards the rear side.

6.7 Railway wagons

6.7.1 In intermodal transport, railway wagons are used for two different purposes: First, they may be used as carrier unit to transport other CTUs such as freight containers, swap bodies or semi-trailers. Second, they may be used as a CTU themselves which is packed or loaded with cargo and run by rail or by sea on a railway ferry.

6.7.2 The first mentioned purpose is exclusively served by open wagons, which are specifically fitted with devices for securing freight containers, inland containers and swap bodies or have dedicated bedding devices for accommodating road vehicles, in particular semi-trailers. The second mentioned purpose is served by multifunctional closed or open wagons, or wagons which have special equipment for certain cargoes, e.g. coil hutches, pipe stakes or strong lashing points.

6.7.3 On board ferries the shunting twin hooks are normally used for securing the wagon to the ship's deck. These twin hooks have a limited strength and therefore some wagons are equipped with additional stronger ferry eyes. These external lashing points should never be used for securing cargo to the wagon.

6.7.4 The maximum payload is generally not a fixed value for the distinguished wagon, but allocated case by case by means of the intended track category and the speed category. More details are provided in annex 4, subsection 5.1.5.

6.7.5 In case of concentrated loads a reduction of the payload is required, which depends on the loaded length and the way of bedding the concentrated load. The applicable load figures are marked on each wagon. Also any longitudinal or transverse eccentricity of concentrated loads is limited by the individual axle load capacity or the wheel load capacity. More details are provided in annex 4, subsection 5.1.6.

6.7.6 Closed railway wagons are designed for the compact stowage of cargo. The securing of cargo should be accomplished by tight packing or blocking to the boundaries of the wagon. However, wagons equipped with sliding doors should be packed in a way that doors remain operable.

6.7.7 When a railway ferry is operating between railway systems of different gauges, wagons which are capable for changing their wheel sets over from standard gauge to broad gauge or vice versa are employed. Such wagons are identified by the first two figures of the wagon number code.

Chapter 7. CTU suitability

7.1 Suitability in general

7.1.1 Freight containers and some other types of CTUs (e.g. swap bodies for rail transport in Europe) require type approval. In addition, depending on the type, the verification of a periodic or continuous examination scheme might be required as well. A CTU requiring approval (and examination) and not bearing a valid approval plate is not suitable for transport (see subsection 8.2.1).

7.1.2 Freight containers and swap bodies showing serious defects in their structural components (e.g. top and bottom side rails, top and bottom end rails, door sills and header, floor cross members, corner posts and corner fittings) may place persons into danger and are therefore not suitable for transport (see subsection 8.2.2).

7.1.3 Road vehicles, semi-trailers and railway wagons showing deterioration in major structural components or other obvious defects impede the safe traffic on road or rail and are therefore not suitable for transport.

7.2 Suitability for the cargo

7.2.1 All cargo which is sensitive against weather conditions such as rain, snow, dust and sunlight, or against theft and other consequences of easy access should be carried in a closed or sheeted CTU. Freight containers, closed or sheeted swap bodies, semi-trailers and other road vehicles are suitable for most cargoes.

7.2.2 Single packages such as:

- Cartons stacked by hand;
- Drums or similar packages stacked by forklift truck; or
- Any kind of palletized cargo

can be packed and preferably stowed from boundary to boundary. However, it depends on the type of CTU, whether such firm stowage alone provides sufficient cargo securing or whether additional securing is needed (see section 9.4).

7.2.3 Certain cargoes such as cocoa or other agricultural produce are sensitive against climatic effects and may be damaged when the humidity within the CTU is condensed due to a decrease of temperature. This effect is specific for long distance sea transport and can be controlled by appropriate ventilation. Standard freight containers however allow only restricted air changes. Therefore, specially designed containers with increased ventilation may be preferred for such sensitive cargo.

7.2.4 Certain perishable cargoes such as foodstuffs and, in particular, deep frozen products, require transport at low temperatures. Other products, e.g. certain chemicals, need to be protected from frost. Such commodities should be transported in insulated and temperature controlled CTUs which can be refrigerated or heated as appropriate.

7.2.5 Heavy items such as granite and marble blocks may also be packed into closed CTUs. However, this cargo cannot be simply stowed from wall to wall. Bracing and blocking against the frame of the CTU and/or lashing to the securing points is necessary (see annex 7, section 4.3). As the lashing capacity of the securing points in general purpose freight containers is limited, such standard containers might not be appropriate for certain large and heavy cargo items. Instead, platforms or flatracks could be used.

7.2.6 Cargo items of extreme dimensions may not fit inside a standard CTU as they exceed the inner width, length and perhaps also the height of the unit. Such cargo may be accommodated on a platform or on a flatrack. When the cargo is only "over-height" but not "over-width" an open top CTU may also be suitable.

7.2.7 Heavy cargo items lifted by a forklift truck may result in a front axle load exceeding the maximum permissible concentrated load inside a CTU. For example modern freight containers are designed to withstand a force of 0.5 kN/cm^2 which may limit package masses to approximately 3 to 3.5 tons depending on the type of forklift truck used. For heavy cargo, open top, open side or platform CTUs should be used so that the cargo can be loaded from the top or from the side without a need to drive into the CTU with the forklift truck. For load distribution, see annex 7, section 3.1.

7.2.8 Some cargoes such as scrap metal are usually handled by grabs or by conveyors. When this cargo is to be loaded into a CTU and a conveyor is not available, the only suitable CTU type is an open top CTU capable to be loaded with grabs. Placing the CTU vertically on its end and "pouring" the cargo in through the open doors is not permitted.

7.2.9 General purpose CTUs are not suitable for certain long, heavy and irregular cargo items such as timber logs, as the side walls are not designed to withstand the acceleration forces of such cargo and may suffer bulging damages. Stowage in shape of a pyramid and securing by lashing is extremely difficult in a freight container, because the securing points are not accessible after this cargo is loaded, unless the lashings are arranged before loading. Therefore, such cargo should preferably be carried only on platform or flatrack CTUs.

7.2.10 Liquid and solid bulk cargoes should be preferably transported in tank CTUs or solid bulk CTUs. Under certain conditions, liquid bulk cargo may be carried in flexitanks which are stowed in CTUs. Similarly, solid bulk may be carried in general purpose CTUs which are equipped with a liner. However, CTUs used for such purposes should be suitably reinforced[9] and prepared, operational restrictions regarding the permissible payload should be observed (see annex 7, section 5).

7.3 Suitability for the transport mode

7.3.1 Freight containers, including swap bodies and regional containers designed for stacking and approved under the CSC are basically suitable for all modes of transport. However, freight containers having an allowable stacking mass of less than 192,000 kg marked on the approval plate (see annex 4, section 1) require special stowage on board a ship, where the superimposed stacking mass will not exceed the permitted limits as marked on the plate. Furthermore, some freight containers and swap bodies may have a gross mass of 34 tons or higher for which some road chassis and railcars will not be capable of carrying such heavy units. Therefore, especially for heavy massed containers, it is of utmost importance to arrange for an appropriate chassis and tractor vehicle or railcar, as applicable.

7.3.2 As the maximum permissible payload of a railcar is not a fixed value for the distinguished wagon but depends in addition on the track category of the railway network (see annex 4, section 5.1), the railway operator should be contacted when necessary, in order to prevent overloading.

[9] False bulkheads may be fitted at the rear (door) end as required.

7.3.3 Swap bodies and semi-trailers are designed for an easy change of the means of transport. In most cases this might be an interchange between different carrier vehicles for swap bodies or different tractor vehicles for semi-trailers. When an intermodal change from road to rail is intended, it should be ensured that the swap body or the semi-trailer is capable of being lifted by grappler arms and approved for rail transport.

7.3.4 CTUs on ro-ro ships

7.3.4.1 Before dispatching a CTU for carriage on a ro-ro, the shipper needs to confirm with the CTU operator and/or the ro-ro ship operator whether specific requirements apply. Further, the shipper needs to ensure that the CTU to be used is fit for this kind of transport.

7.3.4.2 When road vehicles or semi-trailers are intended to be transported on a ro-ro ship, they should be equipped with securing points of a defined minimum strength in sufficient number according to the following table[10]:

Gross vehicle mass (GVM (tons))	Minimum number of securing points on each side of the vehicle	Minimum strength of each securing point (kN)
3.5 ≤ GVM ≤ 20	2	$\frac{GVM \times 10 \times 1.2}{n}$
20 < GVM ≤ 30	3	
30 < GVM ≤ 40	4	
40 < GVM ≤ 50	5	
50 < GVM ≤ 60	6	

where n is the total number of securing points on each side of the vehicle

7.3.4.3 Road trains, comprising two or more trailers, require each trailer to be considered in isolation and be fitted with, and secured by, the minimum number of securing points for the GVM of that trailer component. Semi-trailer tractor or towing vehicles are excluded from the table and should be provided with two securing points or a towing coupling at the front of the vehicle.

7.3.4.4 When railway wagons are intended to be transported on a railway ferry, they should be able to pass over the kink angle of the ferry ramp and to pass through the track curves on the ferry vessel. In general, there are more restrictions for wagons equipped with bogies than for wagons equipped with two wheel sets only. The details should be clarified with the ferry line operator.

7.3.4.5 Railway wagons should be equipped with securing points on both sides in sufficient number when used in ferry traffic. To determine the required number and strength of securing points the ferry operator should be contacted. The maximum permitted axle loads and maximum permitted loads per linear metre depend on the properties of the ferry ramp and of the characteristics of the ferry vessels employed in the respective ferry service.

[10] See IMO Resolution A.581(14).

Chapter 8. Arrival, checking and positioning of CTUs

8.1 CTU Arrival

8.1.1 The type of CTU used for the transport will influence:

- The process of confirming that it is fit for use;
- The CTU's positioning to suit the packing operation and timing;
- The planning of the cargo packing.

8.1.2 The CTU operator will advise of the estimated time of arrival and departure. The type of CTU may influence these timings:

- Rigid road vehicles will come with a driver and it would be expected that the time to pack the vehicle will be dictated by any time restrictions that local regulations may impose.
- Detachable CTUs, such as trailers and rail wagons may be left at the packer's facility and the tractor unit/motor unit permitted to depart if the packing procedure is extended.
- Class C swap bodies fitted with legs can be unloaded onto their legs and the tractor unit/engine unit plus trailer (if present) may be driven away.
- Freight containers and class A and B swap bodies can remain on the trailer or be unloaded and placed on the ground.
- CTUs remaining on trailers may be left for a period of time.

8.1.3 If the consignment requires more than one CTU then it is important to plan what packages go within each unit and how each CTU is managed: multiple units might be delivered all at once and the packer can manage positioning of each unit to suit the facility available. Another option is to deliver the units sequentially so that the container operator delivers an empty unit and picks up a fully packed one.

8.1.4 In both cases planning what packages go into each unit will be important. Demand at the destination may require particular packages to be packed in each CTU. However such demand can have an adverse effect on the load distribution, on possibility to secure the cargo properly, on the segregation of dangerous goods and also on volume utilisation. It is therefore important that a complete plan may be generated for all packages and CTUs prior to the start of packing the first CTU.

8.2 CTU checks

8.2.1 Approval plates

8.2.1.1 Freight containers and, under certain conditions, also swap bodies and road trailers may be required by applicable regulations to bear a safety approval plate. Details of the markings required on swap bodies and road trailers destined for transport by rail within the European railway network and data plates on freight containers transported internationally by sea and covered by the International Convention for Safe Containers (CSC) are shown in annex 4.

8.2.1.2 The safety approval plate as required by the CSC should be permanently affixed to the rear of the freight container, usually the left hand door. On this plate, the most important information for the packer are:

- The maximum gross mass. This is the maximum mass of the packed freight container and should never be exceeded.
- The allowable stacking mass (see annex 4, section 3 for more information). Freight containers having an allowable stacking mass of less than 192,000 kg are not suitable for unrestricted transport by sea (see paragraph 7.3.1).

If there is no CSC approval plate, the freight container should not be used in international traffic.

8.2.1.3 The CSC requires freight containers to be thoroughly examined 5 years after manufacture and subsequently at least every 30 months and two methods are used by the container industry for recording that the freight container is fit for use. Both methods require marks to be shown on or near to the safety approval plate:

8.2.1.3.1 The date of the next periodic examination is stamped on the approval plate or affixed to it in form of a decal. The date of the next examination shown in figure 8.1 is September 2018.

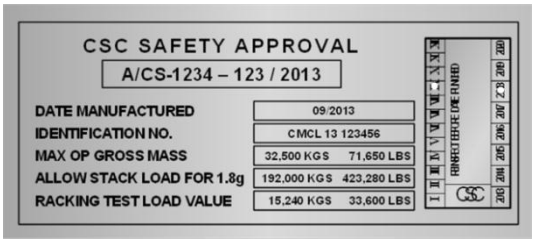


Figure 8.1 CSC safety approval plate with next examination date



Figure 8.2 CSC safety approval plate with ACEP mark

8.2.1.3.2 As an alternative to such periodic inspections, the owner or operator of the freight container may execute an approved continuous examination programme where the freight container is frequently inspected at major interchanges. Freight containers operated under such a programme should be marked on or near to the safety approval plate with a mark starting "ACEP" followed by numerals and letters indicating the approval number of this continuous examination programme (see figure 8.2).

8.2.1.4 If there is no ACEP mark and if the next examination date is already elapsed, or is before the expected arrival time of the freight container at its destination, the freight container should not be used in intermodal or international traffic.

8.2.1.5 The practice of transporting cargo in one door open or one door removed freight containers is inherently dangerous and therefore is strongly discouraged. The practice is illegal unless it is marked on the CSC plate (see figure 8.3). Additionally, there may be negative consequences to using this practice in the supply chain (e.g. terminals refusing to handle open door freight containers).

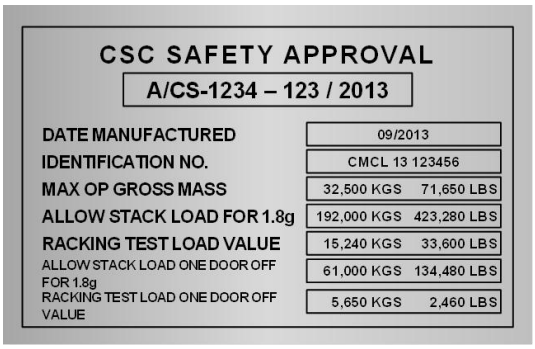


Figure 8.3 CSC safety approval plate for one door off operation

8.2.2 Exterior checks

8.2.2.1 The structural framework, the walls and roof of a CTU should be in good condition, and not significantly distorted, cracked or bent. The CTU operator is responsible for delivering a CTU that complies with international structural integrity requirements and international or national safety regulations. If the structural integrity is in doubt, advice should be sought from supervisory personnel or the CTU operator.

8.2.2.2 The doors of a CTU should work properly and be capable of being securely locked and sealed in the closed position, and properly secured in the open position. Door gaskets and weather strips should be in good condition.

8.2.2.3 A folding CTU with movable or removable main components should be correctly assembled. Care should be taken to ensure that removable parts not in use are packed and secured inside the unit.

8.2.2.4 Any component that can be adjusted or moved, or a pin that can be engaged and withdrawn, should be checked to see that it can be moved easily and retained correctly. This is of particular importance for folding flatracks where the end-walls are retained in the upright position by a pin or shoot bolt which should be engaged and retained from accidentally pulling out by a retaining flap.

8.2.2.5 Removable or swinging headers of open top CTUs should be inspected. The header is generally supported by removable pins. Checks should be made to ensure that the pins are of the correct length and freely removable at both ends. Checks should also be made for signs of cracks around the hinges.

8.2.2.6 Road vehicles that are likely to be carried on rail wagons or on ro-ro ships should be provided with points for securing them. There should be equal numbers of lashing points on both sides of the vehicle and each point should be intact and free from serious corrosion or damage.

8.2.2.7 For sheeted vehicles or containers the side, top or all round covers should be checked as being in satisfactory condition and capable of being secured. Loops or eyes in such canvas which take the fastening ropes, as well as the ropes themselves, should be in good condition. All lashing strap ratchet tighteners should be able to be engaged and operate correctly.

8.2.2.8 Labels, placards, marks or signs regarding previous usages of the CTU should be removed. Permanently affixed signs and marks may never be removed.

8.2.2.9 When undertaking the exterior checks, the CTU should be checked for any signs of recontamination particularly:

- Along bottom rails;
- Within forklift pockets;
- In and around the twist lock fittings;
- Underside and cross members;
- On tops where necessary.

8.2.3 Interior checks

8.2.3.1 Before entering a closed CTU, the doors should be opened for a period of time – enough to allow the internal atmosphere to regularize with the ambient. Care should be taken to ensure that during this period, animals and insects should not enter the CTU.

8.2.3.2 The CTU should be free from major damage, with no broken flooring or protrusions such as nails, bolts, special fittings, etc. which could cause injury to persons or damage to the cargo.

8.2.3.3 The CTU should not show liquids or persisting stains on flooring and side walls. There are a number of different materials and surface treatments used for flooring in CTUs. Sealed surfaces generally can be cleaned with absorbent materials. Where a stain can be transferred by wiping a gloved hand over it, the CTU should not be used and a replacement CTU should be requested.

8.2.3.4 A CTU should be weatherproof unless clearly designed otherwise (e.g. flatrack). Patches or repairs to solid walls should be carefully checked for possible leakage by looking for rusty streaks below patches. Repairs to side and roof sheets should have a fully stitched patch covering all of the hole with a substantial overlap.

8.2.3.5 Potential points of leakage may be detected by observing whether any light enters a closed unit. Standard and approved procedures for identifying pin holes and other points of leakage should be adopted.

8.2.3.6 Cargo tie-down cleats or rings, where provided, should be in good condition and well anchored. If heavy items of cargo are to be secured in a CTU, the operator should be contacted for information about the cleat strength and appropriate action taken.

8.2.4 Cleanliness

8.2.4.1 All CTUs should be provided clean and free from contamination, but the type will dictate the standard that can be expected.

8.2.4.2 Closed CTUs should be clean, dry and free of residue and/or persistent odours from previous cargo.

8.2.4.3 Open CTUs should be free from debris and as dry as is possible.

8.2.4.4 Following receipt of the CTU the packer should prevent recontamination. Examples of recontamination will be the presence of any of the following:

- Soil;
- Plants/plant products/debris;
- Seeds;

- Moths, wasps and bees;
- Snails, slugs, ants and spiders;
- Mould and fungi;
- Frass (insect and bird droppings or waste);
- Egg sacs;
- Animals (including frogs), animal parts/blood/excreta and reproductive components or parts thereof;
- Other contamination that shows visible signs of harbouring pests or invasive alien species (including alien species which carry risks of becoming invasive at the site of arrival of CTUs).

8.3 Positioning CTUs for packing

8.3.1 Wheeled operation

8.3.1.1 Road trailers and containers on chassis can be left at the packer's premises for a period of time without a tractor unit. When this happens, the correct positioning of the CTU is particularly important as a safe shifting of the CTU at a later stage might be difficult. After positioning, brakes should be applied and wheels should be chocked.

8.3.1.2 Trailers with end door openings and general purpose freight containers on chassis can be backed up to an enclosed loading bay or can be positioned elsewhere in the premises. For this type of operation a safe access to the CTU by means of suitable ramps is required.

8.3.1.3 Where the CTU cannot be closed in situ because of the loading bay structure, or where to secure the area the CTU would need moving then the packer should consider positioning the CTU so that the doors to the facility and/or the CTU can be closed and access gained by a removable ramp.

8.3.1.4 When a semi-trailer or a container on a chassis is to be packed, care should be taken to ensure that the trailer or chassis cannot tip while a lift truck is being used inside the CTU.

8.3.1.5 For more information on positioning and securing wheeled CTUs, see annex 5, section 2.1.

8.3.2 Grounded operation

8.3.2.1 CTUs may be unloaded from the delivery vehicle and be placed within secure areas for packing. Proper lifting equipment is required.

8.3.2.2 When landing CTUs it should be ensured that the area is clear of any debris or undulations in the ground that may damage the understructure (cross members or rails) of the CTU.

8.3.2.3 Grounded CTUs will deform to the ground on which they are placed, therefore it is important that the area should be firm, level and well drained. Failure may result in:

- The CTU racking if the ground is not level which may result in the doors being difficult to open and, more importantly, close;
- The CTU sinking into the soft area which may result in serious deformation;
- The CTU becoming flooded. Where there is a risk of flooding it should be placed on blocks to elevate it.

8.3.2.4 Packers should not position CTUs in such locations where there is a risk of recontamination. This means that, whenever possible, CTUs should be placed on a hard pavement clear of soil, vegetation, overhanging trees and away from flood lights.

8.3.2.5 CTUs should not be positioned where there is mud, vegetation or standing pools of water as these can harbour pests, insects and other animals or under flood lights which attract nocturnal organisms.

8.3.2.6 When a swap body standing on its support legs is to be packed, particular care should be taken to ensure that the swap body does not tip when a lift truck is used for packing. It should be checked that the support legs of the swap body rest firmly on the ground and cannot shift, slump or move when forces are exerted to the swap body during packing.

8.3.2.7 For more information on grounded operation of CTUs, see annex 5, section 2.2.

8.3.3 Access to the CTU

8.3.3.1 After the CTU has been positioned for packing, a safe access should be provided. For loading a CTU by means of forklift trucks driven into the CTU, a bridging unit between the working ground or loading ramp and the CTU floor should be used. The bridging unit should have lateral boundaries and be safely connected to the CTU for avoiding dislocation of the bridging unit during driving operations.

8.3.3.2 If the CTU floor is at a height level different to that of the loading ramp, a hump may appear between the loading ramp and the bridging unit or between the bridging unit and the CTU floor. Care should be taken that the forklift truck used keeps sufficient ground clearance over this hump. Lining the level differences with suitable timber material under the bridging unit should be considered.

8.3.3.3 If forklift trucks are employed for packing, any roofs or covers of the CTU should be opened if necessary. Any movable parts of such roofs or covers should be removed or suitably secured in order to avoid interference with the loading procedure.

8.3.3.4 Packing of CTUs in poor daylight conditions may require additional lighting. Electric lighting equipment should be used under the strict observance of relevant safety regulations, in order to eliminate the risk of electric shocks or incendive sparks from defective cables or heat accumulation from light bulbs.

8.3.3.5 For more information on access to CTU, see annex 5, section 2.3.

Chapter 9. Packing cargo into CTUs

9.1 Planning of packing

9.1.1 Packers should ensure that:

- The packing process is planned in advance as far as practical;
- Incompatible cargoes are segregated;
- Special handling instructions for certain cargoes are observed;
- The maximum permitted payload is not exceeded;
- Restrictions for concentrated loads are complied with;
- Restrictions for eccentricity of the centre of gravity are complied with;
- The cargo and securing materials complies with the International Standards for Phytosanitary Measures[11] when applicable.

9.1.2 To carry out effective planning, packers should follow the provisions of annex 7, section 1.

9.2 Packing and securing materials

9.2.1 Packers should ensure that securing materials are:

- Strong enough for the intended purpose;
- In good order and condition without tears, fractures or other damages;
- Appropriate to the CTU and goods to be carried;
- In compliance with the International Standards for Phytosanitary Measures No.15[11].

9.2.2 More information on packing and securing materials is provided in annex 7, section 2 and in the appendices to annex 7.

9.3 Principles of packing

9.3.1 Packers should ensure that:

- The load is properly distributed in the CTU;
- Stowage and packing techniques are suitable to the nature of the cargo;
- Operational safety hazards are taken into account.

9.3.2 In order to comply with the obligations in 9.3.1 packers should follow the provisions of annex 7, section 3 and the appendices to annex 7.

9.4 Securing cargo in CTUs

9.4.1 The packers should ensure that:

- Tightly arranged cargoes are so stowed in CTUs that boundaries of the CTU are not overstressed;

[11] International Standards for Phytosanitary Measures, No. 15 Regulation of wood packaging material in international trade, 2009 (ISPM 15).

- In the case of CTUs with weak or without boundaries sufficient securing forces are produced by the cargo securing arrangement;
- Packages of greater size, mass or shape are individually secured to prevent sliding and, when necessary, tilting;
- The efficiency of the cargo securing arrangement is properly evaluated.

9.4.2 In order to comply with the obligations in 9.4.1 the packer should follow the provisions of annex 7, section 4 and the appendices to annex 7.

9.4.3 Additional advice for the evaluation for certain cargo securing arrangements may be found in annex 7, appendix 4.

9.5 Packing bulk materials

9.5.1 Packers should ensure that:

- Applicable filling ratios for liquids are complied with;
- Tank fittings and valves are compatible with the goods to be carried;
- Specific requirements for foodstuffs are observed;
- Procedures for the safe transport of liquids in flexitanks are observed;
- CTUs are not overstressed by the carriage of solid bulk cargoes.

9.5.2 When working on the top of CTUs during the preparation, filling or emptying of CTUs packers should comply with the requirements of annex 8.

9.5.3 In order to comply with the obligations in 9.5.1 the packer should follow the provisions of annex 7, section 5.

9.6 Safety at work and security

Only activities authorized by the facility should be carried out in the vicinity where the CTU is packed.

Chapter 10. Additional advice on the packing of dangerous goods

10.1 General

10.1.1 The advice of this section applies to CTUs in which dangerous goods are packed. It should be followed in addition to the advice given elsewhere in this Code.

10.1.2 International (and often national) transport of dangerous goods may be subject to several dangerous goods transport regulations, depending on the origin, final destination and the modes of transport used.

10.1.3 For intermodal transport involving different modes, the rules and regulations applicable depend upon whether it is an international, national or regional move (e.g. transport within a political or economic union or trading zone).

10.1.4 Most national and international regulations are based on the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations (Orange Book). However, international (ADR, IMDG, …) and national rules (CFR49, …) may differ from the United Nations Recommendations on the Transport of Dangerous Goods.

10.1.5 Transport of dangerous goods by road, rail or inland waterways is subject to various regulations and agreements. Examples are:

- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);
- European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN);
- Regulations concerning the International Carriage of Dangerous Goods by Rail (RID); and
- Title 49 of the Code of Federal Regulations of the United States.

10.1.6 For international maritime transport, the provisions of the International Maritime Dangerous Goods (IMDG) Code apply. The IMDG Code provides detailed provisions on all aspects of the transport of packaged dangerous goods by sea.

10.1.7 Dangerous goods are classified into nine hazard classes. Some of these are subdivided into divisions. All details are set forth in the applicable dangerous goods regulations as mentioned above. The consignor is responsible for ensuring that packages containing dangerous goods are authorized and bear the appropriate labels and marks.

10.2 Before packing

10.2.1 The IMDG Code and other international and national regulations require that the consignor provides transport information on each dangerous substance, material or article. This information should include at least the following basic items:

- The UN number;
- The proper shipping name (including the technical name, as applicable);
- The class and/or division (and the compatibility group letter for goods of class 1);

- Subsidiary risks when assigned;
- The packing group when assigned;
- The total quantity of dangerous goods (by volume or mass, and for explosives the net explosive content); and
- The number and kind of packages.

Other items of information may be required, depending on the mode of transport and the classification of the goods (e.g., flashpoint for transport by sea). The various items of information required under each regulation and applicable during intermodal transport operations should be provided so that appropriate documentation may be prepared for each shipment.

10.2.2 The consignor is also responsible for ensuring that dangerous goods are classified, packaged, packed and marked in accordance with the applicable regulations. A declaration by the consignor that this has been carried out is normally required. Such a declaration may be included with the required transport information.

10.2.3 The shipper is responsible for ensuring that the goods to be transported are authorized for transport for the applicable modes to be used for the transport operation. For example, self-reacting substances and organic peroxides requiring temperature control are not authorized for transport by rail under the RID regime. Certain types of dangerous goods are not authorized to be transported on board passenger ships and therefore the requirements of the IMDG Code should be carefully studied.

10.2.4 The carrier is responsible for ensuring that dangerous goods declared by the shipper are transported in accordance with applicable international and national regulations.

10.2.5 Current versions of all applicable regulations should be easily accessible and referred to during packing to ensure compliance.

10.2.6 Dangerous goods should only be handled, packed and secured by trained personnel. Supervision is required by a responsible person who is familiar with the legal provisions, the risks involved and the measures that should be taken in an emergency.

10.2.7 Suitable measures to prevent incidents such as fires should be taken, including the prohibition of smoking in the vicinity of dangerous goods.

10.2.8 Packages of dangerous goods need to be examined by the packer and any found to be damaged, leaking or sifting should not be packed into the CTU. Packages showing evidence of staining, etc., should not be packed without first determining that it is safe and acceptable to do so. Water, snow, ice or other matter adhering to packages should be removed before packing. Substances that have accumulated on drum heads should initially be treated with caution in case they are the result of leakage or sifting of contents. If pallets have been contaminated by spilt dangerous goods, they should be destroyed by appropriate disposal methods to prevent use at a later date.

10.2.9 If dangerous goods are palletized or otherwise unitized, they should be packed so as to be regularly shaped, with approximately vertical sides and level at the top. They should be secured in a manner unlikely to damage the individual packages

comprising the unit load. The materials used to bond a unit load together should be compatible with the substances unitized and retain their efficiency when exposed to moisture, extremes of temperature and sunlight.

10.2.10 The packing, labelling, marking and method of securing of dangerous goods in a CTU in compliance with applicable international and national regulations should be planned before packing is commenced.

10.3 Packing

10.3.1 Special care should be taken during handling to avoid damage to packages. However, if a package containing dangerous goods is damaged during handling so that the contents leak out, the immediate area should be evacuated and personnel immediately moved to a safe place until the hazard potential can be assessed. The damaged package should not be shipped. It should be moved to a safe place in accordance with instructions given by a responsible person who is familiar with the risks involved and knows the measures that should be taken in an emergency in conformance with national regulations.

10.3.2 CTUs should be packed so that incompatible dangerous or other goods are segregated in accordance with the rules of all modes of transport. In some instances even goods of the same class are incompatible with each other and should not be packed in the same unit, e.g., acids and alkalis of class 8. The requirements of the IMDG Code concerning the segregation of dangerous goods inside CTUs are usually more stringent than those for road and rail transport. Whenever an intermodal transport operation does not include international transport by sea, compliance with national relevant regulations and the respective inland transport regulations may be sufficient. However, if there is any possibility that a part of the transport operation will be international by sea, the segregation requirements of the IMDG Code generally apply.

10.3.3 Some dangerous goods should be segregated from foodstuffs by a certain distance within the CTU or are even prohibited in the same unit. More advice is to be found in the applicable dangerous goods regulations.

10.3.4 When dangerous goods are being handled, the consumption of food and drink should be prohibited.

10.3.5 Packages should be handled and packed in accordance with their markings (if any). Further details regarding markings are provided in annex 7, appendix 1.

10.3.6 Drums containing dangerous goods should always be stowed in an upright position unless otherwise authorized by the competent authority.

10.3.7 Stacking heights, stacking load tests and stacking limitations are set forth in applicable dangerous goods regulations that should be strictly followed.

10.3.8 Dangerous goods consignments which form only part of the load of a CTU should, whenever possible, be packed adjacent to the doors with markings and labels visible. Particular attention is drawn to annex 7, subsection 3.2.7 concerning the securing of cargo at the doors of a unit.

Chapter 11. On completion of packing

11.1 Closing the CTU

11.1.1 After closing the CTU, the packer should ensure that all closures are properly engaged and secured. If the doors are locked, the means of locking should be such that, in case of emergency, they can be opened without delay. Where CTUs have hinged or detachable fittings, a check should be made that they are properly secured, with no loose equipment likely to cause a hazard during transport.

11.1.2 When required, the shipper should ensure that CTUs in international transport be sealed immediately upon completion of the packing with a seal bearing a unique identification number. Countries may require that such seals meet the standard of ISO 17712.

11.1.3 Where security devices, beacons or other tracking or monitoring equipment are used, they should be securely installed to the CTU and, when equipped with a source of energy, they should be of a certified safe type. It should be noted that, where applicable, the International Convention for the Safety of Life at Sea (SOLAS) specifies that during sea transport no sources of ignition be present in enclosed cargo spaces where highly flammable dangerous goods are stowed.

11.2 Marking and placarding

11.2.1 The applicable dangerous goods regulations may require that placards (enlarged labels), marks and other signs be affixed to the surfaces of a CTU. The specifications of these placards, marks and signs and the locations where they should be affixed are described in detail in the applicable dangerous goods regulations.

11.2.2 The applicable dangerous goods regulations may require other warning signs for specific risks, e.g. a sign warning of the possibility of an asphyxiating atmosphere when solid carbon dioxide (CO_2 – dry ice) or other expendable refrigerant has been used for cooling purposes or a sign warning of a potentially explosive atmosphere when vehicles or lighters have been packed into the CTU.

11.2.3 The applicable dangerous goods regulations may require specific warning signs for CTUs under fumigation even though the cargo is not classified as dangerous. The details of marking and further instructions for the handling of such CTUs are set forth in the applicable dangerous goods regulations (see annex 9).

11.3 Documentation

11.3.1 In conformance with paragraph 4.2.4, the shipper is responsible for ensuring that all documents required by applicable international and national regulations are received from the consignor and the packer, that the documents are accurate, and, where required, are provided to the carrier before the transport commences respectively as early as required by the carrier.

11.3.2 The packer is responsible for accurately determining the gross mass of the packed CTU. Applicable international and national regulations may prescribe how the gross mass should be determined, and should be followed.

11.3.3 The packer of the CTU should inform the shipper of the identification number of the CTU (container number or vehicle number as appropriate), the verified gross mass of the unit and the identification number of the seal (if applicable), thus to ensure that the verified gross mass and the identification numbers are included in all transport documents, such as bills of lading, way bills, consignment notes or cargo manifests, and are communicated to the carrier as early as required by the carrier.

11.3.4 Whenever the cargo projects beyond the overall dimensions of the CTU the information described in paragraph 11.3.3 should state the exact maximum over-height, over-width or over-length, as appropriate.

11.3.5 If a freight container having an allowable stacking mass of less than 192,000 kg marked on the safety approval plate (see subsection 8.2.1) is intended to be carried by ship, the carrier should be informed of the reduced stacking capability of that freight container.

11.3.6 In addition, whenever dangerous goods are packed into a CTU for transport by sea or where a maritime leg is included in the transport route, the IMDG Code and other transport regulations may require that those responsible for the packing of the CTU provide a "container/vehicle packing certificate" specifying the identification number of the container or the vehicle and certifying that the packing operation was carried out in accordance with the requirements of the applicable dangerous goods regulations. For all details of documentation, the relevant dangerous goods regulations should be referred to.

Chapter 12. Advice on receipt and unpacking of CTUs

Note: For further information see annex 5.

12.1 General precautions

12.1.1 When applicable the consignee or the receiver of a CTU should check whether the unit is externally in good condition, and not significantly distorted, cracked or bent. If such damage is found, the receiver should document and notify it to the CTU operator. Specific attention should be paid to damage that may have influenced the condition of the cargo within the unit.

12.1.2 Where a seal number is stated on the transport documentation, the seal should be checked. If the reference number on the seal differs from the documentation or if the seal appears to be damaged or is missing, this could indicate that the CTU has been opened during transport. In such case the CTU operator should be contacted.

12.1.3 If a CTU shows signs of abnormally high temperatures it should be moved to a safe place and the fire services notified. Care should be taken to ensure that the fire-fighting methods used are suitable for the cargo in the unit.

12.1.4 Persons opening a CTU should be aware of the risk of cargo falling out (for details see annex 5, section 6).

12.1.5 CTUs with substances used for cooling or conditioning purposes present a particular risk of a toxic or asphyxiant atmosphere (see paragraphs 11.2.2 and 11.2.3). Before opening the doors, it should be ascertained by measurement that no harmful atmosphere is present in the CTU.

12.1.6 Some cargoes may emit harmful fumes. Especially after long sea voyages, it has been repeatedly realized that apparently non-hazardous goods such as shoes, textile products, furniture or the like emit harmful substances to an extent making the atmosphere in the CTU dangerous. Care should be taken not to come into contact with the internal atmosphere when opening the doors. Therefore, any CTU should be ventilated before allowing personnel to enter, preferably by mechanically forced ventilation. If this is not available, the doors should be opened for a period of time – enough to allow the internal atmosphere to regularize with the ambient.

12.1.7 CTUs that are fumigated should be properly marked. On occasion, marks may become obliterated or lost during transport. As CTUs may then not be appropriately marked, the doors and vents should be checked. Tape applied to door gaskets or to the vents may indicate the risk of fumigant presence.

12.1.8 If there is a particular reason to suspect damage to packages with dangerous goods, expert advice should be sought before unpacking of the unit starts. When possible, a safety data sheet (SDS) should be required from the consignor, to determine appropriate measures and necessary personal protection equipment.

12.2 Unpacking a CTU

12.2.1 For the positioning of a CTU, section 8.3 applies. Where access to the roof of the CTU is required, e.g. to remove the canvas of an open top unit, mobile steps or a gantry platform should be provided. Access to the doors of a CTU should be made by using ramps or platforms if required (see subsection 8.3.3).

12.2.2 Persons opening CTUs should be aware of the risk of cargo falling out. To reduce the risk of personal injury from shifted cargo coming out when doors are opened, the use of a safety strap is encouraged. The strap should be secured around the inner locking rods of a CTU to minimize the free movement of the door which is first opened. Movement of the cargo within sheeted CTUs may also present a risk to those opening the side curtains of open sided units.

12.2.3 Suitable unpacking equipment and techniques should be used (see annex 7, section 3.3), so that persons involved are not placed at risk.

12.2.4 When removing lashing or blocking devices or other cargo securing material, care should be taken to ensure that cargo items do not move when released. The valves of inflatable dunnage bags should be opened and the air released.

12.2.5 It should be considered that items with low friction such as piles of steel plates may suddenly shift and that unstable items may topple when retaining straps are removed.

12.2.6 When any damage to the cargo is detected during the unloading of the CTU, this should be documented and notified to the carrier and/or CTU operator and shipper, as appropriate. If a package containing dangerous goods is found to be so damaged that the contents leak out, the immediate area should be evacuated until the hazard potential has been assessed. When possible, a safety data sheet (SDS) should be requested from the consignor, to determine appropriate measures and necessary personal protection equipment.

12.3 Returning the unpacked CTU

12.3.1 Upon unpacking the CTU, it may in agreement with the CTU operator either be returned to the CTU operators' facility or transported to a new consignor/packer/shipper. Under either scenario, unless otherwise agreed, the consignee is responsible for ensuring that the CTU is completely clean, free of cargo residues, noxious materials, plants, plant products and visible pests.

12.3.2 When disposing of cargo residues and cargo associated waste, the applicable environmental regulations should be considered. Wherever practicable, dunnage bags and other securing materials should be recycled. When wood quarantine requirements apply, timber bracings and packing/securing material of natural wood, not bearing the appropriate IPPC marking, (see annex 7, section 1.14) should be disposed of as required by national or local plant protection regulations.

12.3.3 After a CTU with dangerous goods has been unpacked, particular care should be taken to ensure that no hazard remains. This may require special cleaning, particularly if spillage of a toxic or corrosive substance has occurred or is suspected. In case of doubt with regard to appropriate cleaning measures, the CTU operator should be contacted.

12.3.4 All placards and other markings referring to the last shipment, including, where applicable, markings referring to dangerous goods, should be removed, masked or otherwise obliterated.

Chapter 13. Training in packing of CTUs

13.1 Introduction

13.1.1 The successful application of this Code concerning the packing of CTUs and the achievement of its objectives are greatly dependent on the appreciation by all persons concerned of the risks involved and on a detailed understanding of the Code. This can only be achieved by properly planned and maintained initial and retraining programmes for all persons concerned with the packing of CTUs.

13.1.2 Training of persons employed by the parties mentioned in chapter 4 can be undertaken in-house through the use of designated personnel. Alternatively, external or distance (e-learning) training providers may be used. However, when parties use external training providers, they should ensure that such providers can provide training to meet the requirements of this Code. Persons responsible for planning and supervision of packing should be fully knowledgeable about all technical, legal and commercial requirements of this task and on all risks and dangers involved. They should know the customary terminology in order to communicate effectively with consignors, forwarders and the persons who do the actual packing.

13.1.3 Personnel engaged in the actual packing should be trained and skilled in doing this work and understand the relevant terminology in order to comply with the instructions of the planner. They should be aware of the risks and dangers involved including safe manual handling.

13.1.4 Persons responsible for planning and supervision of packing as well as personnel responsible for the actual packing should receive appropriate education and training for their tasks before they do the work with immediate responsibility.

13.1.5 The management of a facility where CTUs are packed is responsible to ensure that all personnel involved in the packing of cargo in CTUs or in the supervision thereof are adequately trained and appropriately qualified, commensurate with their responsibilities within their organization.

13.2 Regulatory authorities

The regulatory authority should work with stakeholders to establish minimum requirements for training and, where appropriate, qualifications for each person involved, directly or indirectly, in the packing of cargo in CTUs, particularly in relation to dangerous goods.

13.3 Training

13.3.1 Personnel engaged in the packing of CTUs should be trained in the contents of this Code commensurate with their responsibilities. Employees should be trained before assuming responsibilities and should only perform functions for which training has not been provided under the direct supervision of a trained person. If appropriate, such training should be supplemented by a period spent assisting knowledgeable planners and packers so that practical experience can be gained.

13.3.2 The training should be designed to provide an appreciation of the consequences of badly packed and secured cargo in CTUs, the legal requirements, the magnitude of forces which may act on cargo during road, rail and sea transport, as well as basic principles of packing and securing of cargoes in CTUs. Topics for consideration, to be included in the training as appropriate, are given in annex 10.

13.4 Records

Records of training should be kept and maintained to document employee training in accordance with local regulatory practice.

Annex 1. Information flow

1 To ensure that the cargo is transported from sender to destination safely and securely, it is essential that those involved in CTU movements fully comply with the proper flow of information.

2 This includes the responsibility of the packer to identify all packages packed into a CTU and to include them in all appropriate documentation.

3 Additionally, it will include a responsibility of the packer to determine the actual gross mass of the CTU and to declare any hazards that may be present for all or part of the journey.

4 Parties involved with transport are responsible for ensuring that documentation and information is provided in adequate time and using terms that are internationally accepted.

5 The functions of the supply chain are discussed in chapter 4 of this Code and can be summarized in the graphical representation shown in figure 1.1.

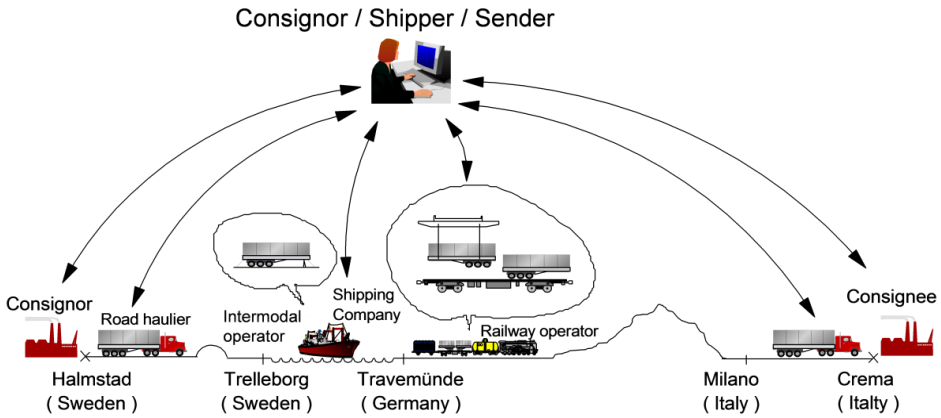


Figure 1.1 Typical flow of information

6 Within the terms of this Code the principal contracts are between the shipper and the carrier. Others parties such as the terminal or haulier, though actively involved, are responsible to one of these parties.

7 Figure 1.2 shows the relationship of functions at the start of the supply chain. A sender and consignor may be considered as the same function and under certain circumstances may be also referred to as the shipper. However the shipper may act as the processor of information receiving information about the cargo and the packing details from the consignor / sender and packer / consolidator respectively.

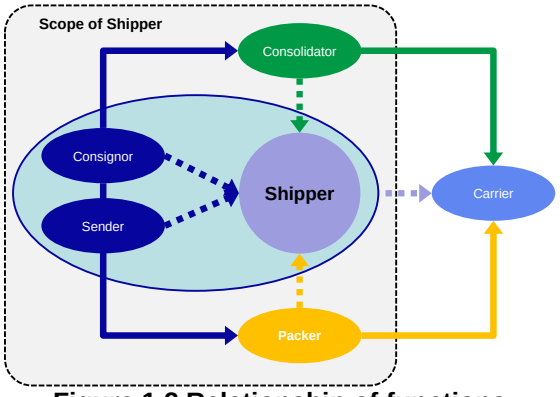


Figure 1.2 Relationship of functions

7.1 The shipper may also be the packer / consolidator receiving goods from the consignor and packing them into the CTU before despatching it to the carrier.

7.2 Finally the shipper may be the consignor, producing the goods, packing it into the CTU and then contracting the carrier to move the CTU to its destination.

7.3 There is a final combination, where the shipper combines the consignor, the packer and the carrier.

8 The shipper will arrange the transport of the goods and may arrange the cargo insurance cover. In some contracts there is an agreed location, terminal or destination where the responsibility of the shipper ends. Thereafter responsibility is transferred to the consignee or another party who may undertake the function of a shipper.

8.1 Figure 1.3 shows a typical INCOTERM published by the International Chamber of Commerce. Under this contract the shipper is responsible for all aspects of transport up until the CTU is unloaded at the port of import.

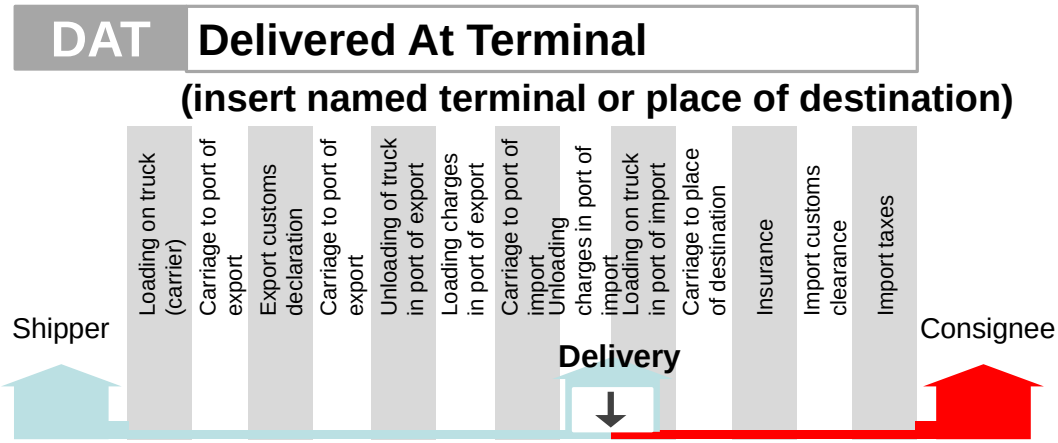


Figure 1.3 Typical sales contract terms

8.2 Thereafter the consignee, or their agent who will undertake the function of a shipper, will arrange onward transport of the CTU and continue the chain of information for the shipment.

Annex 2. Safe handling of CTUs

1 General

1.1 CTUs are designed for intermodal transport. They are capable to be transferred from one mode of transport to another by rolling or lifting. A swap body can be carried on a road vehicle or on a railway wagon. A freight container can be carried on a road vehicle, on a railway wagon, on an inland barge or on a seagoing vessel. A road vehicle can be carried on a railway wagon, on an inland barge or on a seagoing vessel (ro-ro ship). A railway wagon can be carried on a seagoing vessel (railway ferry).

1.2 When CTUs are handled, it should be ensured that all handling devices such as lifting appliances and internal movement equipment are in good condition and suitable for the intended purpose.

1.3 On completion of handling, CTUs should be secured to the means of transport as appropriate for the specific transport mode.

1.4 A CTU which is leaking cargo or obviously unsafe for further transport should not be loaded onto a means of transport.

2 Transfer by rolling

2.1 Swap bodies are carried by road on special swap carrier vehicles. The carrier vehicle is capable to be lowered on its wheels and to roll under the swap body standing on its supports. By lifting the vehicle to its normal operating position, the swap body is taken onto the chassis of the carrier vehicle. Then the support legs are retracted.

2.2 Road vehicles may be rolled onto a ship driven by their own engine. Semi-trailers are normally carried on board ships without tractor unit. They are loaded to and unloaded from the ships by specific port internal movement vehicles. These vehicles should be conspicuously painted or marked and fitted with a flashing or rotating yellow beacon. The drivers' cab should provide good all round visibility, with minimal obstruction of the driver's view. Only authorized persons should be allowed on the ramp or any vehicle deck while vehicle movements are taking place. The movement of persons on foot on the ramp should be strictly controlled and minimized.

2.3 The cargo decks of railway ferries are equipped with several rail tracks which can be accessed by a movable ramp which is fitted with rails, capable to be connected to the rail tracks on board. The maximum permissible kink angle between the ramp and the level of the rail deck in the ship is restricted and depends on the type of wagons shunted into the ship. In specific cases this angle may be as low as 1.5°.

3 Transfer by lifting

3.1 Before lifting a CTU, the handling staff should ensure that the lifting equipment is safely attached to the CTU and that all securing, fixing and lashing devices have been released.

3.2 Swap bodies for combined road/rail transport and also purpose built semi-trailers for combined road/rail transport are equipped with standardized recesses for being lifted at four points by grappler arms attached to the spreader of a crane or reach stacker. Thus they can be transferred from road to rail and vice versa.

3.3 Lifting of freight containers (refer to ISO 3874)

3.3.1 The most appropriate method to lift a freight container is the use of a top lift spreader. The spreader is locked by twistlocks to the top corner fittings of the freight container. This method can be used for all freight container sizes fitted with top corner fittings, in an empty or packed state. When the spreader cannot be attached directly to the corner fittings, e.g. in case of over-height cargo, slings or chains can be used and connected to the spreader so that the lifting force remains vertical.

3.3.2 The side-lift frame is designed to lift a freight container by the two top corner fittings of one side and to take the reaction forces on the bottom corner fittings of the same side or on suitable corner post areas above those corner fittings. This method can be used on all sizes of empty freight containers. In the case of packed freight containers, this method is suitable for 20-foot and 10-foot freight containers only.

3.3.3 The end-lift frame is suitable only for the handling of 20-foot and 10-foot empty freight containers. The frame is designed to lift a freight container by the two top corner fittings of one end and to take reaction forces on the bottom corner fittings of the same end or on suitable corner post areas above those corner fittings.

3.3.4 A top lift sling can be used for empty freight containers of all sizes. The freight container is lifted by all four top corner castings with forces applied other than vertically. Lifting devices need to be properly engaged, hooks always be placed in an inward to outward direction. In the packed state, this method is suitable only for 10-foot freight containers, provided that the lifting forces are applied at an angle not less than 60° to the horizontal.

3.3.5 A bottom sling is used in connection with a cross beam spreader bar. The freight container is lifted from the side apertures of four bottom corner fittings by means of slings which are connected to the corner fittings by means of locking devices. Hooks are not suitable for this connection. This method can be used for all freight container sizes in an empty or packed state. For packed freight containers the angle between the sling and the horizontal should not be less than 30° for 40-foot freight containers, 45° for 20-foot freight containers and 60° for 10-foot freight containers.

3.3.6 When a freight container is provided with fork pockets, it can be lifted by means of forks under certain conditions. The forks should, ideally, extend the whole width of the freight container, but under no circumstances should they extend less than 1,825 mm into the fork pockets. This method can be used on 20-foot and 10-foot freight containers in an empty or packed state with the exception of tanks and pressurized bulk containers which should not be lifted by forklift trucks at all. Where there are no fork pockets, the freight container should not be lifted by forks in any state.

3.4 Railway wagons may be lifted and may change bogies when the railway ferry operates between countries where the gauge of the track is different. In such cases, the railway wagons should be suitable for an easy exchange of bogies. The involved ferry ports provide specific equipment for this operation.

4 Safety and security checks prior to entry

4.1 It is important for the terminal to ensure that CTUs accepted into the terminal are safe for operations and do not present a threat to the safety and security of the terminal, or ships and personnel within its environs. It is particularly important to ensure that "paperless" systems do not result in any dilution of the need to verify documentation.

4.2 The terminal should undertake the following actions at the first entry gate of the export yard, or while the CTU is in the terminal and before it goes onto a ship:

- Match the carrier's documentation against that of the haulier in order to prevent fraudulent shipments;
- Check the integrity of the CTU and its seal in order to preclude stowaways and the smuggling of contraband or threats to security. Whenever a broken or missing seal is found, it should be reported to the shipper and the authorities, and replaced with a new seal. The new seal number should be recorded;
- Check the CTU number against documentation;
- Check the presence of placards and markings on CTUs containing dangerous goods and verify them against documentation;
- Verify the gross mass against documentation by use of a weighbridge or mass gauge/load indicator on yard equipment or, alternatively, verify that accurate gross mass determination has occurred before entry and that such determination was compliant with international requirements, where applicable, or accepted best practice;
- Ensure, during the lifting of the CTU by any terminal equipment, that an evaluation is made by the operator to check that the mass of the cargo is reasonably evenly distributed. If it is determined to exceed the "60% within half the length rule", the terminal should take steps to rectify the problem;
- Sideline any CTU that appears to be structurally unsound and/or unsafe for a more detailed examination;
- Check the lashing of non-enclosed CTUs;
- Confirm the dimensions of out of gauge cargo and update booking data accordingly;
- Notify the CTU operator if out of gauge cargo is found to be improperly or inadequately secured to the CTU;
- Check reefer temperatures against setting and, in cases where the allowable variance is exceeded, follow up with the CTU operator. A reasonable temperature variance should be set to trigger follow up action with CTU operators, and this should vary depending on the cargo type, i.e. chilled or frozen. If this is not possible at the gate due to a low battery, then the check should be made when the CTU is plugged into the terminal's power supply;
- Check reefer plugs and wires for defects prior to plugging into the terminal's reefer system.

5 Stacking on ground and terminal operation with freight containers

5.1 The ground should be a firm, flat and drained surface. On the ground, the freight container should be supported by the four bottom container fittings only. When stacking freight containers, the bottom surfaces of the lower corner fittings of the upper freight container should have complete contact with upper surfaces of top container fittings of the lower freight container. A shift of up to 25 mm laterally and 38 mm longitudinally may be tolerated.

5.2 A freight container stack may be subject to forces by heavy wind. This might lead to sliding and toppling of freight containers. Stacks of empty freight containers will be more subject to such dangers than stacks of packed freight containers. The critical wind speed is higher for multiple rows than for a single row. Wind effect can be reduced by limiting the stacking height, by block stowage or by a combination of both. A recommended combination is shown in the table below:

Number of tiers	20-foot standard	40-foot standard	40-foot high cube
2	2 rows	2 rows	3 rows
3	2 rows	3 rows	3 rows
4	2 rows	3 rows	3 rows
5	3 rows	3 rows	4 rows
6	4 rows	4 rows	5 rows

5.3 Above recommendation is applicable for a wind speed up to 20 m/s (8 Bft). In case of higher wind speeds, additional measures should be considered, such as changing the block to a stepped pyramid or securing freight containers with lashings to the ground.

5.4 Freight containers should be moved within a terminal area only by use of suitable equipment, such as van carriers, reach stackers or trailers. Trailers should be so constructed that the freight containers are supported by their corner fittings. For operation within the designated terminal area, tie down devices are not required, provided that the freight container is correctly loaded on the trailer and prevented from moving horizontally. Therefore, trailers which are not equipped with twistlocks should be fitted with substantial corner plates or other restraints of sufficient height to retain the freight container in position.

6 Securing of CTUs

6.1 Swap bodies are carried by road on dedicated carrier vehicles. The corner fittings of the swap body fit onto cones of locking devices (twistlocks) which, by turning the cones, provide a form closure between the swap body and the vehicle structure (see figure 2.1).

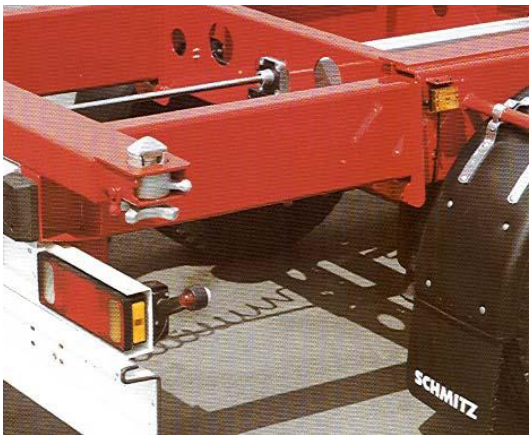


Figure 2.1 Twistlock on a road vehicle

6.2 Freight containers should be carried by road on purpose built container chassis, where the freight container is supported by the four corner fittings. The corner fittings of the freight container fit onto the twistlocks cones of the chassis, similar to the securing devices described in 6.1.

6.3 When carried by rail, swap bodies and freight containers are loaded on open wagons which are specifically fitted with stacking or locking devices. Semi-trailers may be carried on wagons equipped with dedicated bedding devices for accommodating road vehicles.

6.4 Container vessels are specifically constructed for the carriage of freight containers. Cargo spaces under deck or cargo spaces on hatchless container vessels are equipped with cell guides, where the freight containers are stacked, obtaining sufficient hold and securing. 20-foot freight containers may be stowed in 40-foot cell guides, provided that suitable stacking cones are inserted into the corner fittings of the freight containers. Freight containers carried on deck are affixed to the ships structure by means of twistlocks. Twistlocks are used also to interconnect freight containers stowed one on top of another. In addition, container stacks on deck are secured to the ships structure by means of lashing rods and tensioning devices (bottle screws) (see figure 2.2). Details of the securing arrangement are described in the Cargo Securing Manual of the individual ship.



Figure: 2.2 Cell guides and lashing rods on a container vessel

6.5 When carried on general cargo ships which are not specifically constructed for the carriage of freight containers, the freight containers are secured to the ships structure by means of lashing chains or wire ropes and tensioning devices (see IMO Code of Safe Practice for Cargo Stowage and Securing, Annex 1). Further details are described in the Cargo Securing Manual of the individual ship.

6.6 When vehicles are loaded in a vehicle deck of a ro-ro ship, the parking brakes should be applied and locked, engines should be in gear. Uncoupled semi-trailers should not be supported on their landing legs but preferably supported by a trestle or similar device. Lashings which are attached to the securing points of the vehicle should be connected with hooks or other devices so designed that they cannot disengage from the aperture of the securing point if the lashing slackens during the voyage. Only one lashing should be attached to any one aperture of the securing point on the vehicle. Further details are described in the Cargo Securing Manual of the individual ship.

6.7 The wheels of railcars shunted into the rail deck of a railway ferry should be chocked on the rail with appropriate steel chocks. The wagons should be secured to the ships structure with chains and tensioning devices (bottle screws). In case of severe weather conditions, the spring system of the wagons should be released by use of specific trestles. Further details are described in the Cargo Securing Manual of the individual ship.

Annex 3. Prevention of condensation damages

1 Introduction

Condensation damage is a collective term for damage to cargo in a CTU from internal humidity especially in freight containers on long voyages. This damage may materialize in form of corrosion, mildew, rot, fermentation, breakdown of cardboard packaging, leakage, staining, chemical reaction including self-heating, gassing and auto-ignition. The source of this humidity is generally the cargo itself and to some extent timber bracings, pallets, porous packaging and moisture introduced by packing the CTU during rain or snow or packing in an atmospheric condition of high humidity and high temperature. It is therefore of utmost importance to control the moisture content of cargo to be packed and of any dunnage used, taking into consideration the foreseeable climatic impacts of the intended transport.

2 Definitions

For the assessment of the proper state of "container-fitness" of the cargo to be packed and for the understanding of typical processes of condensation damage the most relevant technical terms and definitions are given below:

Absolute humidity of air	Actual amount of water vapour in the air, measured in g/m^3 or g/kg.
Condensation	Conversion of water vapour into a liquid state. Condensation usually starts when air is cooled down to its dew point in contact with cold surfaces.
Corrosion threshold	A relative humidity of 40% or more will lead to an increasing risk of corrosion of ferrous metals.
Crypto climate in the container	State of relative humidity of the air in a closed container, which depends on the water content of the cargo or materials in the container and on the ambient temperature.
Daily temperature variation in the container	Rise and fall of temperature in accordance with the times of day and often exaggerated by radiation or other weather influences.
Dew point of air:	Temperature below the actual temperature at which a given relative humidity would reach 100%. Example: The dew point of air at a temperature of 30°C and 57% relative humidity (= 17.3 g/m^3 absolute humidity) would be 20°C, because at this temperature the 17.3 g/m^3 represent the saturation humidity or 100% relative humidity.
Hygroscopicity of cargo	Property of certain cargoes or materials to absorb water vapour (adsorption) or emit water vapour (desorption) depending on the relative humidity of the ambient air.
Mould growth threshold	A relative humidity of 75% or more will lead to an increasing risk of mould growth on substances of organic origin like foodstuff, textiles, leather, wood, ore substances of non-organic origin such as pottery.
Relative humidity of air	Actual absolute humidity expressed as percentage of the saturation humidity at a given temperature. Example: An absolute humidity of 17.3 g/m^3 in an air of 30°C represents a relative humidity of $100 \cdot 17.3 / 30.3 = 57\%$.

Saturation humidity of air	Maximum possible humidity content in the air depending on the air temperature (2.4 g/m^3 at -10°C; 4.8 g/m^3 at 0°C; 9.4 g/m^3 at 10°C; 17.3 g/m^3 at 20°C; 30.3 g/m^3 at 30°C; see figure 3.1 below).
Sorption equilibrium	State of equilibrium of adsorption and desorption at a given relative humidity of the ambient air and the associated water content of the cargo or material.
Sorption isotherm	An empirical graph showing the relation of water content of a cargo or material to the relative humidity of the ambient air. Usually the adsorption process is used to characterize the above relation. Sorption isotherms are specific for the various cargoes or materials (see figure 3.2 below).
Water content of cargo	Latent water and water vapour in a hygroscopic cargo or associated material, usually stated as percentage of the wet mass of cargo (e.g. 20 t cocoa beans with 8% water content will contain 1.6 t water).

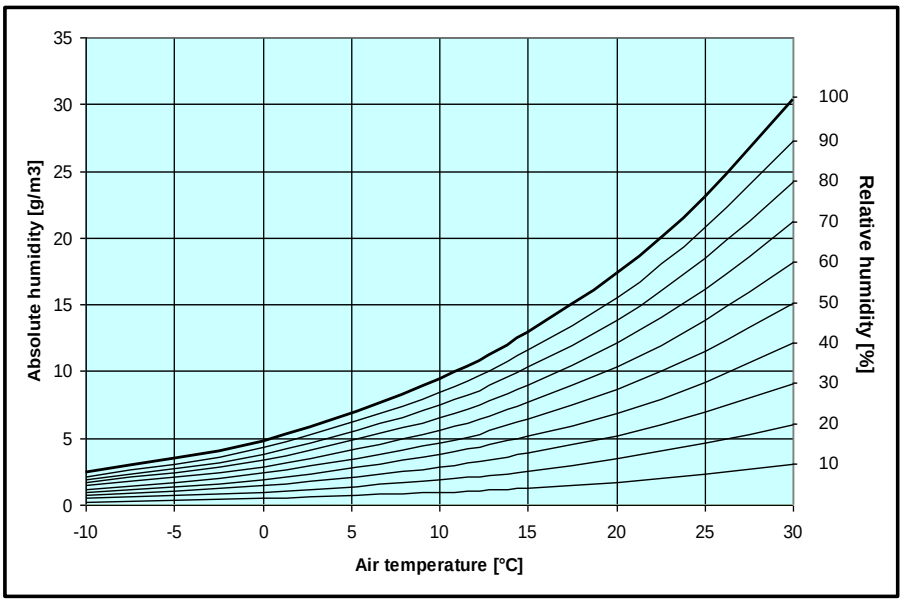


Figure 3.1 Absolute and relative humidity

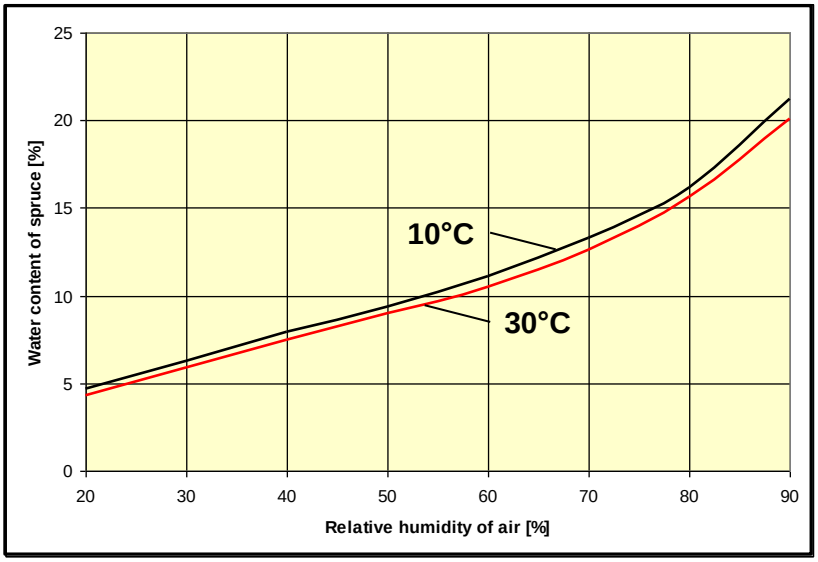


Figure 3.2 Sorption isotherms of Sitka spruce

3 Mechanisms of condensation

3.1 Closed CTUs, in particular closed freight containers, packed with a cargo that contains water vapour, will quickly develop an internal crypto climate with a distinguished relative humidity in the air surrounding the cargo. The level of this relative humidity is a function of the water content of the cargo and the associated materials of packaging and dunnage, following the specific sorption isotherms of the cargo and associated materials. A relative humidity of less than 100% will prevent condensation, less than 75% will prevent mould growth and less than 40% will prevent corrosion. However, this protective illusion is only valid as long as the CTU is not subjected to changing temperatures.

3.2 Daily temperature variations to CTUs are common in longer transport routes, in particular in sea transport, where they also depend largely on the stowage position of the CTU in the ship. Stowage on top of the deck stow may cause daily temperature variations of more than 25 °C, while positions in the cargo hold may show marginal variations only.

3.3 Rising temperatures in a CTU in the morning hours will cause the established relative humidity of the air to drop below the sorption equilibrium. This in turn initiates the process of desorption of water vapour from the cargo and associated materials, thus raising the absolute humidity in the internal air, in particular in the upper regions of the CTU with the highest temperature. There is no risk of condensation during this phase.

3.4 In the late afternoon the temperature in the CTU begins to decline with a pronounced drop in the upper regions. In the boundary layer of the roof, the air reaches quickly the dew point at 100% relative humidity with immediate onset of condensation, forming big hanging drops of water. This is the formidable container sweat which will fall down onto the cargo and cause local wetting with all possible consequences of damage. Similarly, condensate on the container walls will run down and may wet the cargo or dunnage from below.

3.5 The condensed water retards the overall increase of the relative humidity in the air and thereby decelerates the absorption of water vapour back into the cargo and associated materials. If this temperature variation process is repeated a number of times, the amount of liquid water set free by desorption may be considerable, although some of it will evaporate during the hot phases of the process.

3.6 A quite similar mechanism of condensation may take place if a freight container with a warm and hygroscopic cargo, e.g. coffee in bags, is unloaded from the ship but left unopened for some days in a cold climate. The cargo will be soaked by condensation from the inner roof of the freight container.

3.7 Notwithstanding the above described risk of container sweat due to the daily temperature variation, an entirely different type of condensation may take place if cargo is transported in a closed CTU from a cold into a warm climate. If the CTU is unpacked in a humid atmosphere immediately after unloading from the vessel, the still cold cargo may prompt condensation of water vapour from the ambient air. This is the so-called cargo sweat, which is particularly fatal on metal products and machinery, because corrosion starts immediately.

4 Loss prevention measures

4.1 Corrosion damage: Ferrous metal products, including machinery, technical instruments and tinned food should be protected from corrosion either by a suitable coating or by measures which keep the relative humidity of the ambient air in the CTU reliably below the corrosion threshold of 40%.

4.2 The moisture content of dry dunnage, pallets and packing material can be estimated as 12% to 15%. The sorption isotherms for those materials show that with this moisture content the relative humidity of the air inside the CTU will inevitably establish itself at about 60% to 75% after closing the doors. Therefore additional measures like active drying of the dunnage and packing material or the use of desiccants (drying agents in pouches and other passive methods for moisture capture) should be taken, in combination with a sealed plastic wrapping.

4.3 Fibreboard packaging and dunnage when used in association with dangerous goods should undergo water resistance test using the Cobb method as specified in ISO 535[1].

4.4 Mould, rot and staining: Cargoes of organic origin, including raw foodstuff, textiles, leather, wood and wood products, or substances of non-organic origin such as pottery, should be packed into a CTU in "container-dry" condition. Although the mould growth threshold has been established at 75% relative humidity, the condition "container-dry" defines a moisture content of a specific cargo that maintains a sorption equilibrium with about 60% relative humidity of the air in the CTU. This provides a safety margin against daily temperature variations and the associated variations of relative humidity. Additionally, very sensitive cargo should be covered by unwoven fabric (fleece) which protects the cargo top against falling drops of sweat water. The introduction of desiccants into a CTU containing hygroscopic cargo, that is not "container-dry", will generally fail due to the lack of sufficient absorption capacity of the drying agent.

4.5 Collapse of packing: This is a side effect of moisture adsorption of usual cardboard that is not waterproof. With increasing humidity from 40% to 95% the cardboard loses up to 75% of its stableness. The consequences are the collapse of stacked cartons, destruction and spill of contents. Measures to be taken are in principle identical to those for avoiding mould and rot, or the use of "wet strength" cardboard packaging.

[1] EN 20535:1994, ISO 535:1991 Paper and board - Determination of water absorptiveness - Cobb method

4.6 Unpacking

4.6.1 Goods packed in a cold climate on arrival in a warm climate with higher absolute humidity should be delayed until the goods have warmed up sufficiently for avoiding cargo sweat. This may take a waiting time of one or more days unless the goods are protected by vapour tight plastic sheeting and a sufficient stock of desiccants. The sheeting should be left in place until the cargo has completely acclimatized.

4.6.2 Hygroscopic goods packed in a warm climate on arrival in a cold climate with low absolute humidity should be unpacked immediately after unloading from the vessel, in order to avoid cargo damage from container sweat. There may be a risk of internal cargo sweat when the cargo is cooled down too quickly in contact with the open air, but experience has shown that the process of drying outruns the growth of mould, if the packages are sufficiently ventilated after unpacking

.

Annex 4. Approval plates

1 Safety plates

1.1 Freight containers used in international transport and, under certain conditions, also swap bodies and road trailers are required by applicable regulations to bear safety approval plates.

1.2 Under the International Convention for Safe Containers (CSC), each freight container is required to bear a safety approval plate permanently affixed to the rear of the freight container, usually the left hand door. On this plate, the most important information for the packer is:

- The date manufactured;
- The maximum gross mass[1]; and
- The allowable stacking mass[1],

as shown in figure 4.1.

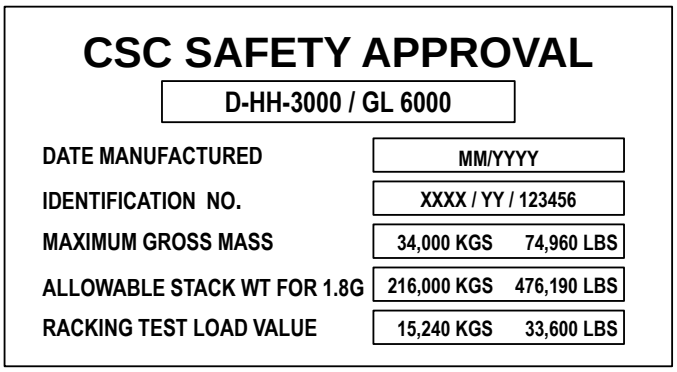


Figure 4.1 Diagram of CSC safety approval plate

1.2.1 The CSC requires freight containers to be thoroughly examined 5 years after manufacture and subsequently at least every 30 months. The date of the next periodic examination is stamped on the approval plate or affixed to it in form of a decal (see figure 4.2).

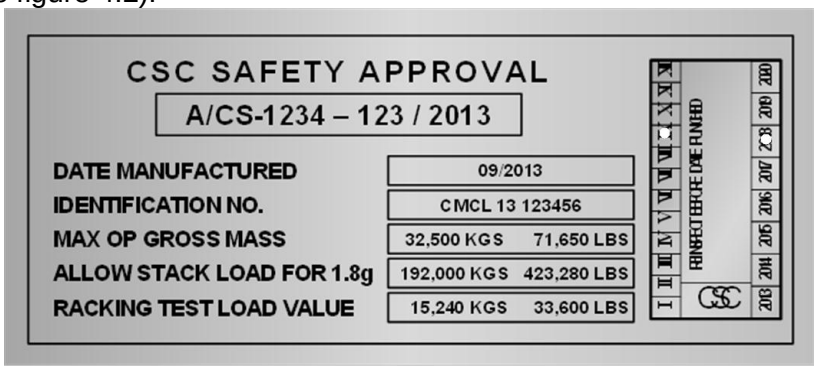


Figure 4.2 CSC safety approval plate with next examination date

1.2.2 As an alternative to such periodic inspections, the owner or operator of the freight container may execute an approved continuous examination programme where the freight container is frequently inspected at major interchanges. Freight containers operated under such programme should be marked on or near to the safety approval plate with a mark starting "ACEP" followed by numerals and letters indicating the approval number of this continuous examination programme (see figure 4.3).

[1] The maximum gross mass and the maximum allowable stacking mass (allow. stack. wt.) should not be exceeded.

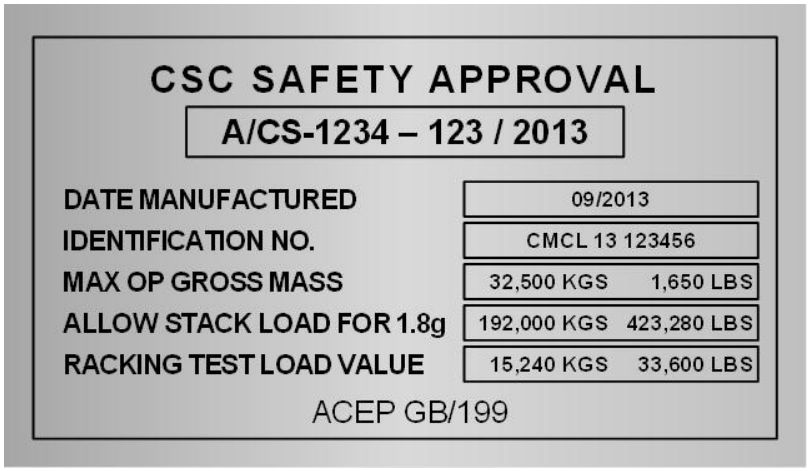


Figure 4.3 Safety approval plate with ACEP mark

1.2.3 If there is no ACEP mark and if the next examination date is already elapsed, or is before the expected arrival time of the freight container at its destination, the freight container should not be used in intermodal or international transport.

1.3 Swap bodies and road trailers destined for transport by rail within the European railway network require a marking as per EN 13044[2]. This operational marking provides information for codification and for approval of the swap body or semi-trailer for rail transport.

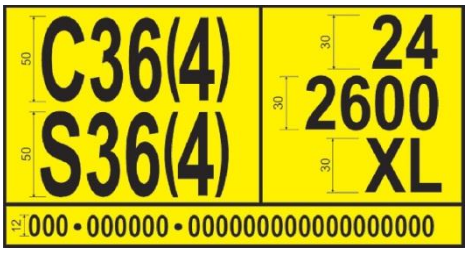


Figure 4.4 Yellow operational mark for swap bodies

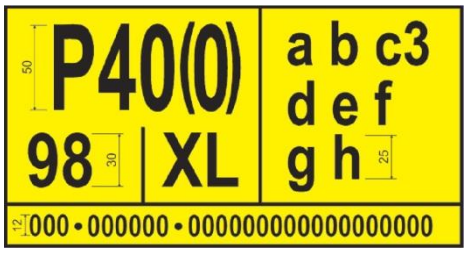


Figure 4.5 Yellow operational mark for trailers

1.3.1 The data on the plates shown in figures 4.4 and 4.5 relate to dimensions of CTU and how they can fit onto rail wagons. The significant information relates to the characters "XL" shown on both plates. This indicates the strength of the swap bodies' body, standard or reinforced, with the marking referring to EN 12642 (see also figure 4.6).

Component	Standard structure Code L	Reinforced structure Code XL
Front wall	0.4P and maximum limit[a]	0.5P without maximum limit
Rear wall	0.25P and maximum limit[b]	0.3P without maximum limit
Side wall	Up to 0.3P	0.4P[c]

[a] 5,000 daN

[b] 3,100 daN

[c] Except for double-decker

Figure 4.6 Static test conditions

[2] EN 13044-2:2011 Intermodal loading units – Marking Part 2: markings of swap bodies related to rail operation

1.3.2 The XL test requirements specifically apply to the following types of body structures:

- box type;
- drop side with side and tail boards without cover;
- drop side with side and tail boards with tarpaulin cover;
- curtain-siders.

2 Maximum gross mass

2.1 Freight containers, like all CTUs, have a maximum gross operating mass or rating which is shown both on the CSC safety approval plate (see figures 4.1, 4.2 and 4.3) and on the rear end of the freight container (see figure 4.7).

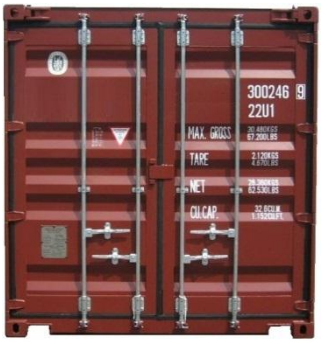


Figure 4.7 Rear of freight container

2.2 The two values shown on a freight container should be the same, however if they are different the value shown on the CSC safety approval plate should be used.

2.3 The tare mass shown in the figure relates to the empty mass of the freight container and should always be shown on the rear end of the freight container. This value will include any permanently attached equipment such as an integral refrigeration unit, but will not include items that are attached, such as a nose mounted generator (clip on unit).

2.4 The maximum payload (or net mass) may be shown on the rear of the freight container, however the correct method for calculating the maximum mass of cargo that the freight container can carry is:

$$P = R – (T_c + T_g + T_s)$$

Where:

P	Maximum payload (or net mass) of cargo
R	Maximum gross mass of freight container
T_c	Tare mass of the freight container
T_g	Mass of additional attached items
T_s	Mass of the securing and bracing materials

3 Allowable stacking mass

3.1 The allowable stacking mass represents the maximum superimposed load that any freight container can be subjected to and is often referred to as the stacking capability or stack height (when converted to a number of freight containers).

3.2 Freight containers built to the provisions of ISO 1496 are required to withstand a minimum superimposed load of 192,000kg. This value is the equivalent of eight superimposed freight containers with an average mass of 24,000kg.

3.3 Freight containers having an allowable stacking mass of less than 192,000 kg are not unrestrictedly suitable for sea transport. This includes:

- Freight containers built to a previous standard;
- Swap bodies;
- Freight containers designed to be used with one door removed/open.

3.4 Swap containers and tanks have a different design and therefore a different stacking capability. The wider designed width of the swap bodies means that there is a step between the corner posts and the top corner fittings which are shown clearly on the swap tank as shown in figures 4.8 and 4.9.



Figure 4.8 Step back at the top fitting



Figure 4.9 Step back with secondary side lift aperture

3.5 Freight containers with a step of this nature will generally have a lower stacking capability. The freight container may be marked with a warning decal that indicates that there is a reduced stacking capability.

3.6 Freight containers with one door off / open will have reduced allowable stacking mass and racking as shown in figure 4.10.

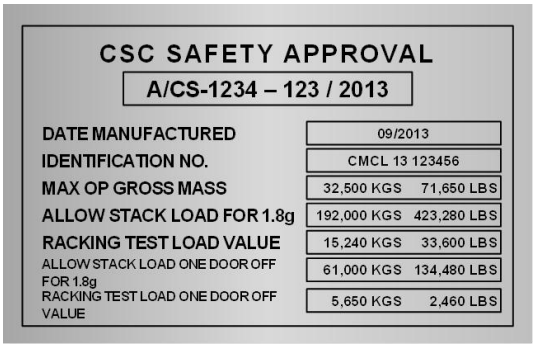


Figure 4.10 CSC safety approval plate for one door off operation

3.7 The practice of transporting cargo in one door open or one door removed freight containers is inherently dangerous and therefore is strongly discouraged. The practice is illegal unless it is marked on the CSC plate (see figure 4.10). Additionally, there may be negative consequences to using this practice in the supply chain (e.g. terminals refusing to handle open door freight containers).

3.8 Where there is reduced allowable stacking mass, due to design or operation, the total gross mass of freight containers and swap bodies placed above should not exceed this value.

3.9 Freight containers which are designed with an allowable stacking mass less than 192,000 kg should be marked in accordance with ISO 6346. This means that the fourth character of the ISO size type code will be a letter.

4 Tank data plates

4.1 All tank containers and swap tanks require essential manufacturing and test data to be recorded on a data plate. This will be generally found on the rear of the tank but may be found attached to the side of one of the rear corner posts.

4.2 The plate shown in figure 4.11 is a typical tank data plate with the sections identified.



Figure 4.11 Typical tank data plate

Owner's name and address

Manufacturers name, address and manufacturing serial number

Tank design details

Operation details

Pressures

Materials

Connections

Inspecting authority

Hydraulic test data

Timber content

CSC safety approval plate

Customs plate

4.3 The important sections are the CSC safety approval plate and the hydraulic test data. Every tank should be subjected to a pressure test every 30 months and a full hydraulic test every 5 years and the date of the test marked on the data plate.

5 European rail wagon marks

5.1 Static axle load and linear load

5.1.1 The axle load and axle spacing of the vehicles defines the vertical quasi-static load input to the track.

5.1.2 The load limits for wagons take into account their geometrical characteristics, weights per axle and weights per linear metre.

5.1.3 They should be in accordance with the classification of lines or sections of lines, categories A, B1, B2, C2, C3, C4, D2, D3, D4 as defined in the following table.

Classification	Mass per axle (P)						
	A	B	C	D	E	F	G
Mass per unit length (*p*)	16.0 t	18.0 t	20 t	22.5 t	25.0 t	27.5 t	30.0 t
5.0 t / m	A	B1					
6.4 t / m		B2	C2	D2			
7.2 t / m			C3	D3			

8.0 t / m			C4	D4	E4		
8.8 t / m					E5		
10.0 t / m							

p = Mass per unit length, i.e. the wagon mass plus the mass of the load, divided by the wagon length in metres, measured over the buffers when uncompressed.

P = Mass per axle

5.1.4 Classification according to the maximum mass per axle P is expressed in capital letters (A, B, C, D, E, F, G); classification according to the maximum mass per unit length *p* is expressed in Arabic numerals (1, 2, 3, 4, 5, 6), except for Category A.

5.1.5 Rail vehicle load table

Shown on each side to the left

The maximum payload is generally not a fixed value for the distinguished wagon, but allocated case by case by means of the intended track category (categories A, B, C, D) and the speed category (S: ≤ 100 km/h; SS: ≥ 120 km/h). These payload figures imply a homogeneous load distribution over the entire loading area (see figure 4.12).

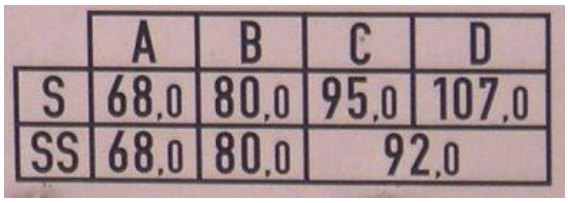


Figure 4.12 Allocation of payload to a rail car

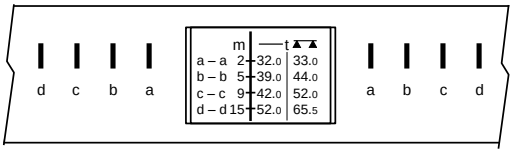
5.1.6 Concentrated loads

Shown in the centre of each solebar[3]

In case of concentrated loads a reduction of the payload is required, which depends on the loaded length and the way of bedding the concentrated load. The applicable load figures are marked in each wagon. Also any longitudinal or transverse eccentricity of concentrated loads is limited by the individual axle load capacity or the wheel load capacity (see figure 4.13).



[3] Main side beam of a rail wagon



Column	Symbol	Description
1		Signs showing the length of the supporting surfaces of concentrated loads, or the distance between supports
2	m	Distance in metre between the signs showing the length
3	——	Maximum tonnage of concentrated loads
4	▲ ▲	Maximum tonnage of loads resting on two supports

Figure 4.13 Reduction in payload due to concentrated load and bedding distance

Annex 5. Receiving CTUs

1 Introduction

1.1 This annex covers a number of actions and activities and provides safety advice for persons involved in the reception and unpacking of CTUs.



1.2 When receiving a CTU, the receiver or consignee should:

1.2.1 Confirm that the unit is as specified on the transport documentation, checking the CTU identification reference as shown in figure 5.1. If the identification reference shown on the documentation is not the same as that on the CTU, it should not be accepted until clarification is received from the shipper.

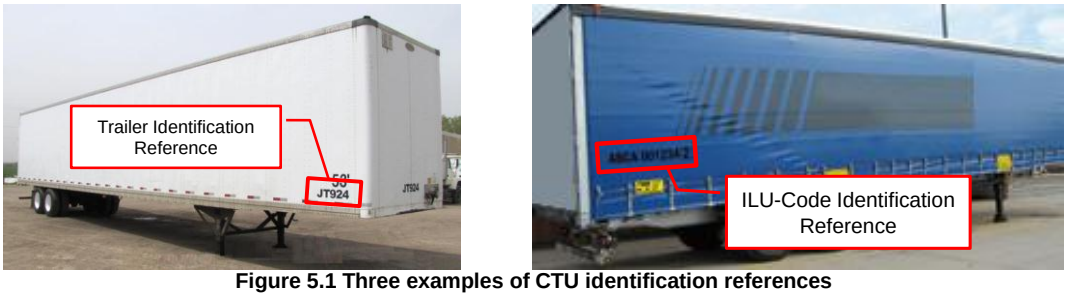


Figure 5.1 Three examples of CTU identification references

1.2.2 Inspect the seal, if fitted. Inspecting a seal requires visual check for signs of tampering, comparison of the seal's identification number with the cargo documentation, and noting the inspection in the appropriate documentation. If the seal is missing, or shows signs of tampering, or shows a different identification number than the cargo documentation, then a number of actions are necessary:

1.2.3 The receiver or consignee should bring the discrepancy to the attention of the carrier and the shipper. The consignee should also note the discrepancy on the cargo documentation and notify Customs or law enforcement agencies, in accordance with national legislation. Where no such notification requirements exist, the consignee should refuse custody of the CTU pending communication with the carrier until such discrepancies can be resolved.

2 Positioning CTUs

2.1 Wheeled operation

2.1.1 Road trailers and freight containers on chassis can be left at the packer's premises for a period of time without a tractor unit. When this happens, the correct positioning of the CTU is particularly important as a safe shifting of the CTU at a later stage might be difficult. After positioning, brakes should be applied and wheels should be chocked.

2.1.2 Trailers with end door openings and general purpose freight containers on chassis can be backed up to an enclosed loading bay or can be positioned elsewhere in the premises. For this type of operation a safe access to the CTU by means of suitable ramps is required.

2.1.3 When a semi-trailer or a freight container on a chassis is to be packed, care should be taken to ensure that the trailer or chassis cannot tip while a lift truck is being used inside the CTU (see figure 5.2).

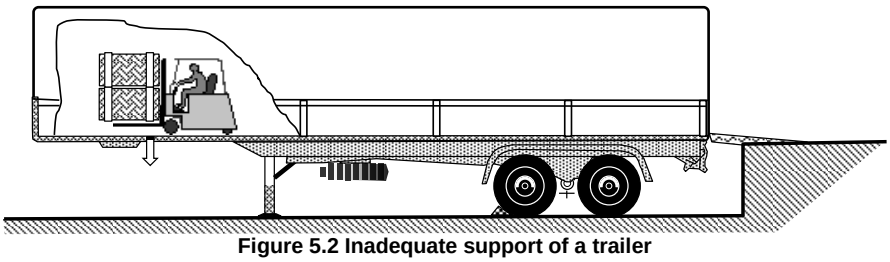


Figure 5.2 Inadequate support of a trailer

If there is a risk for forward tipping the semi-trailer or chassis should be sufficiently supported by fixed or adjustable supports (see figures 5.3 and 5.4).



Figure 5.3 Fixed support



Figure 5.4 Adjustable support

2.2 Grounded operation

2.2.1 Freight containers may be unloaded from the delivery vehicle and be placed within secure areas for packing. The area should be level and have a firm ground. Proper lifting equipment is required.

2.2.2 When landing freight containers it should be ensured that the area is clear of any debris or undulations in the ground that may damage the understructure (cross members or rails) of the freight container.

2.2.3 As freight container doors may not operate correctly when the ground is not level, the door end of the freight container should be examined. When one corner is raised off the ground, when the doors are out of line (see figure 5.5) or when the anti-racking plate is hard against one of the stops, the freight container doors should be levelled out by placing shims under one or other corner fitting, as appropriate.

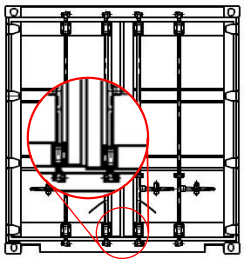


Figure 5.5 Racked freight container

2.2.4 When a swap body standing on its support legs is to be packed, particular care should be taken to ensure that the swap body does not tip when a lift truck is used for packing. It should be checked that the support legs of the swap body rest firmly on the ground and cannot shift, slump or move when forces are exerted to the swap body during packing (see figure 5.6).



Figure 5.6 Swap body landed on support legs

2.3 Access to the CTU

2.3.1 After the CTU has been positioned for packing, a safe access should be provided. For loading a CTU by means of forklift trucks driven into the CTU, a bridging unit between the working ground or loading ramp and the CTU floor should be used. The bridging unit should have lateral boundaries and be safely connected to the CTU for avoiding dislocation of the bridging unit during driving operations.

2.3.2 If the CTU floor is at a height level different to that of the loading ramp, a hump may appear between the loading ramp and the bridging unit or between the bridging unit and the CTU floor. Care should be taken that the forklift truck used keeps sufficient ground clearance over this hump. Lining the level differences with suitable timber material under the bridging unit should be considered (see figures 5.7 and 5.8).

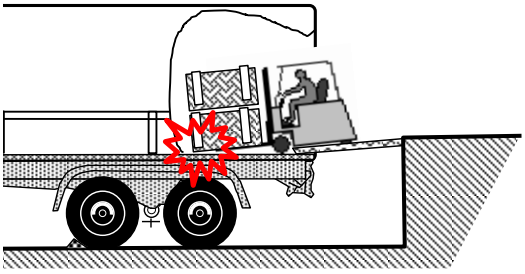


Figure 5.7 Grounding on down slope

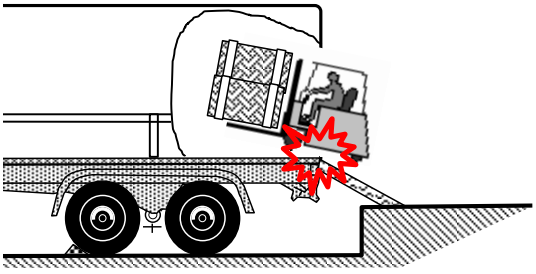


Figure 5.8 Grounding on up slope

2.3.3 If forklift trucks are employed for packing, any roofs or covers of the CTU should be opened if necessary. Any movable parts of such roofs or covers should be removed or suitably secured in order to avoid interference with the loading procedure.

2.4 Packing of CTUs in poor daylight conditions may require additional lighting. Electric lighting equipment should be used under the strict observance of relevant safety regulations, in order to eliminate the risk of electric shocks or incentive sparks from defective cables or heat accumulation from light bulbs.

3 Removing seals

3.1 Stance

3.1.1 The height of the door handle and the seal varies depending on the type of CTU and the design of the door. Rigid vehicles and trailers are generally lower within a range of

1.1 and 1.6 m from the ground. Freight containers carried on a trailer will have the security cam fitted seal approximately 1.4 m from the ground, but the handles and any seals attached to them at a height of approximately 1.9 m (see figures 5.9 and 5.10).

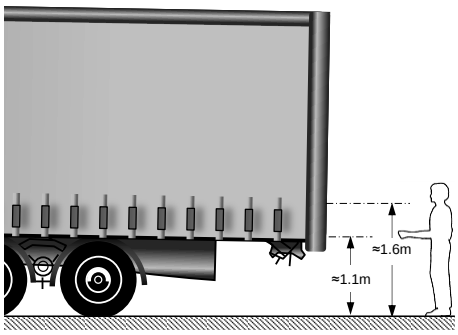


Figure 5.9 Seal heights - trailer

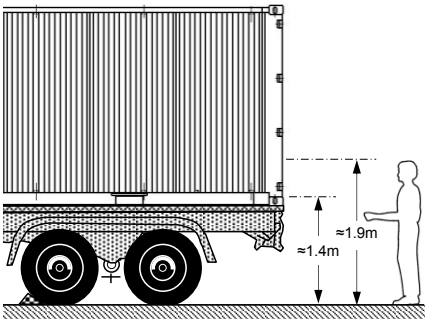


Figure 5.10 Seal heights - freight container

3.1.2 Seals attached to handles on container doors (approximately 1.9 m above the ground) will be about head height for the average person and attempting to cut through a bolt seal at that height is likely to result in a musculoskeletal injury.

3.1.3 The best posture for cutting seals is for the operator to stand upright with the angle at the elbow between 90° and 120° and the elbow in line or slightly forward of the body.

3.1.3.1 Avoid positions where the elbows are behind the body or above the shoulder.

3.1.3.2 When gripping the cutting tool, the wrist should be kept as straight as possible.

3.1.3.3 The best position of the cutting head will be approximately 0 to 15 cm above the height of the elbow. The height above ground level to the elbow for the average (western) man is 109 cm. This means that the best position for the seal will be between 109 and 124 cm (1.09 and 1.24 m) above standing level.



Figure 5.11 Cutting the seal

3.1.4 Figure 5.11 shows a typical example of how many seals are actually cut. The operator has his back bent, the seal is well below the height of the elbow, the arms are almost straight and the left wrist is cocked, while the right appears to be straight.

3.1.5 The length of the bolt cutter levers are very long compared to the movement of the cutting blades, therefore the hands have to "squeeze" in a considerable distance.

3.1.6 Cutting resistance is high as the blades start to cut and reduces to grow again as the cut finishes. Therefore while the hands are wide apart the greatest inwards pressure is required.

3.2 Height adjustment

3.2.1 The normal height for the seals above ground level is between 1.09 and 1.24 m. This means that a normal person when cutting the lower seal position of a freight container mounted on a trailer and with an ideal stance would have their feet approximately 16 cm above ground level. For the higher seal position the foot position would be about 50 cm above the ground.

3.2.2 It is essential that the operator is able to gain a firm footing when cutting the seal. This may require the legs to be spread both laterally and longitudinally. The footing should be:

- Non-slip;
- Level;
- Free from debris and loose items.

There should also be no trip hazard or risk of the operator falling.

3.2.3 For cutting the seal at the lower position a single pallet with a plywood panel fixed to the top, or two pallets stacked with a plywood panel, all fixed together so that there is no risk of the items sliding independently would provide a suitable platform. However there is a risk of the operator accidentally falling from the platform during the cutting operation.

3.2.4 To access the highest seals, the use of a proprietary platform with a narrow work platform width may not allow the operator to stand comfortably and safely as the depth may not be sufficient. A second platform with a plywood panel fixed to both will allow sufficient area for the operator to stand and operate the bolt cutters safely (see figure 5.12). Such platforms should also be fitted with fall protection by way of barriers.



Figure 5.12 Work platform

3.2.5 Mobile work platforms similar to the one shown in figure 5.13 may be rather more sophisticated than is required and a smaller version may be more appropriate (see figure 5.14). As an alternative a simpler device can be fitted to the tines of a forklift truck as shown in figure 5.15.



Figure 5.13 Mobile work platform



Figure 5.14 Mobile work device



Figure 5.15 Mobile work station

3.2.6 The important feature of a mobile work platform is that it can be adjusted to exactly the correct height, has a platform of sufficient area and provides the operator with full fall protection.

3.2.7 A ladder can be used, but this is not a really suitable platform for cutting with large bolt cutters. For smaller cutters they may be used with care.

3.2.7.1 When carrying out a task using a ladder or a step ladder it is essential that three points of contact (hands and feet) are maintained at the working position. Since both hands are required to cut the seal using the bolt cutters, the third point of contact can be substituted by leaning the chest on the ladder or step ladder.

3.2.7.2 Working on a ladder or step ladder should not involve any side loading which necessitates twisting of the body, therefore it is improbable that a ladder can be positioned so as to comply with these requirements and provide sufficient room for the bolt cutters to be operated correctly.

3.2.7.3 Therefore if there is a choice only between a ladder and a step ladder the step ladder will probably provide the better work position.

3.2.8 Figure 5.16 shows the correct position for the operator with the bolt cutters held between the step ladder and the CTU.

3.2.9 In this position there is still a risk of the ladder falling sideways as the cutters are squeezed in, therefore the operator should be supported by a co-worker or the step ladder secured to prevent it falling or sliding.

3.2.10 A safer solution is to use wide mobile steps with a top platform sufficiently wide and deep to permit the operator to stand safely.

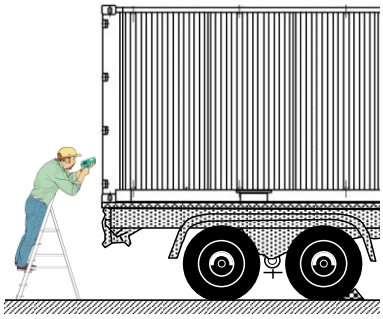


Figure 5.16 Working on container doors

4 Preparing to open the doors

4.1 External checks

4.1.1 Once the seal has been removed the CTU doors may be opened, however before doing so, a few more checks should be made.

4.1.1.1 Check the exterior for signs, marks or other labels that may indicate that the cargo may put those involved in unpacking the CTU at risk.



Figure 5.17 Flexitank label

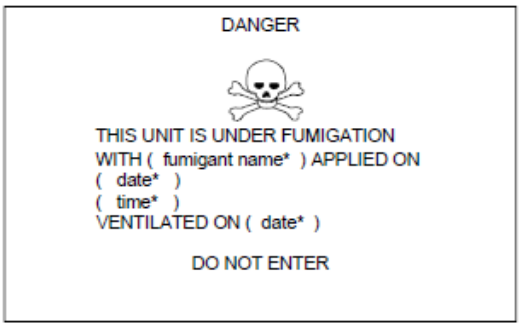


Figure 5.18 Fumigation label



Figure 5.19 Dangerous atmosphere label

4.1.1.2 The labels shown above indicate that opening the doors should follow a particular process. Only the right hand door on a CTU carrying a flexitank should be opened (see figure 5.17). CTUs that have been fumigated (see figure 5.18) or where there is a coolant or conditioner (see figure 5.19) should be opened and ventilated before entering the CTU.

4.1.2 Dangerous atmospheres

4.1.2.1 CTUs carrying dangerous goods also should be opened with care as there is a risk that the carrying packages have been damaged and the goods spilled.

4.1.2.2 Fumigants are highly toxic. Cargoes most likely to have been fumigated include foodstuffs, leather goods, handicrafts, textiles, timber or cane furniture, luxury vehicles and cargo in timber cases or on timber pallets.

4.1.2.3 CTUs transported under fumigation are required to be marked and declared in accordance with the applicable dangerous goods regulations. However, absence of marking cannot be taken to mean fumigants are not present. CTUs marked as having been ventilated after fumigation may also contain fumigant that was absorbed by the cargo and released during transit (see annex 9).

4.1.2.4 CTUs that are fumigated should be properly marked. On occasion, marks may become obliterated or lost during transport. As CTUs may then not be appropriately marked, the doors and vents should be checked. Tape applied to door gaskets or to the vents may indicate the risk of fumigant presence (see figure 5.20).



Figure 5.20 Vent tapped over

4.1.2.5 In addition to the presence of fumigants, toxic gases associated with the cargo's manufacturing process have been found in dangerous levels, for example shoes may have high levels of toluene, benzene and 1,2-dichloroethane.

4.1.2.6 In the short term, vapours irritate the eyes, the skin and respiratory tract. Inhalation of vapours can cause pulmonary oedema. The substance can have an effect on the central nervous system, the kidneys and the liver, causing functional deficiency.

4.1.3 If there are concerns that there are signs of a dangerous atmosphere, a safety data sheet (SDS) should be requested from the consignor or from the shipper, as appropriate and sampling the air inside the CTU before opening could be considered.

5 Measuring gases

5.1 A number of surveys have revealed undeclared gases carried in CTUs. Many of the gases are dangerous and would constitute a severe risk to those involved in unpacking.

5.2 The person who controls the opening and entry of CTUs should always check the chemical properties and the threshold limit value (TLV) of the relevant chemical, referring to their own national standards and guidelines where they exist.

5.3 Unfortunately, one cannot rely on ones sense of smell as most of these gases will be well above their TLV by the time they can be detected. The only practical way is to take air samples. In the open this is very difficult. Initially, a device that identifies the gas is required before the concentration of the gas can be measured.

5.4 The simplest and easiest way to measure the internal atmosphere is to use a readily available detector tube device. Do not open the CTU but gas can be sampled by forcing a solid tube in through the door gaskets (see figure 5.21).

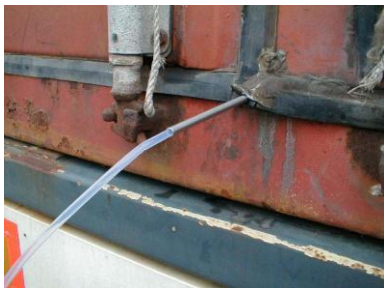


Figure 5.21 Sampling gas

5.5 There is no device available that can detect all hazardous gases, therefore one measurement will not provide sufficient information about the internal atmosphere and multiple tests will be required.

5.6 The risk of hazardous gases in CTUs is relevant to all parties in the supply chain. The causes of these gases can be attributed to internal business processes in manufacturing or by actions performed on behalf of third parties (service providers and logistics companies).

5.7 Action plans for testing and reacting to hazardous gases in CTUs may be drawn up by companies to protect their employees from the effects of these gases when opening and unpacking them. The companies producing the actions plans may not be the ultimate consignees of the goods, but may be authorized to open the CTU earlier in the supply chain or responsible for unpacking.

5.8 It should be remembered that hazardous gases may be introduced into the CTU by:

- Deliberately adding gases to prevent deterioration of the goods by pests;
- Emissions of substances used in the manufacture of products or dunnage;
- Chemical or other processes in the cargo.

5.9 In addition, incidents may occur that permit the release of gases from declared or undeclared dangerous goods being carried.

6 Opening the doors

6.1 Unstable or poorly packed cargoes may be pressing against the doors which may be forced open when the door gear is released, or the cargo may fall out once the doors are opened.

6.2 The first action for steel doors is to "ring" them which is to tap the flat surface of both doors. If the sound is dull and there is no resonance then it is likely that the cargo will be resting against the door. Extra care should be taken when opening the door.

6.3 If there is a risk that the cargo is resting against the doors or the CTU contains bulk materials, a safety chain can be fitted across the doors, from top to bottom corner fittings (see figure 5.22). This technique can be also used on CTUs without corner fittings by applying a chain from an anchor point on each side or using a shorter chain attached to the locking bars. The length of the chain should be long enough to permit the doors to open but short enough so that the doors cannot open more than 150 mm (6 in).



Figure 5.22 Safety chain

6.4 If a diagonal chain cannot be fitted, then a loose strap across the inner lock rods may be used. If there is no facility for attaching the strap, or strap available the person opening the doors should always open the doors with caution.

6.5 Handles for CTUs vary, some will have one locking bar, others two and the handle design may be a bar or a formed handle, as shown in figures 5.23 to 5.25.

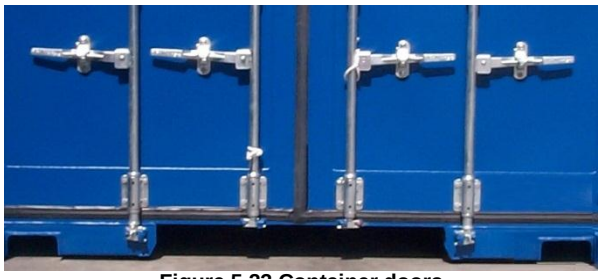


Figure 5.23 Container doors

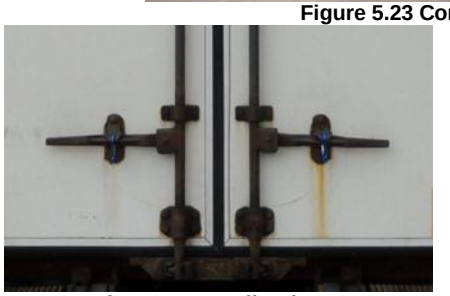


Figure 5.24 Trailer doors



Figure 5.25 Trailer doors

6.6 They may be in the format where the handle is on the same side of the locking rod (see figure 5.26) or between the rods (see figure 5.27).



Figure 5.26 Handles on same side



Figure 5.27 Handles between bars

6.7 Most CTU doors open easily by rotating the handles approximately 90° and then pulling on the handles of locking bars. The action of rotating the bars will mean that the cams push against their keepers and force the door open.

6.8 Figure 5.28 shows the operation of the cams on many freight containers. Rotating the lock rod (A) will cause the breaker surface of the cam to press against the keeper (B), thus forcing the door open(C).

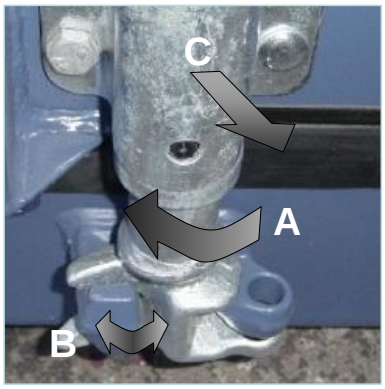


Figure 5.28 Door cam operation

6.9 Once the lock rods have been fully rotated, adopt an upright stance and grasp the lock rods or the door at about shoulder height or just below and pull backwards using the whole body.

6.10 If the doors do not open easily:

- Check that the cams are clear of the keepers;
- Check that the CTU is level and the doors are not binding on the frame;
- Gain assistance to pull the doors open.

6.11 If one door will not open, and the other door may be opened (i.e. the CTU is not carrying a dry bulk tank), then both doors could be opened at the same time which may make opening the doors easier.

6.12 As the door opens be prepared to step back quickly if:

- The contents of the CTU start to fall out; or
- The door appears to be pushing you, not you pulling the door.

6.13 If you need to step out of the way move away from the hinged side of the door.

6.14 Doors in the various types of CTU may open with different degrees of difficulty. The following contribute to this difficulty:

- Corrosion to the door component and hinge pins;
- Damage to the door component, including door gear, or corner post resulting in the misalignment of the hinges;
- Condition of the gaskets, which may not seat properly on the door;
- Racking of the CTU. Many CTUs rely on the doors to hold the rear end of the CTU square. If the CTU is placed on uneven ground the CTU may rack and the doors become misaligned (see figure 5.29).

6.15 Once the doors are free to swing and there is no risk on injury caused by the cargo falling out, walk the doors through 270° and attach the retaining strap to the hook to prevent the door from swinging (see figure 5.30).

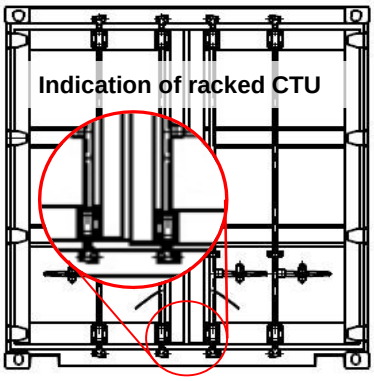


Figure 5.29 Racked CTU



Figure 5.30 Door retaining strap

6.16 DO NOT ENTER THE CTU YET

7 Ventilation

7.1 Introduction

7.1.1 Closed CTUs are enclosed spaces and care should be taken before entering. Even without toxic gases and other asphyxiates oxygen supply may be depleted which could make normal breathing difficult. Ventilating a CTU will allow fresh air to circulate into the CTU and around any cargo carried and remove any harmful or toxic gases or fumes. The most effective method is to use forced ventilation.

7.1.2 It is a risky activity and it is important that CTUs are ventilated responsibly. The person who opens and closes the doors should be aware of the possible risks involved and, if required, wear personal protective equipment (PPE). The selection of the appropriate PPE will depend on measurements taken to determine the concentration and toxicity of the gases within the CTU and may require a combination of breathing apparatus and skin protection.

7.2 Planning

7.2.1 When ventilating CTUs a number of factors will determine the action required:

7.2.1.1 The concentration of the gas. The greater the concentration the longer the CTU will require for ventilation.

7.2.1.2 The nature of the gas. Some gases are very light and volatile and will evaporate quickly. Others are less volatile and/or adhere to the cargo, such as methyl bromide and 1,2-dichloroethane. The time for ventilation will need to be decided upon accordingly. It may not be possible to completely remove traces of gases that adhere to the cargo and the CTU may only be declared clean and safe to enter after the cargo has been removed and the CTU washed.

7.2.1.3 Ambient temperature. Higher temperatures will generally permit faster evaporation thus reducing the time to declare the CTU safe to enter. At lower temperatures, some fumigants stop working and remain inert until the temperature again rises. This can mean that the correct volume of a fumigant for the journey initially applied in a hot packing location which then passes into a colder area may arrive at the destination with high levels of fumigant still remaining in the CTU.

7.2.1.4 The size of the CTU. A 12 m long CTU has approximately twice the internal volume of a 6 m unit, and if the doors are only at one end, the circulation of gas has to travel considerably further.

7.2.1.5 The packing method. A CTU that has been tightly packed and is especially full will be more difficult to ventilate than one with many gaps and "open air" around the packages.

7.2.1.6 The nature of the cargo. Cargo that absorbs gases, such as mattresses and clothes, requires more time for ventilation than hard surfaced products. Absorbent materials hermetically sealed within a plastic or similar cover will not require the same time to ventilate as an uncovered item.

7.2.1.7 Packing material used. Absorbent packing materials will require extra time for any gases to leach out. Such materials may require special disposal to meet local environmental regulations.

7.2.1.8 The time which elapsed after the CTU has been closed.

7.3 Ventilation of CTUs can happen in two ways, natural or forced ventilation.

7.3.1 Natural ventilation

7.3.1.1 This can be done by simply opening the doors.

7.3.1.2 In some countries local regulations require an environmental permit for opening CTUs with high concentrations of dangerous gases. Once the application is received the Competent Authority determines under what conditions the company may ventilate on site. The granting of an environmental permit may take up to 6 months.

7.3.1.3 Estimate the necessary ventilation time in advance. CO, CO_2 or O_2 degas quickly. At encountering these substances start with a minimum of 2 hours ventilation. For other substances this will be insufficient and it is suggested that the CTU is ventilated for at least 24 hours. Record start and end time.

7.3.2 Forced ventilation

7.3.2.1 To carry out forced ventilation or degassing there are several possibilities. A few examples:

- Powerful fans, one or more fans directing air into and/or out of the CTU will stimulate the circulation of gases within the CTU.
- A "degassing door" (Ventilation & Gas Recapture System). This door will completely seal off the CTU and is fitted with two sealable openings. When for example air is blown through the top opening and is extracted at the bottom the unwanted gas disappears with the air from the CTU. At the end of the hose where the air from the CTU comes out, a suitable filter can be placed so the gases don't end up in the environment.

7.3.2.2 The advantage of forced ventilation is that it reduces the time necessary to remove high concentration of residual gas, partly because the climatic conditions can be optimized.

7.3.3 General safety

7.3.3.1 Do not enter the CTU during ventilation.

7.3.3.2 Make sure that during ventilation warning signs or otherwise clearly indicate that the CTU should not be approached or entered. For methyl bromide, phosphine and sulfuryl fluoride, for example, a minimum distance of 20 m all around the CTU should be set.

7.3.3.3 Toxic gas concentrations in the cargo space and the cargo itself should be measured and once they fall below the limit(s) the CTU may be released for entry. Carry out additional measurements if the doors are closed without the cargo being unpacked and the interior cleaned for a period of 12 or more hours.

7.3.3.4 The climatic conditions should also be monitored and action taken if:

- The outside temperature falls below 10°C. It is unlikely that ventilation will occur as gases will not evaporate at this temperature;
- There is no wind. Gases expelled from the CTU will not be diluted into the atmosphere and may linger at the CTU's doors.

7.3.3.5 A specialist gas removal contractor should be used if:

- The concentration exceeds 6 times the limit;
- If phosphine is detected. When opening a CTU or when unpacking or transferring cargo, highly toxic gas may be released as a result of residues of tablets not yet exhausted. In this case, the limit of the substance concerned may be exceeded.

7.3.3.6 Specialist gas removal contractors may move the CTU off site into closed and regulated area. The premises are inaccessible to unauthorized persons and the company guarantees that the cargo is monitored.

7.3.3.7 If in doubt, or for questions always contact a local company who specializes in the ventilation and degassing of CTUs.

7.3.4 Environment

7.3.4.1 Remember that toxic gases within the CTU will dissipate into the atmosphere. It should be remembered that the higher the gas concentration the greater the harm to the environment.

7.3.4.2 Consider the waste (residue) as hazardous waste. In practice this means that the waste should be offered to a certified collector to be processed or destroyed.

7.4 Ventilation first, then measure. This means that if the quantity and concentration of a toxic gas is known, then the CTU may be ventilated in accordance with the calculated time without the need for measuring the atmosphere until the ventilation time has expired. As always a test should be carried out before entering the CTU.

8 Returning the CTU

8.1 General

8.1.1 The internal and external cleanliness of CTUs is very important if unnecessary restrictions to their use and movement are to be avoided.

8.1.2 The receiver or consignee should return the CTU in the same state that it was delivered. This means that the CTU should be:

- Completely empty and clean. A clean CTU should be free of all cargo residues, plants, plant products, visible signs of pests, packing, lashing and securing materials marks, signs and placards associated with packing the CTU or the cargo, and any other debris removed. This includes fumigant materials or other noxious substances (see definitions in chapter 2 of this Code). Personal protective equipment should be provided for such work;
- Returned in a timely manner as agreed with the CTU operator. CTUs in the supply chain and associated road vehicles, if separate, are often scheduled for immediate reuse or positioning. CTU operators may charge demurrage if the CTU is not returned as soon as practically possible after unpacking.

8.2 Cleanliness

8.2.1 If additional cleaning beyond a thorough sweep of the CTU is required the consignees should consider the following techniques:

- Washing – wash the interior of the CTU using a low pressure hose and a scrubbing brush (if required). To remove contamination a suitable additive or detergent can be used;
- Power washing – internal faces using a medium pressure washing device;
- Scraping – areas of contamination can be removed by light scrapping. Care should be taken not to damage the paint work, or flooring.

8.2.2 After a CTU with dangerous cargoes, including fumigated cargoes, has been unpacked, particular care should be taken to ensure that no hazard remains. This may require special cleaning, particularly if spillage of a toxic substance has occurred or is suspected. When the CTU offers no further hazard, the dangerous goods placards, placards and any other marks or signs regarding the cargoes should be removed. A CTU that retains these exterior signs and marks should continue to be handled as though it still carried the dangerous goods.

8.2.3 Contamination of the CTU can be found in many different guises:

- Damage to the interior paint work where the surface finish becomes cracked, flaky or softened by contact with a substance;
- Stains and wet patches to any part of the CTU, especially the flooring, which can be transferred to a cloth by light wiping. Small dry stains that do not transfer to the cloth are considered as non-transferrable and may not be considered as contamination;
- Visible forms of animals, insects or other invertebrates (alive or dead, in any lifecycle stage, including egg casings or rafts), or any organic material of animal

origin (including blood, bones, hair, flesh, secretions, excretions); viable or non-viable plants or plant products (including fruit, seeds, leaves, twigs, roots, bark); or other organic material, including fungi; or soil, or water; where such products are not the manifested cargo within the CTU.

8.2.4 Dunnage, blocks, bags, braces, lashing materials, nails into the floor and tape used to cover vents and gaskets should all be removed.

8.3 Disposal

8.3.1 Local environmental regulations and legislation should be considered when disposing of waste removed from the CTU.

8.3.2 Cargo residues should be removed and disposed of in line with the consignee's procedures.

8.3.3 Wherever possible or practicable, dunnage bags and other materials should be recycled[1].

8.3.4 Timber dunnage, blocks and braces should be checked for the appropriate IPPC mark (see annex 7, section 1.14). Other timber should be disposed of by incineration.

8.3.5 Liner bags and flexitanks are often removed by the supplier; however all will be contaminated and should be disposed of at an appropriate facility.

8.3.6 Plants, plant products, visible pests, animals and other invasive alien species should be disposed of as described in annex 6.

8.4 Damages

8.4.1 The various types of CTU suffer differing degrees of damage en route. Rail wagons probably do not suffer much handling damage and are only likely to be damaged by poorly secured cargoes. Road vehicles, especially articulated trailers, do suffer from turning and reversing damage as the vehicle is manoeuvred. Freight containers and swap bodies will suffer from the same manoeuvring damage, but may also suffer from impact damage between other freight containers and swap bodies and handling equipment.

8.4.2 Drivers of road vehicles will generally report any manoeuvring damage but if the trailer or freight container has been collected from a terminal, will only be able to report on damages incurred in the delivery phase. Damages incurred earlier in the supply chain may go unreported unless marked on an interchange document.

8.4.3 The consignee will generally be held responsible for any damage incurred, other than those that have been verifiably observed and endorsed by the CTU operator. For unaccompanied CTUs this endorsement should be shown on the interchange document. It is therefore important that any signs of damage, including recent damage, should be identified and reported on arrival.

[1] Do not reuse inflatable dunnage bags if they cannot be safely reinflated.

Annex 6. Minimizing the risk of recontamination

1 Introduction[1]

1.1 The delivery of a clean CTU to the packer is of little use if the CTU becomes recontaminated during its movement within the supply chain. Appropriate measures should be taken to ensure recontamination does not occur. This should include:

- Storing the CTU an appropriate distance away from pest habitats or resident pest populations (the distance will depend on the pest);
- Storing the clean CTU in areas free of risk from recontamination by vegetation, soil, free standing water or unclean CTUs;
- Taking species' specific measures where quarantine pests are nominated by importing countries;
- Fully paved/sealed storage and handling areas;
- Safeguards should be applied in specific situations to prevent attracting pests such as when using artificial lights, or during seasonal pest emergence periods and occasional pest outbreaks

1.2 Where CTUs are moved to a storage area, packing area, port of loading, or are transiting through another country, prevention measures should be taken to avoid contamination.

2 Safeguards

2.1 Artificial lighting

CTU and other storage yards are often illuminated by a number of high light pylons/towers (see figure 6.1). These are normally fitted with gas discharge lamps. Due to the height of the towers and the area that they illuminate the lights are generally "bright" and therefore can attract insect and other pests from some distance.



Figure 6.1 Lighting tower

2.1.1 Lights that attract

Lights that radiate ultraviolet and blue light attract more insects than other types of lights. Examples of these types of lights include black lights, metal halide and fluorescent. Lights that generate heat may attract insects.

2.1.2 Less attractive to bugs

Yellow incandescent, high-pressure sodium and regular incandescent lights radiate less blue and ultraviolet light, thus reducing the attraction of insects to the area.

2.1.2.1 Low-pressure sodium lights

Low-pressure sodium lights do not attract insects. They are efficient, and give off an orange-yellow light. The light gives off less light pollution at night, and is better for stargazers. The light will change the appearance of colours it illuminates, though, because of its orange-yellow glow.

[1] Relevant definitions are given in chapter 2 of this Code.

2.1.2.2 LED lighting

New versions of light-emitting diode, or LED, lighting are more efficient and attract fewer flying insects than other traditional lighting. LED lighting has a long lifespan, but can be more expensive for municipalities to install initially. LED lamps are more directional and give off less light pollution.

2.1.3 Considerations

Yard lights that do not give off ultraviolet radiation are considered less attractive to flying insects. Some bugs are attracted to the heat emitted from incandescent street lighting. Some bugs will be attracted to any light, which is called positively phototactic. Some insects, like moths, use light for navigation. Moths use the light from the moon, but when they encounter a brighter source, they move toward it.

2.2 Seasonal pest emergence

2.2.1 In any given landscape, there may be hundreds of species and cultivars of native and exotic trees, shrubs, and garden plants. Throughout the growing season, these plants may be attacked by a similarly diverse assortment of insects, including wood borers, leafminers, scale insects, plant bugs, and leaf-feeding caterpillars.

2.2.2 Timing is everything when managing landscape pests. To be effective, insecticides or biological controls should be applied when pests are present and at their most vulnerable life stage. For example, scale insects are best controlled after the eggs have hatched but before the crawlers have formed a protective cover. Controlling wood borers requires treating host trees with insecticides to intercept the newly hatched larvae before they have penetrated the bark. Leaf-feeding caterpillars such as bagworms and tent caterpillars are easiest to control when the larvae are small. Timing is especially important when using short-lived materials such as summer oils, soaps, and Bacillus thuringiensis.

2.2.3 Frequent in-the-field inspection is the most reliable means to detect insect problems and time control efforts. Unfortunately, regular monitoring is too time-consuming for many landscape managers. Field workers may not know when or where to look for vulnerable life stages or may not recognize them when encountered. Pests such as the holly leafminer, honeylocust plant bug, and potato leafhopper feed in advance of any recognizable damage. Pheromone traps are available for monitoring certain insects (e.g., clearwing borers) but require time and expertise to use effectively.

2.3 Forecasting using plant phenology

2.3.1 Phenology is the science dealing with the effects of climate on seasonal biological events, including plant flowering and insect emergence. Insects are cold-blooded, and like plants, their development will be earlier or later depending on spring temperatures. Since both plant and insect development are temperature dependent, seasonal appearance of particular insect pests should follow a predictable sequence correlated with the flowering of particular landscape plants. In a three-year research project[2] , the seasonal development and emergence of 33 important insect pests were systematically monitored and tracked resulting in the creation of the timetable below. This information would help landscape managers and lay persons anticipate the appearance of important insect pests and effectively schedule control measures.

[2] Timing Control Actions for Landscape Insect Pests Using Flowering Plants as Indicators, G.J. Mussey, D.A. Potter, and M.F. Potter: Department of Entomology, College of Agriculture, University of Kentucky.

2.3.2 Using this science it is possible to develop a table which predicts the sequence and date of emergence of particular insects, pests or other species that could constitute a biotic threat if transported overseas. Seasonal emergence of each pest is correlated with the flowering of 34 familiar landscape plants.

2.4 Occasional pest outbreaks

2.4.1 Occasional invaders are insects and other arthropods that sporadically enter facilities and in particular CTUs, sometimes in large numbers.

2.4.2 By far the most common problem with occasional invaders is that they become an annoying nuisance. Some can bite, pinch, secrete foul odours, damage plants, stain indoor furnishings, and damage fabrics. Even after they are dead, the problem may continue. The bodies of dead insects can attract other pests that feed on them, and the bodies, shed skins, secretions and faeces of insects can cause allergic responses and trigger asthma.

2.4.3 Whether they're insects, mites or arthropods, occasional invaders typically live and reproduce outdoors. They invade structures when conditions indoors are better for them than outdoor conditions. It is important to know the conditions that prompt invasions of unwanted pests. Altering environmental conditions can make structures inhospitable for pests, and is an important component of integrated pest management.

2.4.4 How to stop occasional invaders

2.4.4.1 Exclusion is the first step to prevent all occasional invaders. Exclude them by ensuring that CTU doors are kept closed and that the seals are properly position. However, the vents found on many CTUs will permit insects to gain entry. It is therefore important to inspect CTUs interiors before use and/or movement.

2.4.4.2 Habitat modification is another important control method. A plant-free band of rock, gravel or other inorganic material extending away from the facility essentially puts a barrier between occasional invaders and the CTUs. Organic material, such as soil, leaves, mulch, bark, grass and ground covers, retain moisture which attracts pests and also provides food and shelter for them. Leaky pipes, faucets, misdirected downspouts and faulty grades can also provide moisture that attracts not just occasional invaders but many other pests including termites. The environment around a structure also can be manipulated by reducing outdoor lighting. Mercury vapour lights can be replaced with sodium vapour lights which are less attractive to insects. Low-wattage, yellow "bug light" bulbs can be used and shielded to reduce pest attraction. Indoors, windows and doors should be shaded so little or no light is visible from outside.

2.4.4.3 Various mechanical controls also can be employed. When pests enter in significant numbers, it is best to remove them with a vacuum cleaner. After vacuuming, seal them in bags and dispose of them promptly. Pests that cluster outdoors can sometimes be deterred, or at least discouraged, by spraying them with a water hose.

2.4.4.4 Traps are another useful mechanical control. Insect monitors, or sticky traps, can be purchased at local hardware stores, home and garden centres, from some pest control suppliers, or through the Internet. Sticky traps are simply cardboard with an adhesive that pests stick to when walking across them. When positioned indoors at

likely entry points, on either side of doors, for instance, they can help monitor for pest intrusions. When numerous pests are caught on sticky traps in the garage, it may be time to apply additional methods before things get worse.

2.4.4.5 For pests attracted to lights, commercial light traps can be used, or makeshift light traps can be assembled for rooms where invaders congregate. Surround the lights with sticky traps.

2.4.5 Chemical control with pesticides also can be integrated into pest management plans, but consider using pesticides only after other methods fail. Baits, dusts and granular formulations, can be used in some situations (see discussions above). Total-release aerosols (known as "bombs" or "foggers") are generally of little use in combating occasional invaders. These products may not penetrate deeply enough into cracks and voids to contact the pests hiding there. Pesticide application directly into nooks and crannies that harbour pests such as boxelder bugs and lady beetles is also often recommended, but treatment of wall and window frame voids, above false ceilings, etc., can be counterproductive. First, pests killed in these spots are often difficult to remove and are attractive to pests that feed on dead insects. Also, when exposed to accumulations of insects, some people develop allergic reactions to the insect fragments, shed skins and faeces. As an alternative to the direct treatment of voids, pests can be allowed to overwinter in them and emerge when temperatures warm up, at which time they can be killed and collected.

2.4.6 In most cases, the most effective and least hazardous pesticide applications for control of occasional invaders are outdoor applications. These involve residual pesticides applied in a band to the ground immediately around the foundation, the foundation wall, and sometimes around other potential points of entry including door and window frames, around vents, and where utility lines enter.

2.4.7 Microencapsulate, wettable powder, and suspended concentrate products work well for perimeter treatment because they don't soak in to porous surfaces as much as other formulations and adhere more easily to pests. But the timing of perimeter treatments is critical to success. Applications at times when pests are not likely to enter the structure, after pests have already entered, or with ineffective products, can needlessly expose people, pets and other non-target organisms to pesticides while providing little or no control. The use of pesticides may be best left up to pest management professionals.

NOTE: When pesticides are used, it is the applicator's legal responsibility to read and follow directions on the product label. Not following label directions, even if they conflict with information provided herein, may be a violation of local regulations.

3 Pests, insects, animals etc. that can cause recontamination

3.1 Soil

3.1.1 Soil can contain spores, seed and eggs of one or more invasive alien species, and therefore should not be carried on or in the CTU internationally. Soil can be found at floor level in the internal corrugations of the side wall, in the internal angles of the corner posts and externally in the corner fitting apertures and body, fork pocket openings and on the upper surfaces of the cross rail bottom flanges (see figures 6.2 and 6.3).



Figure 6.2 Mud in corner fitting



Figure 6.3 Mud in fork pocket

3.1.2 Recontamination of the CTU will generally result from positioning the CTU on mud, or a soft surface. Care should be taken to prevent the CTU from scraping across the ground surface.

3.1.3 Soil can also enter the CTU on the feet of persons, on the wheels of handling equipment and on the packages or goods themselves.

3.1.4 Soil should be swept out and bagged for incineration or washed out using a high pressure spray.

3.2 Plants/plant parts/debris and seeds

3.2.1 Plants can grow on CTUs if residual seed has been allowed to germinate with or without contaminating soil (see figure 6.4). Other plant matter found on CTUs includes leaves and other plant parts. Leaves can harbour spores and bacteria that can harm crops at the destination.



Figure 6.4 Previous cargo debris

3.2.1.1 Moths

Figure 6.5 shows examples of moths.





Figure 6.5 Asian gipsy moth

3.2.1.2 Snails and slugs

Figure 6.6 shows examples of snails.





Figure 6.6 Giant African snail

3.3 Ants

3.3.1 Some ant species are considered pests, and because of the adaptive nature of ant colonies, eliminating the entire colony is nearly impossible. Pest management is therefore a matter of controlling local populations, instead of eliminating an entire colony, and most attempts at control are temporary solutions.



Figure 6.7 Pharaoh ant



Figure 6.8 Carpenter ant nest

3.3.2 Ants classified as pests include the pavement ant, yellow crazy ant, sugar ants, the Pharaoh ant (see figure 6.7), carpenter ants (see figure 6.8), Argentine ant, odorous house ants, red imported fire ant and European fire ant. Populations are controlled using insecticide baits, either in granule or liquid formulations. Bait is gathered by the ants as food and brought back to the nest where the poison is inadvertently spread to other colony members through trophallaxis. Boric acid and borax are often used as insecticides that are relatively safe for humans. Bait may be broadcast over a large area to control species like the red fire ant that occupy large areas.

3.3.3 Individual ants should be swept out of CTUs if possible, but larger colonies or infestations, require the entire colony to be destroyed and removed for incineration.

3.4 Bees and wasps

Figures 6.9 and 6.10 show examples of wasp and wasp nest.



Figure 6.9 Sirex wasp



Figure 6.10 Sirex wasp nest

3.5 Mould and fungi

When CTUs are left in damp, dark conditions fungi and other airborne spores can lodge and grow on the residual soil left on surfaces of a CTU.

3.6 Spiders

Figures 6.11 and 6.12 show examples of spider and spider eggs.



Figure 6.11 Wolf spider



Figure 6.12 Spider eggs

3.7 Frass

3.7.1 Frass is the fine powdery material phytophagous (plant-eating) insects pass as waste after digesting plant parts. It causes plants to excrete chitinase due to high chitin levels, it is a natural bloom stimulant, and has high nutrient levels. Frass is known to have abundant amoeba, beneficial bacteria, and fungi content. Frass is a microbial inoculant, also known as a soil inoculant, which promotes plant health using beneficial microbes. It is a large nutrient contributor to the rainforest, and it can often be seen in leaf mines.

3.7.2 Frass can also refer to the excavated wood shavings that insects like the carpenter ants kick out of their galleries during the mining process. Carpenter ants do not eat wood, so they discard the shavings as they tunnel (see figure 6.13).



Figure 6.13 Wood frass from boring insect

3.7.3 Frass is a general sign of the presence of a wood boring or another insect and therefore in need of cleaning. It is essential that affected plants or timber be removed and incinerated.

3.8 Animals (including frogs)

Figure 6.14 shows examples of animals.



Figure 6.14 Squirrels and frogs

4 Contaminant treatment

4.1 The contaminant treatment method should be that most effective for the contamination present. Consideration should be given to containment and treatment of pests that have a potential for spread. In some cases national authorities may request the specimen be collected for identification purposes.

4.2 If a CTU is found to have a minor recontamination, cleaning can be effected using one of the following methods:

- Sweeping out or vacuum cleaning the CTU and applying an absorbent powder if required;
- Using low pressure water wash;
- Scraping.

4.3 If a live animal or insect is found which can be swept or washed out then this should be done. Bodies of animals should be disposed of safely by bagging and incineration. If the animal is considered as too dangerous to remove, then close the CTU's doors and inform the CTU supplier.

4.4 Intermodal operators may have contracts with pest control organizations who may be employed to remove serious recontamination.

4.5 Examples of contaminant disposal methods



Figure 6.15 Quarantine waste

4.5.1 Bagging

Most operators within the supply chain can only resort to this option, where any pest or animal waste is placed within bag, sealed and then into a sealable containment bin for collection by a suitable pest control organization (see figure 6.15). It is essential that there is no opportunity for the sealed bags to be attacked by other animals which could spread the pest contamination.

4.5.2 Incineration

4.5.2.1 High temperature

High temperature incineration requires a temperature of 10,000 °C and is unlikely that operators will have a facility to achieve this. Therefore any waste that should be incinerated using high temperature should be passed onto a suitable facility.

4.5.2.2 Low temperature

Incineration within a local incinerator for general waste may be suitable for timber and other non-animal waste.

4.5.3 Deep burial

Deep burial requires quarantine waste to be buried below at least 2 m of non-quarantine waste. It is unlikely that this disposal method for supply chain operators.

Annex 7. Packing and securing cargo into CTUs

1 Planning of packing

1.1 When applicable, planning of packing should be conducted as early as possible and before packing actually commences. Foremost, the fitness of the envisaged CTU should be verified (see chapter 7 of this Code). Deficiencies should be rectified before packing starts.

1.2 Planning should aim at producing either a tight stow, where all cargo packages are placed tightly within the boundaries of the side and front walls of the CTU, or a secured stow, where packages do not fill the entire space and will therefore be secured within the boundaries of the CTU by blocking and/or lashing.

1.3 The compatibility of all items of cargo and the nature, i.e. type and strength, of any packages or packaging involved should be taken into account. The possibility of cross-contamination by odour or dust, as well as physical or chemical compatibility, should be considered. Incompatible cargoes should be segregated.

1.4 In order to avoid cargo damage from moisture in closed CTUs during long voyages, care should be taken that other wet cargoes, moisture inherent cargoes or cargoes liable to leak are not packed together with cargoes susceptible to damage by moisture. Wet timber planks and bracings, pallets or packagings should not be used. In certain cases, damage to equipment and cargo by condensed water dripping from above may be prevented by the use of protective material such as polythene sheeting. However, such sheeting or wrapping may promote mildew and other water damage, if the overall moisture content within the CTU is too high. If drying agents are to be used, the necessary absorption capacity should be calculated. More information may be found in annex 3.

1.5 Any special instructions on packages, or otherwise available, should be followed, e.g.:

- Cargoes marked "this way up" should be packed accordingly;
- Maximum stacking height marked should not be exceeded.

Note: See appendix 1 to this annex for further details on packaging marks.

1.6 Where packing results in stacks of packages, the strength of the individual packages should be capable of supporting those placed above them. Care should be taken that the stacking strength of packages is appropriate for the stack design.

1.7 Consideration should be given to potential problems, which may be created for those persons who unpack the CTU at its destination. The possibility of cargo falling out when the CTU is opened should definitely be avoided.

1.8 The mass of the planned cargo should not exceed the maximum payload of the CTU. In the case of freight containers, this ensures that the permitted maximum gross mass of the freight container, marked on the CSC safety approval plate, will not be exceeded. For CTUs not marked with their maximum permissible gross mass or payload, these values should be identified before packing starts.

1.9 Notwithstanding the foregoing, any limitation of height or mass along the projected route that may be dictated by regulations or other circumstances, such as lifting,

handling equipment, clearances and surface conditions, should be complied with. Such mass limits may be considerably lower than the permitted gross mass referred to above.

1.10 When a heavy package with a small "footprint" will be shipped in a CTU, the concentrated load should be transferred to the structural transverse and longitudinal bottom girders of the CTU (see section 3.1 of this annex for details).

1.11 In longitudinal direction the centre of gravity of the packed cargo should be within allowed limits. In transverse direction the centre of gravity should be close to the half width of the CTU. In vertical direction the centre of gravity should be below half the height of the cargo space of the unit. If these conditions cannot be met, suitable measures should be taken to ensure the safe handling and transporting of the CTU, e.g. by external marking of the centre of gravity and/or by instructing forwarders/carriers. In case of CTUs, which will be lifted by cranes or container bridges, the longitudinal centre of gravity should be close to a position at half the length of the CTU (see appendix 4 to this annex).

1.12 If the planned cargo of an open-topped or open-sided CTU will project beyond the overall dimensions of the unit, suitable arrangements should be made with the carriers or forwarders for accommodating compliance with road or rail traffic regulations or advising on special stowage locations on a ship.

1.13 When deciding on packaging and cargo-securing material, it should be borne in mind that some countries enforce a garbage and litter avoidance policy. This may limit the use of certain materials and imply fees for the recovery of packaging at the reception point. In such cases, reusable packaging and securing material should be used. Increasingly, countries require timber dunnage, bracings and packaging materials to be free of bark.

1.14 If a CTU is destined for a country with wood treatment quarantine regulations, care should be taken that all wood in the unit, packaging and cargo complies with the International Standards for Phytosanitary Measures, No. 15 (ISPM 15)[1].This standard covers packaging material made of natural wood such as pallets, dunnage, crating, packing blocks, drums, cases, load boards and skids. Approved measures of wood treatment are specified in Annex I of ISPM 15. Wood packaging material subjected to these approved measures should display the following specified mark:

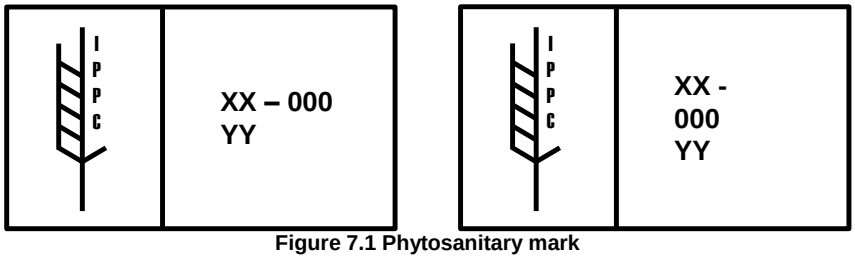


Figure 7.1 Phytosanitary mark

The marks indicating that wood packaging and dunnage material has been subjected to approved phytosanitary treatment in accordance with the symbols shown in figure 7.1 will have the following components:

[1] Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations: Regulation of wood packaging material in international trade.

1.14.1 Country code

The country code should be the International Organization for Standardization (ISO) two letter code (shown in the figure as "XX").

1.14.2 Producer/treatment provider code

The producer/treatment provider code is a unique code assigned by the national plant protection organization to the producer of the wood packaging material, who is responsible for ensuring that appropriate wood is used (shown in the figure as "000").

1.14.3 Treatment code

The treatment code (shown as "YY" in the figure) shows the abbreviation for the approved measure used (HT for heat treatment, MB for fumigation with methyl bromide). In Europe the letters "DB" can be added where debarking has been done.

Note: Treatment should be carried out before the packaging and dunnage material is packed into the CTU. In situ treatment is not permitted.

1.15 Damaged packages should not be packed into a CTU, unless precautions have been taken against harm from spillage or leakage (see also chapter 10 of this Code on dangerous goods). The overall capability to resist handling and transport stresses should be ensured.

1.16 The result of planning the packing of a CTU may be presented to the packers by means of an oral or written instruction or by a sketch or even scale drawing, depending on the complexity of the case. Appropriate supervision and/or inspection should ensure that the planned concept is properly implemented.

2 Packing and securing materials

2.1 Dunnaging and separating material

2.1.1 Dunnaging materials should be used as appropriate for the protection of the cargo against water from condensed humidity, in particular by:

- Timber planks against water collecting at the bottom of the CTU;
- Gunny cloth, paperboard or natural fibre mats against water dropping from the ceiling; and
- Timber planks or plywood against sweat water running down the sides of the CTU.

2.1.2 Timber planks or scantlings may also be used for creating gaps between parcels of cargo in order to facilitate natural ventilation, particularly in ventilated containers. Moreover, the use of such dunnaging is indispensable, when packing reefer containers.

2.1.3 Timber planks, plywood sheets or pallets may be used to equalize loads within stacks of cargo parcels and to stabilize these stacks against dislocation or collapse. The same material may be used for separating packages, which may damage each other or even for installing a temporary floor in a CTU for eliminating inappropriate stack loads to the cargo (see figure 7.2).



Figure 7.2 Timber temporary floor

2.1.4 Cardboard or plastic sheathing may be used for protecting sensitive cargo from dirt, dust or moisture, in particular while packing is still in progress.

2.1.5 Dunnaging material, in particular sheets of plastic or paper and fibre nets may be used for separating unpackaged cargo items, which are designated for different consignees.

2.1.6 The restrictions on the use of dunnaging materials with regard to quarantine regulations, in particular wood or timber, should be kept in mind (see sections 1.13 and 1.14 of this annex).

2.2 Friction and friction increasing material

2.2.1 For handling and packing of cartons and pushing heavy units a low friction surface may be desirable. However, for minimizing additional securing effort, a high friction between the cargo and the stowage ground of the CTU is of great advantage. Additionally, good friction between parcels or within the goods themselves, e.g. powder or granulate material in bags, will support a stable stow.

2.2.2 The magnitude of the vertical friction forces between a cargo item and the stowage ground depends on the mass of the item, the vertical acceleration coefficient and a specific friction factor μ, which may be obtained from appendix 2 to this annex.

Friction force:

$$F_F = \mu \cdot c_z \cdot m \cdot g \quad [kN], \quad \text{with mass of cargo [t] and } g = 9.81\ [m/s^2]$$

2.2.2.1 The factors presented in appendix 2 are applicable for static friction between different surface materials. These figures may be used for cargoes secured by blocking or by friction lashings.

2.2.2.2 For cargoes secured by direct securing, a dynamic friction factor should be used with 75% of the applicable static friction factor, because the necessary elongation of the lashings for attaining the desired restraint forces will go along with a little movement of the cargo.

2.2.2.3 The friction values given in appendix 2 to this annex are valid for swept clean dry or wet surfaces free from frost, ice, snow, oil and grease. When a combination of contact surfaces is missing in the table in appendix 2 or if the friction factor cannot be verified in another way, the maximum friction factor to be used in calculations is 0.3. If the surface contact is not swept clean, the maximum friction factor to be used is 0.3 or the value in the table, when this is lower. If the surface contacts are not free from frost, ice and snow a friction factor μ = 0.2 should be used unless the table shows a lower value. For oily and greasy surfaces or when slip sheets have been

used a friction factor μ = 0.1 should be used. The friction factor for a material contact can be verified by static inclination or dragging tests. A number of tests should be performed to establish the friction for a material contact (see appendix 3 to this annex).

2.2.3 Friction increasing materials like rubber mats, sheets of structured plastics or special cardboard may provide considerably higher friction factors, which are declared and certified by the manufacturers. However, care should be taken in the practical use of these materials. Their certified friction factor may be limited to perfect cleanliness and evenness of the contact areas and to specified ambient conditions of temperature and humidity. The desired friction increasing effect will be obtained only if the weight of the cargo is fully transferred via the friction increasing material, this means only if there is no direct contact between the cargo and the stowage ground. Manufacturer's instructions on the use of the material should be observed.

2.3 Blocking and bracing material and arrangements

2.3.1 Blocking, bracing or shoring is a securing method, where e.g. timber beams and frames, empty pallets or dunnage bags are filled into gaps between cargo and solid boundaries of the CTU or into gaps between different packages (see figure 7.3). Forces are transferred in this method by compression with minimal deformation. Inclined bracing or shoring arrangements bear the risk of bursting open under load and should therefore be properly designed. In CTUs with strong sides, if possible, packages should be stowed tightly to the boundaries of the CTU on both sides, leaving the remaining gap in the middle. This reduces the forces to the bracing arrangement, because lateral g-forces from only one side will need to be transferred at a time.

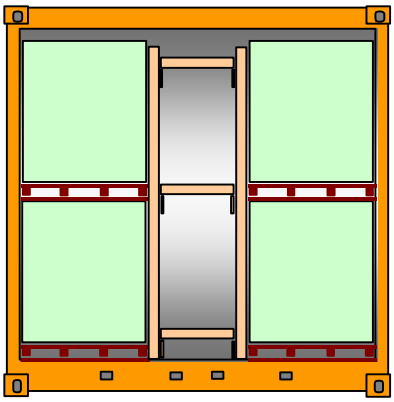


Figure 7.3 Centre gap with transverse bracing

2.3.2 Forces being transferred by bracing or shoring need to be dispersed at the points of contact by suitable cross-beams, unless a point of contact represents a strong structural member of the cargo or the CTU. Softwood timber cross-beams should be given sufficient overlaps at the shore contact points. For the assessment of bedding and blocking arrangements, the nominal strength of timber should be taken from the following table:

	Compressive strength normal to the grain	**Compressive strength parallel to the grain**	**Bending strength**
Low quality	0.3 kN/cm²	2.0 kN/cm²	2.4 kN/cm²
Medium quality	0.5 kN/cm²	2.0 kN/cm²	3.0 kN/cm²

2.3.3 A bracing or shoring arrangement should be designed and completed in such a way that it remains intact and in place, also if compression is temporarily lost. This requires suitable uprights or benches supporting the actual shores, a proper joining of the elements by nails or clamps and the stabilizing of the arrangement by diagonal braces as appropriate (see figures 7.4 and 7.5).

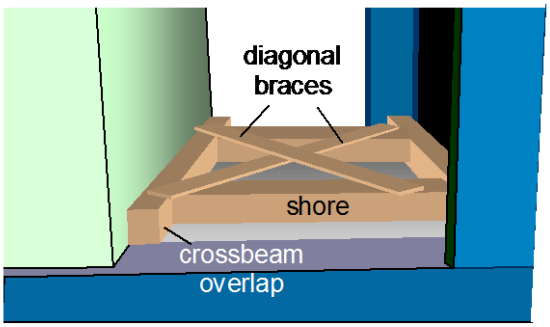


Figure 7.4 Shoring arrangement showing cross beam overlap and diagonal braces

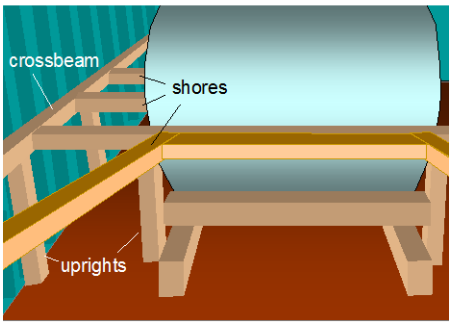


Figure 7.5 Shoring arrangement with uprights and crossbeam

2.3.4 Transverse battens in a CTU, intended to restrain a block of packages in front of the door or at intermediate positions within the CTU, should be sufficiently dimensioned in their cross section, in order to withstand the expected longitudinal forces from the cargo (see figure 7.6). The ends of such battens may be forced into solid corrugations of the side walls of the CTU. However, preference should be given to brace them against the frame structure, such as bottom or top rails or corner posts. Such battens act as beams, which are fixed at their ends and loaded homogeneously over their entire length of about 2.4 metres. Their bending strength is decisive for the force that can be resisted. The required number of such battens together with their dimensions may be identified by calculations, which is shown in appendix 4 to this annex.

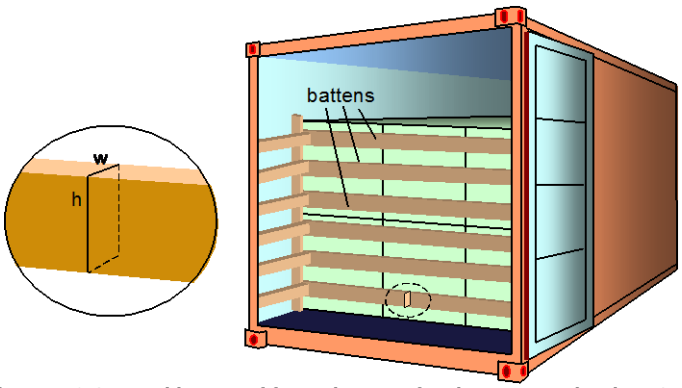


Figure 7.6 General layout of fence battens for door protection in a CTU

2.3.5 Blocking by nailed on scantlings should be used for minor securing demands only. Depending on the size of the nails used, the shear strength of such a blocking arrangement may be estimated to take up a blocking force between 1 and 4 kN per nail. Nailed on wedges may be favourable for blocking round shapes like pipes. Care should be taken that wedges are cut in a way that the direction of grain supports the shear strength of the wedge. Any such timber battens or wedges should only be nailed to dunnage or timbers placed under the cargo. Wooden floors of closed CTUs are generally not suitable for nailing. Nailing to the softwood flooring of flatracks or platforms and open CTUs may be acceptable with the consent of the CTU operator (see figure 7.7).

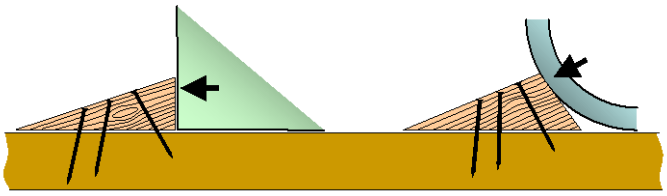


Figure 7.7 Properly cut and nailed wedges

2.3.6 In the case of form locking, void spaces should be filled and may be favourably stuffed by empty pallets inserted vertically and tightened by additional timber battens as necessary. Material which may deform or shrink permanently, like rags of gunny cloth or solid foam of limited strength, should not be used for this purpose. Small gaps between unit loads and similar cargo items, which cannot be avoided and which are necessary for the smooth packing and unpacking of the goods, are acceptable and need not to be filled. The sum of void spaces in any horizontal direction should not exceed 15 cm. However, between dense and rigid cargo items, such as steel, concrete or stone, void spaces should be further minimized, as far as possible.

2.3.7 Gaps between cargo that is stowed on and firmly secured to pallets (by lashings or by shrink foil), need not to be filled, if the pallets are stowed tightly into a CTU and are not liable to tipping (see figure 7.8). Securing of cargo to pallets by shrink foil wrapping is only sufficient if the strength of the foil is appropriate for above purpose. It should be considered that in case of sea transport repetitive high loadings during bad weather may fatigue the strength of a shrink foil and thereby reduce the securing capacity.



Figure 7.8 Cargo firmly secured to pallets by textile lashings

2.3.8 If dunnage bags are used for filling gaps[2], the manufacturer's instructions on filling pressure and the maximum gap should be accurately observed. Dunnage bags should not be used as a means of filling the space at the doorway, unless precautions are taken to ensure that they cannot cause the door to open violently when the doors are opened. If the surfaces in the gap are uneven with the risk of damage to the dunnage bags by chafing or piercing, suitable measures should be taken for smoothing the surfaces appropriately (see figures 7.9 and 7.10). The blocking capacity of dunnage bags should be estimated by multiplying the nominal burst pressure with the contact area to one side of the blocking arrangement and with a safety factor of 0.75 for single use dunnage bags and 0.5 for reusable dunnage bags (see appendix 4 to this annex).

[2] Dunnage bags (inflated by air) should not be used for dangerous goods on US railways.

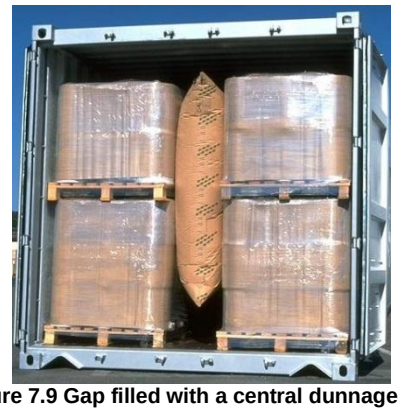


Figure 7.9 Gap filled with a central dunnage bag



Figure 7.10 Irregular shaped packages blocked with dunnage bags

2.3.9 The restrictions on the use of blocking and bracing materials with regard to quarantine regulations, in particular for wood or timber, should be kept in mind (see sections 1.13 and 1.14 of this annex).

2.4 Lashing materials and arrangements

2.4.1 Lashings transfer tensile forces. The strength of a lashing may be declared by its breaking strength or breaking load (BL). The maximum securing load (MSL) is a specified proportion of the breaking strength and denotes the force that should not be exceeded in securing service. The term lashing capacity (LC), used in national and regional standards, corresponds to the MSL. Values for BL, MSL or LC are indicated in units of force, i.e. kilonewton (kN) or dekanewton (daN).

2.4.2 The relation between MSL and the breaking strength is shown in the table below. The figures are consistent with annex 13 of the IMO Code of Safe Practice for Cargo Stowage and Securing. Corresponding relations according to standards may differ slightly.

Material	MSL
shackles, rings, deck eyes, turnbuckles of mild steel	50% of breaking strength
fibre ropes	33% of breaking strength
web lashings (single use)	75% of breaking strength[1]
web lashings (reusable)	50% of breaking strength
wire ropes (single use)	80% of breaking strength
wire ropes (reusable)	30% of breaking strength
steel band (single use)	70% of breaking strength[2]
chains	50% of breaking strength
[1] Maximum allowed elongation 9% at MSL.	
[2] It is recommended to use 50%.	

2.4.3 The values of MSL quoted in the table above rely on the material passing over smooth or smoothed edges. Sharp edges and corners will substantially reduce these values. Wherever possible or practicable, appropriate edge protectors should be used (see figures 7.11 and 7.12).



Figure 7.11 Poor edge protection



Figure 7.12 Edge protectors

2.4.4 Lashings transfer forces under a certain elastic elongation only. They act like a spring. If loaded more than the specific MSL, elongation may become permanent and the lashing will fall slack. New wire and fibre ropes or lashings may show some permanent elongation until gaining the desired elasticity after repeated re-tensioning. Lashings should be given a pre-tension, in order to minimize cargo movement. However, the initial pre-tension should never exceed 50% of the MSL.

2.4.5 Fibre ropes of the materials manila, hemp, sisal or manila-sisal-mix and moreover synthetic fibre ropes may be used for lashing purposes. If their MSL is not supplied by the manufacturer or chandler, rules of thumb may be used for estimating the MSL with d = rope diameter in cm:

Natural fibre ropes:	$MSL = 2 \cdot d^2$ [kN]
Polypropylene ropes:	$MSL = 4 \cdot d^2$ [kN]
Polyester ropes:	$MSL = 5 \cdot d^2$ [kN]
Polyamide ropes:	$MSL = 7 \cdot d^2$ [kN]

Composite ropes made of synthetic fibre and integrated soft wire strings provide suitable stiffness for handling, knotting and tightening and less elongation under load. The strength of this rope is only marginally greater than that made of plain synthetic fibre.

2.4.6 There is no strength reduction to fibre ropes due to bends at round corners. Rope lashings should be attached as double, triple or fourfold strings and tensioned by means of wooden turn sticks. Knots should be of a professional type, e.g. bowline knot and double half hitch[3]. Fibre ropes are highly sensitive against chafing at sharp corners or obstructions.

2.4.7 Web lashings may be reusable devices with integrated ratchet tensioner or one-way hardware, available with removable tensioning and lockable devices. The permitted securing load is generally labelled and certified as lashing capacity LC. There is no rule of thumb available for estimating the MSL due to different base materials and fabrication qualities. The fastening of web lashings by means of knots reduces their strength considerably and should therefore not be applied.

[3] Knots will reduce the strength of the rope.

2.4.8 The elastic elongation of web lashings, when loaded to their specific MSL should not exceed 9%. Web lashings should be protected against chafing at sharp corners, against mechanical wear and tear in general and against chemical agents like solvents, acids and others.

2.4.9 Wire rope used for lashing purposes in CTUs for sea transport consists of steel wires with a nominal BL of around 1.6 kN/mm^2 and the favourite construction 6 x 19 + 1FC, i.e. 6 strands of 19 wires and 1 fibre core (see figure 7.13). If a certified figure of MSL is not available, the MSL for one-way use may be estimated by MSL = 40 · d^2 [kN]. Other available lashing wire constructions with a greater number of fibre cores and less metallic cross section have a considerably lesser strength related to the outer diameter. The elastic elongation of a lashing wire rope is about 1.6% when loaded to one-way MSL, but an initial permanent elongation should be expected after the first tensioning, if the wire rope is new.

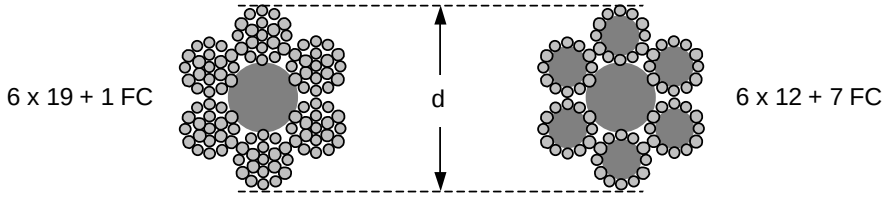


Figure 7.13 Typical lashing wire rope construction

2.4.10 Narrow rounded bends reduce the strength of wire ropes considerably. The residual strength of each part of the rope at the bend depends on the ratio of bend diameter to the rope diameter as shown in the table below.

ratio: bend diameter/rope diameter	1	2	3	4	5
residual strength with rope steady in the bend	65%	76%	85%	93%	100%

Bending a wire rope around sharp corners, like passing it through the edged hole of an eye-plate, reduces its strength even more. The residual MSL after a 180° turn through such an eye-plate is only about 25% of the MSL of the plain rope, if steady in the bend.

2.4.11 Wire rope lashings in sea transport are usually assembled by means of wire rope clips. It is of utmost importance that these clips are of appropriate size and applied in correct number, direction and tightness. Recommended types of such wire rope lashing assemblies are shown in figure 7.14. A typical improper assembly is shown in figure 7.15.

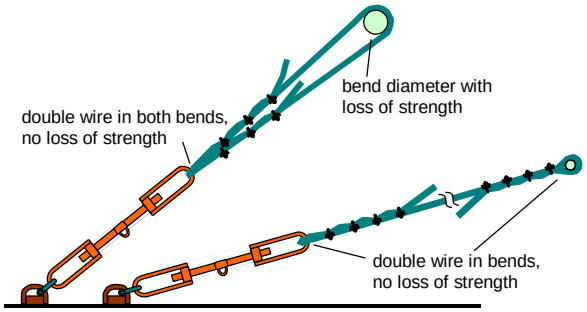


Figure 7.14 Recommended assemblies for wire rope lashing

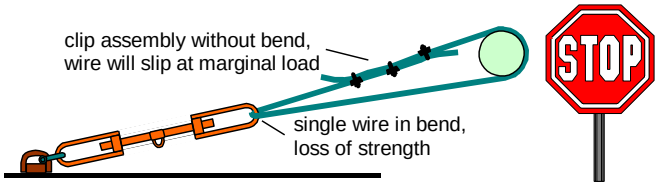


Figure 7.15 Improper assembly for wire rope lashing

2.4.12 Tensioning and joining devices associated with wire rope lashings in sea transport are generally not standardized. The MSL of turnbuckles and lashing shackles should be specified and documented by the manufacturer and at least match the MSL of the wire rope part of the lashing. If manufacturer information is not available, the MSL of turnbuckles and shackles made of ordinary mild steel may be estimated by $MSL = 10 \cdot d^2$ [kN] with d = diameter of thread of turnbuckle or shackle bolt in cm.

2.4.13 Wire rope lashings in road transport are specified as reusable material of distinguished strength in terms of lashing capacity (LC), which should be taken as MSL. Connections elements like shackles, hooks, thimbles, tensioning devices or tension indicators are accordingly standardized by design and strength. The use of wire rope clips for forming soft eyes has not been envisaged. Assembled lashing devices are supplied with a label containing identification and strength data (see figure 7.16). When using such material, the manufacturer's instructions should be observed.

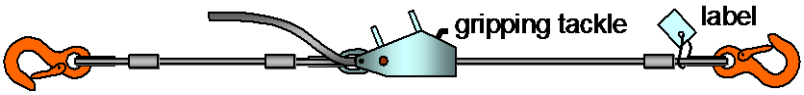


Figure 7.16 Standard wire lashing used in road transport with gripping tackle

2.4.14 Lashing chains used in sea transport are generally long link chains of grade 8 steel. A 13 mm chain of grade 8 steel has a MSL of 100 kN. The MSL for other dimensions and steel qualities should be obtained from the manufacturer's specification. The elastic elongation of the above long link chains is about 1% when loaded to their MSL. Long link chains are sensitive against guiding them around bends of less than about 10 cm radius. The favourite tensioning device is a lever with a so-called climbing hook for re-tightening the lashing during service (see figure 7.17). Manufacturer's instructions and, when existing, national regulations on the use of the tensioning lever and re-tensioning under load should be strictly observed.

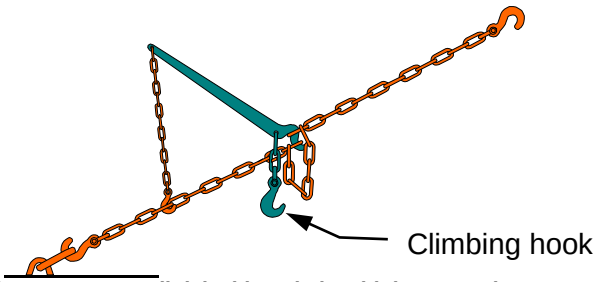


Figure 7.17 Long link lashing chain with lever tensioner

2.4.15 Chain lashings used in road and rail transport according to European standards are mainly short link chains. Long link chains are generally reserved for the transport of logs. Short link chains have an elastic elongation of about 1.5%, when loaded to their MSL. The standard includes various systems of tensioners, specially adapted

hooks, damping devices and devices to shorten a chain to the desired loaded length. Chain compound assemblies may be supplied with a label containing identification and strength data (see figure 7.18). Manufacturer's instructions on the use of the equipment should be strictly observed.



Figure 7.18 Standard chain lashing with shortening hook

2.4.16 Steel band for securing purposes is generally made of high tension steel with a normal breaking strength of 0.8 to 1.0 kN/mm^2. Steel bands are most commonly used for unitizing packages to form greater blocks of cargo (see figure 7.19). In sea transport, such steel bands are also used to "tie down" packages to flatracks, platforms or roll-trailers. The bands are tensioned and locked by special manual or pneumatic tools. Subsequent re-tensioning is not possible. The low flexibility of the band material with about 0.3% elongation, when loaded to its MSL, makes steel band sensitive for loosing pre-tension if cargo shrinks or settles down. Therefore, the suitability of steel band for cargo securing is limited and national restrictions on their use in road or rail transport should always be considered. The use of steel bands for lashing purposes should be avoided on open CTUs as a broken lashing could be of great danger if it hangs outside the CTU.



Figure 7.19 Metal ingots unitized by steel banding (securing not completed)

2.4.17 Twisted soft wire should be used for minor securing demands only. The strength of soft wire lashings in terms of MSL is scarcely determinable and their elastic elongation and restoring force is poor.

2.4.18 Modular lashing systems with ready-made web lashings are available in particular for general purpose freight containers, to secure cargo against movement towards the door. The number of lashings should be calculated depending on the mass of the cargo, the MSL of the lashings, the lashing angle, the friction factor, the mode of transport, and the MSL of the lashing points in the freight container.

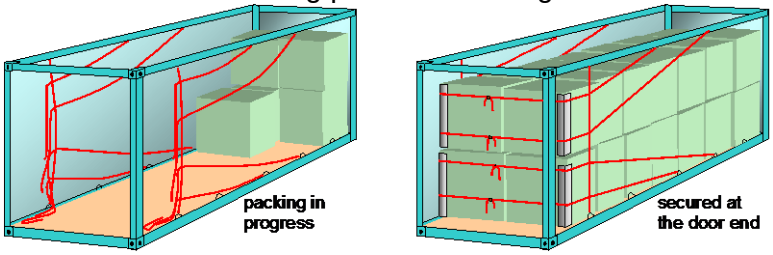


Figure 7.20 Modular lashing system

2.4.19 In the example shown in figure 7.20, the lashings are connected to the lashing points of the CTU with special fittings and are pre-tensioned by means of buckles and a tensioning tool. More information may be obtained from the producers or suppliers of such modular systems.

3 Principles of packing

3.1 Load distribution

3.1.1 Freight containers, flatracks and platforms are designed according to ISO standards, amongst others, in such a way that the permissible payload P, if homogeneously distributed over the entire loading floor, can safely be transferred to the four corner posts under all conditions of carriage. This includes a safety margin for temporary weight increase due to vertical accelerations during a sea passage. When the payload is not homogeneously distributed over the loading floor, the limitations for concentrated loads should be considered. It may be necessary to transfer the weight to the corner posts by supporting the cargo on strong timber or steel beams as appropriate (see figure 7.21).

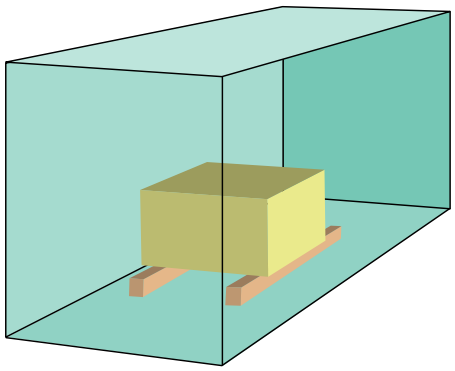


Figure 7.21 Load transfer beams

3.1.2 The bending strength of the beams should be sufficient for the purpose of load transfer of concentrated loads. The arrangement, the required number and the strength of timber beams or steel beams should be designed in consultation with the CTU operator.

3.1.3 Concentrated loads on platforms or flatracks should be similarly expanded by bedding on longitudinal beams or the load should be reduced against the maximum payload. The permissible load should be designed in consultation with the CTU operator.

3.1.4 Where freight containers, including flatracks or platforms, will be lifted and handled in a level state during transport, the cargo should be so arranged and secured in the freight container that its joint centre of gravity is close to the mid-length and mid-width of the freight container. The eccentricity of the centre of gravity of the cargo should not exceed ±5% in general. As a rule of thumb this can be taken as 60% of the cargo's total mass in 50% of the freight container's length. Under particular circumstances an eccentricity of up to ±10% could be accepted, as advanced spreaders for handling freight containers are capable of adjusting for such eccentricity. The precise longitudinal position of the centre of gravity of the cargo may be determined by calculation (see appendix 4 to this annex).

3.1.5 Roll trailers have structural properties similar to platforms, but are less sensitive to concentrated loads due to the usual wheel support at about 3/4 of their length from the gooseneck tunnel end. As they are generally handled without lifting, the longitudinal position of the cargo centre of gravity is also not as critical.

3.1.6 Swap bodies have structural properties similar to freight containers, but in most cases less tare weight and less overall strength. They are normally not stackable. The loading instructions given under subsection 3.1.2 and 3.1.5 should be applied to swap bodies as appropriate.

3.1.7 Road trucks and road trailers are in particular sensitive regarding the position of the centre of gravity of the cargo packed in them, due to specified axle loads for maintaining steering and braking ability. Such vehicles may be equipped with specific diagrams, which show the permissible cargo mass as a function of the longitudinal position of its centre of gravity. Generally, the maximum cargo mass may be used only when the centre of gravity (CoG) is positioned within narrow boundaries about half the length of the loading space (see figures 7.22 and 7.23).

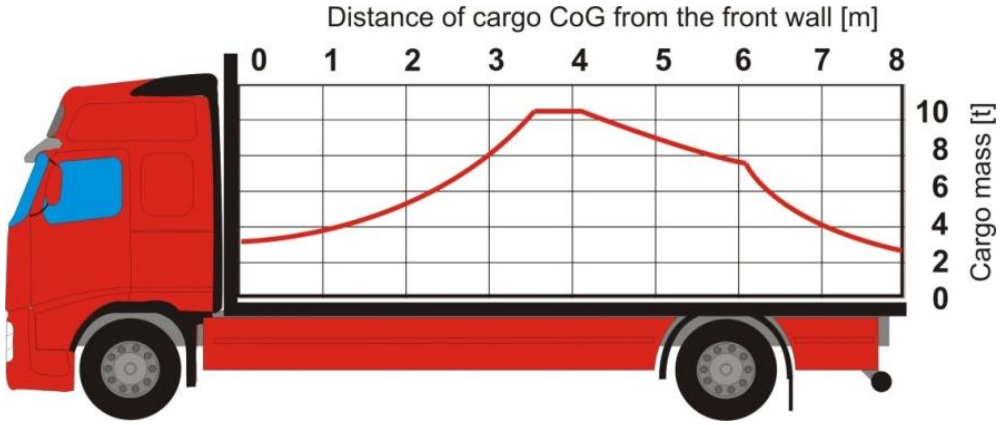


Figure 7.22 An example of a load distribution diagram for a rigid truck

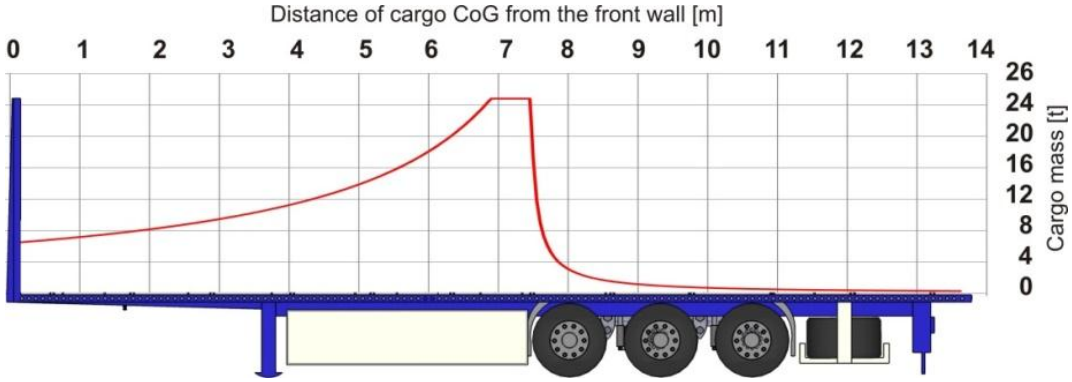


Figure 7.23 An example of a load distribution diagram for a semi-trailer

3.1.8 Railway routes are generally classified into line categories, by which permissible axle loads and loads per metre length of cargo space are allocated to each railway wagon. The applicable figures should be observed in view of the intended route of the wagon. Tolerable concentrated loads are graded depending on their bedding length. The appropriate load figures are marked on the wagons. The transverse and

longitudinal deviation of cargo centre of gravity from wagon centre-lines is limited by defined relations of transverse wheel loads and longitudinal axle/bogie loads. The proper loading of railway wagons should be supervised by specifically trained persons.

3.2 General stowage/packing techniques

3.2.1 Stowage and packing techniques should be suitable to the nature of the cargo with regard to weight, shape, structural strength and climatic conditions. This includes the proper use of dunnage material (see section 2.1 of this annex), the selection of the appropriate method of mechanical handling and the proper stowage of vented packages. The concept of stowage should incorporate the feasibility of smooth unloading.

3.2.2 Any marking on parcels should be strictly observed. Cargoes marked "this way up" should not only be stowed upright but also kept upright during entire handling. Goods which may be subject to inspection by the carrier or by authorities, like dangerous goods or goods liable to Customs duty, should, if possible, be stowed at the door end of the CTU.

3.2.3 When packing mixed cargoes, their compatibility should be considered. Irrespective of the regulations for the stowage of dangerous goods (see chapter 10 of this Code) the following general rules are applicable:

- Heavier cargoes should not be stowed on top of lighter cargoes. This will also provide for the centre of gravity of the CTU in a level not exceeding half the height of the CTU;
- Heavy units should not be stowed on top of fragile parcels;
- Sharp-edged pieces should not be stowed on top of units with weak surfaces;
- Liquid cargoes should not be stowed on solid cargoes;
- Dusty or dirty cargoes should not be placed near to clean and easily soiled cargoes like foodstuff in porous packaging;
- Cargoes emitting moisture should not be stowed on or near to cargoes sensitive to moisture;
- Odorous cargoes should not be stowed in the vicinity of cargoes easily absorbing odour;
- Incompatible cargoes should be packed into the same CTU only if their stow is appropriately separated and/or the goods are effectively protected by suitable sheathing material.

3.2.4 Stacking of sensitive cartons of uniform size and shape should be precise in a way that the mass from above is transferred to the vertical boards of the cartons below. If necessary, e.g. due to lateral leeway of the stack in the CTU, intermediate sheets of fibreboard, plywood or pallets should be placed between layers of the stack (see figures 7.24 and 7.25). Cartons of irregular shape and/or size should be stacked only with due consideration of their structural hardiness. Gaps and irregularities of level should be stuffed or equalized by means of dunnage.

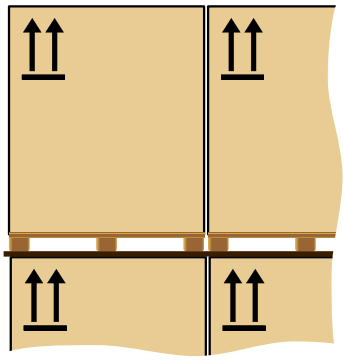


Figure 7.24 With intermediate board

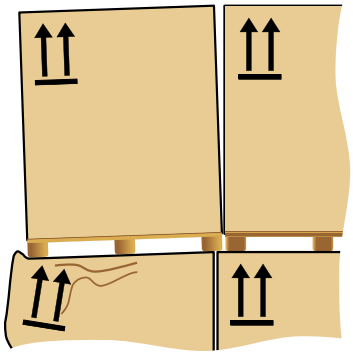


Figure 7.25 Without intermediate board

3.2.5 Packages with a less defined shape like bags or bales may be stacked in an interlocking pattern, also called cross-tie, thereby creating a solid pile that may be secured by blocking or fencing (see figure 7.26). Round longish units like pipes may be stacked into the grooves of the layer below. However, care should be taken of the lateral forces produced by top layers in the grooves of the bottom layers, which may locally overload the side walls of the CTU if the friction between the pipes is low.

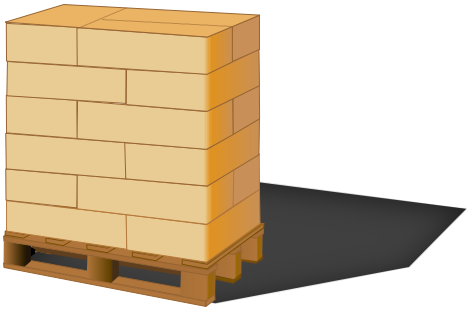


Figure 7.26 Cross-tie stowage

3.2.6 Uniform parcels like drums or standardized pallets should be packed in a way that minimizes lost space and provides a tight stow at the same time. Drums may be stowed either in regular lines, also called "soldier stowage", or into the vertical grooves, also called "offset stowage" (see figures 7.27 and 7.28). With small drums the offset packing is more effective, while with greater drum diameters the advantage may be with the soldier stow. Pallet dimensions are widely standardized and adapted to the inner width and length of cargo spaces in road trucks, road trailers and swap bodies, but not throughout to the inner dimensions of freight containers.

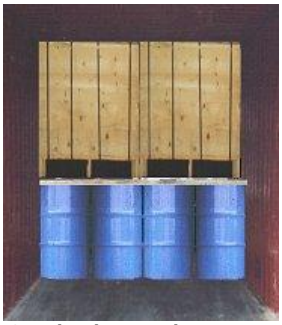


Figure 7.27 Mixed stow, dry over wet goods



Figure 7.28 Mixed stow, use of pallets

3.2.7 Near to completion of packing a CTU, care should be taken to build a firm face of the cargo so as to prevent a "fall out" when the CTU is opened. If there is any doubt about the stability of the face, further steps should be taken such as strapping top layers of cargo back to securing points or building a timber fence between the rear posts in a CTU (see subsection 2.3.4 of this annex). It should be borne in mind, that a freight container on a trailer usually inclines towards the doors aft and that cargo may move against the doors due to vibration induced shift or by jolts during transport.

3.3 Cargo handling

3.3.1 Relevant regulations on the use of personnel protection equipment (helmet, shoes, gloves and clothing) should be adhered to. Personnel should have been instructed on ergonomic aspects of manual lifting of weighty parcels. Weight limitations of parcels to be lifted and carried by persons should be observed.

3.3.2 Forklift trucks, used for driving inside roofed CTUs, should have a short lifting mast and a low driver's overhead guard. If the lift truck operates inside a CTU care should be taken of the exhaust gases and equipment with electric power supply or similar should be used. The truck should be equipped with adequate lighting so that the operator can place packages accurately. Forklift trucks s operated by a combustion engine should comply with national combustion emission standards. Forklift trucks s with engines burning LPG fuel should not be used in enclosed space, in order to prevent the accumulation of explosive gas mixtures from unexpected leaks.

3.3.3 Where there is a risk of explosion due to the vapours, fumes or dust given off by the cargo, all electrical equipment mounted on the forklift trucks should be evaluated to ensure that they are safe for flammable and explosive atmospheres.

3.3.4 Driving forklift trucks into swap bodies, semi-trailers or other supported CTUs should be done slowly, in particular with careful starting and braking, in order to avoid dangerous horizontal forces to the supports of the CTU.

3.3.5 If CTUs are to be packed with forklift trucks from the side, significant lateral impact forces to the CTU should be avoided. Such lateral forces may occur when packages or overpacks are pushed across the loading area. If, during such operations, there is a risk of turning the CTU over packers may consider packing either from both sides to the centre line of the CTU or by using forklift trucks with higher capacity and long forks, which would permit accurate placement without pushing.

3.3.6 If persons need to access the roof of a CTU, e.g. for filling the CTU with a free-flowing bulk cargo, the load-bearing capability of the roof should be considered. Roofs of freight containers are designed for and tested with a load of 300 kg (660 lbs), which acts uniformly on an area of 600 x 300 mm (24 x 12 inches) in the weakest region of the roof (reference: CSC, Annex II). Practically, no more than two persons should work on a freight container roof simultaneously.

3.3.7 When loading or unloading heavy parcels with C-hooks through doors or from the sides of a CTU, care should be taken, that the transverse or longitudinal girders of the roof or side walls are struck neither by the hook nor the cargo. The movement of the unit should be controlled by appropriate means, e.g. guide ropes. Relevant regulations for the prevention of accidents should be observed.

4 Securing of cargo in CTUs

4.1 Aims and principles of securing

4.1.1 Arrangements or stacks of cargo items should be packed in a way so as not to deform and to remain in place and upright with no tilting by their static friction and by their inherent stability, while packing or unpacking a CTU is in progress. This guarantees the safety of packers before additional securing devices are put in place or after such devices have been removed for unpacking.

4.1.2 During transport the CTU may be subjected to vertical, longitudinal and transverse accelerations, which cause forces to each cargo item, which are proportional to its mass. It should not be assumed, that because a package is heavy, it will not move during transport. The relevant accelerations are outlined in chapter 5 of this Code in units of g, indicating the corresponding forces in units of weight of the distinguished cargo item. These forces may easily exceed the capability of static friction and tilting stability, so that cargo items may slide or tilt over. In addition, the CTU may be simultaneously subjected to temporary vertical accelerations, which cause a weight decrease, thereby reduce the friction and the inherent tilting stability, thus promoting sliding and tipping. Any securing of cargo should aim at the avoidance of such unwanted cargo behaviour. All parts of the cargo should remain in place and neither slide nor tip under the stipulated accelerations of the CTU during the intended route of transport.

4.1.3 Practical securing of cargo may be approached by three distinguished principles, which may be used individually or combined as appropriate:

- Direct securing is effected by the immediate transfer of forces from the cargo to the CTU by means of blocking, lashings, shores or locking devices. The securing capacity is proportional to the MSL of the securing devices;
- Friction securing is achieved by so-called tie-down or top-over lashings which, by their pre-tension, increase the apparent weight of the cargo and thereby the friction to the loading ground and also the tilting stability. The securing effect is proportional to the pre-tension of the lashings. Anti-slip material in the sliding surfaces considerably increases the effect of such lashings;
- Compacting cargo by bundling, strapping or wrapping is an auxiliary measure of securing that should always be combined with measures of direct securing or friction securing.

4.1.4 Lashings used for direct securing will inevitably elongate under external forces, thus permitting the package a degree of movement. To minimize this movement, (horizontal or lateral sliding, tipping or racking) it should be ensured that the:

- Lashing material has appropriate load-deformation characteristics (see section 2.4 of this annex);
- Length of the lashing is kept as short as practicable; and
- Direction of the lashing is as close as possible to the direction of the intended restraining effect.

A good pre-tension in lashings will also contribute to minimizing cargo motions, but the pre-tension should never exceed 50% of the MSL of the lashing. Direct securing by stiff pressure elements (shores or stanchions) or by locking devices (locking

cones or twist-locks) will not allow significant cargo motion and should therefore be the preferred method of direct securing.

4.1.5 Lashings used for friction securing should be able to maintain the vital pre-tension for a longer period and should not fall slack from minor settling or shrinking of the cargo. Therefore synthetic fibre web lashings should be preferred to e.g. chains or steel band lashings. The pre-tension of tie-down lashings does in principle not fall under the limitation stated above for direct lashings, but will generally not be greater than 20% of the MSL of the lashing with manually operated tensioners. Care should be taken to establish this pre-tension on both sides of the lashing as far as is practical. For assessing a friction securing arrangement by calculation, the labelled standard pre-tension[4] should be used. If such marking is not available, a rule of thumb value of 10% of the breaking strength of the lashing, but not more than 10 kN, should be used for calculation.

4.1.6 Arrangements of direct securing devices should be homogeneous in a way that each device in the arrangement takes its share of the restraining forces appropriate to its strength. Unavoidable differences in load distribution within complex arrangements may be compensated for by the application of a safety factor. Nevertheless, devices of diverging load-deformation properties should not be placed in parallel, unless used for the distinguishable purposes of sliding prevention and tipping prevention. If, for instance, timber blocking and direct web lashing is used in parallel against sliding, the stiffer timber blocking should be dimensioned so as to resist the expected load alone. This restriction does not apply to the combination of tie-down lashings and e.g. timber blocking.

4.1.7 Any cargo securing measures should be applied in a manner that does not affect, deform or impair the package or the CTU. Permanent securing equipment incorporated into a CTU should be used whenever possible or necessary.

4.1.8 During transport, in particular at suitable occasions of a multimodal transport route, securing arrangements in CTUs should be checked and upgraded if necessary and as far as practicable. This includes re-tightening of lashings and wire rope clips and adjusting of blocking arrangements.

4.2 Tightly arranged cargoes

4.2.1 A vital prerequisite of cargo items for a tight stowage arrangement is their insensibility against mutual physical contact. Cargo parcels in form of cartons, boxes, cases, crates, barrels, drums, bundles, bales, bags, bottles, reels etc. or pallets containing the aforesaid items are usually packed into a CTU in a tight arrangement in order to utilize the cargo space, to prevent cargo items from tumbling around and to enable measures of common securing against transverse and longitudinal movement during transport.

4.2.2 A tight stow of uniform or variable cargo items should be planned and arranged according to principles of good packing practice, in particular observing the advice given in section 3.2 of this annex. If coherence between items or tilting stability of items is poor, additional measures of compacting may be necessary like hooping or strapping batches of cargo items with steel or plastic tape or plastic sheeting. Gaps between cargo items or between cargo and CTU boundaries should be filled as necessary (see subsections 2.3.6 to 2.3.8 of this annex). Direct contact of cargo

[4] Standard tension force S_{TF} according to EN 12195-2

items with CTU boundaries may require an interlayer of protecting material (see section 2.1 of this annex).

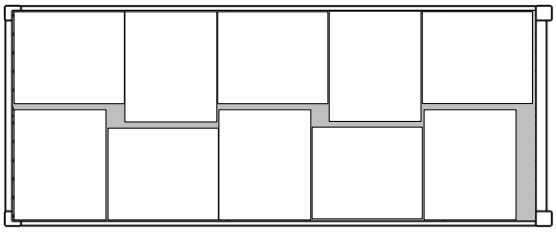


Figure 7.29 Packing 1,000 x 1,200 mm unit loads into a 20-foot container

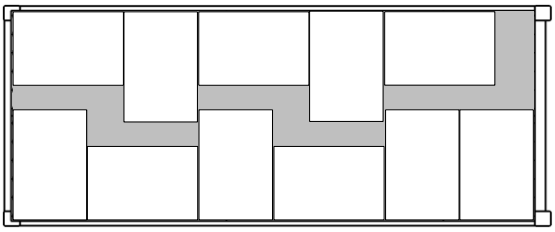


Figure 7.30 Packing 800 x 1,200 mm unit loads into a 20-foot container

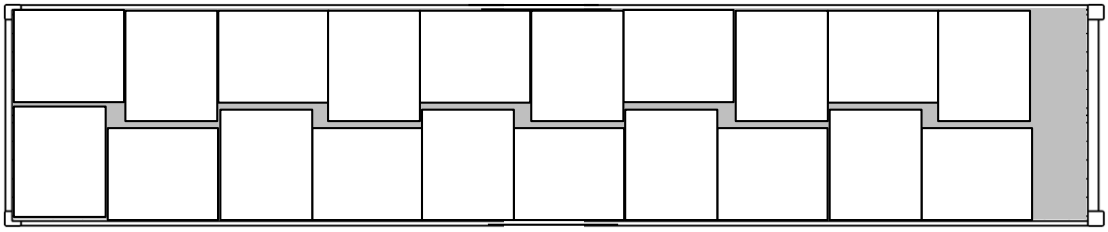


Figure 7.31 Packing 1,000 x 1,200 mm unit loads into a 40-foot container

Note: The void areas (grey shaded) shown in figures 7.29 to 7.31 should be filled when necessary (see subsection 2.3.6 of this annex)

4.2.3 CTUs with strong cargo space boundaries may inherently satisfy transverse and longitudinal securing requirements in many cases, depending on the type of CTU, the intended route of transport and appropriate friction among cargo items and between cargo and stowage ground. The following balance demonstrates the confinement of tightly stowed cargo within strong cargo space boundaries:

$$c_{x,y} \cdot m \cdot g \leq r_{x,y} \cdot P \cdot g + \mu \cdot c_z \cdot m \cdot g \text{ [kN]}$$

$c_{x,y}$ = horizontal acceleration coefficient in the relevant mode of transport (see chapter 5 of this Code)

m = mass of cargo packed [t]

g = gravity acceleration 9.81 m/s^2

$r_{x,y}$ = CTU wall resistance coefficient (see chapter 6 of this Code)

P = maximum payload of CTU (t)

μ = applicable friction factor between cargo and stowage ground (see appendix 2 to this annex)

c_z = vertical acceleration coefficient in the relevant mode of transport (see chapter 5 of this Code)

4.2.4 Critical situations may arise, e.g. with a fully packed freight container in road transport, where longitudinal securing should be able to withstand an acceleration of 0.8 g. The longitudinal wall resistance factor of 0.4 should be combined with a friction factor of at least 0.4 for satisfying the securing balance. If a balance cannot be satisfied, the mass of cargo should be reduced or the longitudinal forces transferred to the main structure of the container. The latter can be achieved by intermediate transverse fences of timber battens (see subsection 2.3.4 of this annex) or by other suitable means (see figure 7.32). Another option is the use of friction increasing material.



Figure 7.32 Blocking in a strong boundary CTU

4.2.5 When the door end of a CTU is designed to provide a defined wall resistance (e.g. the doors of a general purpose freight container (see chapter 6 of this Code), the doors may be considered as a strong cargo space boundary, provided the cargo is stowed to avoid impact loads to the door end and to prevent the cargo from falling out when the doors are opened.

4.2.6 Where there is the need to stack packages in an incomplete second layer at the centre of the CTU, additional longitudinal blocking can be adopted (see figures 7.33 to 7.36).

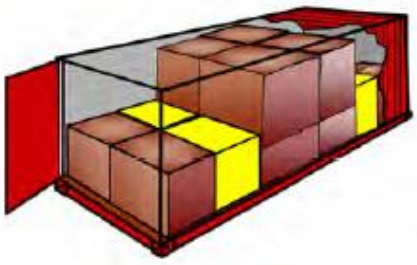


Figure 7.33 Threshold by height

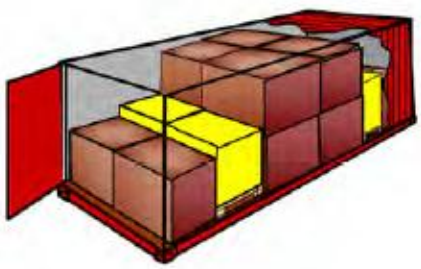


Figure 7.34 Threshold by elevation

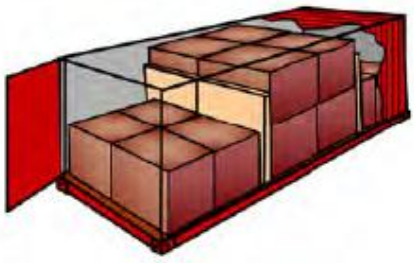


Figure 7.35 Threshold by board

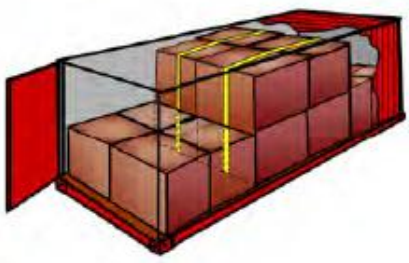


Figure 7.36 Round turn lashing

4.2.7 CTUs with weak cargo space boundaries like certain road vehicles and swap bodies will regularly require additional securing measures against sliding and tipping of a block of tightly stowed cargo. These measures should also contribute to compacting the block of cargo. The favourite method in this situation is friction-securing by so-called top-over lashings. For obtaining a reasonable securing effect from friction lashings, the friction factor between cargo and stowage ground should be sufficient and the inherent elasticity of the lashings should be able to maintain the pre-tension throughout the course of transport. The following balance demonstrates the confinement of tightly stowed cargo within weak cargo space boundaries and an additional securing force against sliding:

$$c_{x,y} \cdot m \cdot g \leq r_{x,y} \cdot P \cdot g + \mu \cdot c_z \cdot m \cdot g + F_{sec} \quad [kN] \quad (F_{sec} = \text{additional securing force})$$

If a wall resistance coefficient is not specified for the distinguished CTU, it should be set to zero. The additional securing (F_{sec}) may consist of blocking the base of the cargo against stronger footing of the otherwise weak cargo space boundary or bracing the block of cargo against stanchions of the cargo space boundary system. Such stanchions may be interconnected by pendants above the cargo for increasing their resistance potential. Alternatively, the additional securing force may be obtained by direct securing methods or top-over lashings. F_{sec} per top-over lashing is: $F_V \cdot \mu$, where F_V is the total vertical force from the pre-tension. For vertical lashings F_V is 1.8 times the pre-tension in the lashing. For direct lashing arrangements μ should be set to 75% of the friction factor.

4.2.8 On CTUs without boundaries the entire securing effect should be accomplished by securing measures like top-over lashings, friction increasing material and, if the CTU is a flatrack, by longitudinal blocking against the end-walls. The following balance demonstrates the securing of tightly stowed cargo on a CTU without cargo space boundaries:

$$c_{x,y} \cdot m \cdot g \leq \mu \cdot c_z \cdot m \cdot g + F_{sec} \quad [kN] \quad (F_{sec} = \text{additional securing force})$$

For F_{sec}, see subsection 4.2.7. It should be noted that even in case of a friction factor that outnumbers the external acceleration coefficients, without cargo space boundaries a minimum number of top-over lashings is imperative for avoiding migration of the cargo due to shocks or vibration of the CTU during transport.

4.3 Individually secured packages and large unpackaged articles

4.3.1 Packages and articles of greater size, mass or shape or units with sensitive exterior facing, which does not allow direct contact to other units or CTU boundaries, should be individually secured. The securing arrangement should be designed to prevent sliding and, where necessary, tipping, both in the longitudinal and transverse direction. Securing against tipping is necessary, if the following condition is true (see also figure 7.37):

$$c_{x,y} \cdot d \geq c_z \cdot b$$

$c_{x,y}$ = horizontal acceleration coefficient in the relevant modes of transport (see chapter 5 of this Code)

d = vertical distance from centre of gravity of the unit to its tipping axis [m]

c_z =	vertical acceleration coefficient in the relevant modes of transport (see chapter 5 of this Code)
b =	horizontal distance from centre of gravity to tipping axis [m]

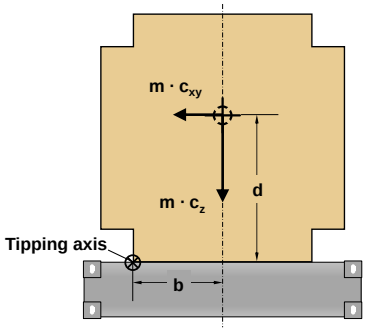


Figure 7.37 Tipping criterion

4.3.2 Individually secured packages and articles should preferably be secured by a direct securing method, i.e. by direct transfer of securing forces from the package to the CTU by means of lashings, shores or blocking.

4.3.2.1 A direct lashing will be between fixed fastening points on the package/article and the CTU and the effective strength of such a lashing is limited by the weakest element within the device, which includes fastening points on the package as well as fastening points on the CTU.

4.3.2.2 For sliding prevention by lashings the vertical lashing angle should preferably be in the range of 30° to 60° (see figure 7.38). For tipping prevention the lashings should be positioned in a way that provides effective levers related to the applicable tipping axis (see figure 7.39).

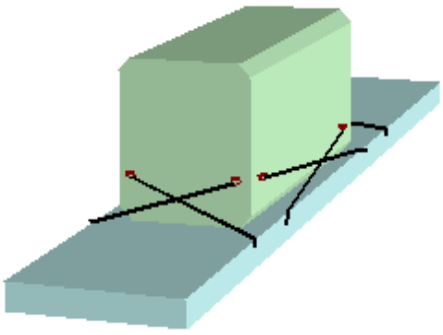


Figure 7.38 Direct lashing against sliding

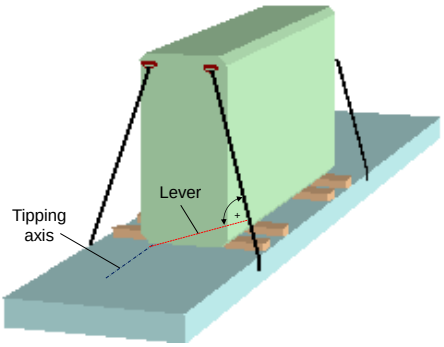


Figure 7.39 Direct lashing against tipping

4.3.3 Packages and articles without securing points should be either secured by shoring or blocking against solid structures of the CTU or by top-over, half-loop or spring lashings (see figures 7.40 to 7.43).

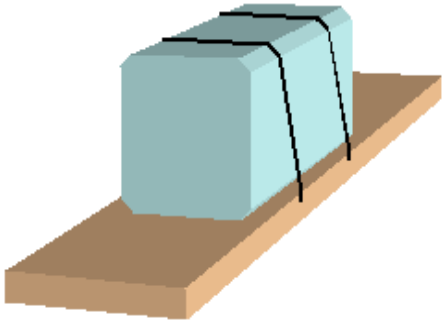


Figure 7.40 Top over lashing

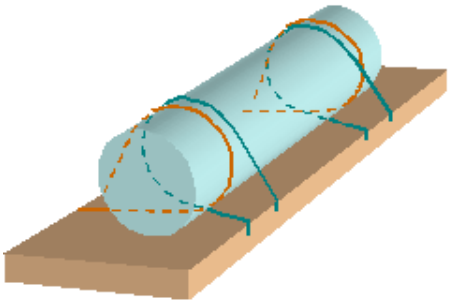


Figure 7.41 Vertical half-loop lashing

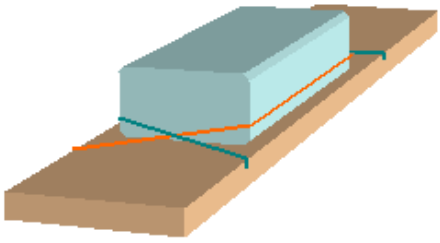


Figure 7.42 Horizontal half-loop lashing

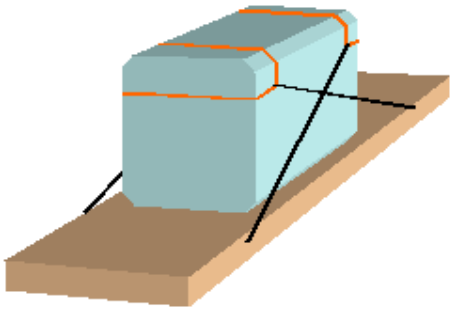


Figure 7.43 Spring lashing

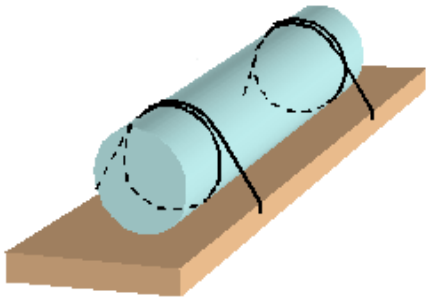


Figure 7.44 Silly-loop lashing

4.3.3.1 Loop lashings with their ends fastened to either side (see figure 7.44), also called "silly-loops", do not provide any direct securing effect and may permit the package/article to roll and therefore are not recommended

4.3.3.2 Lashing corner fittings are available to provide alternative lashing to the spring lashing (see figure 7.43).

4.3.3.3 Any lashing method adopted will require that the lashing material stretches in order to develop a restraining force. As the material relaxes, the tension in the lashing will slowly reduce, therefore it is important that the guidance given in subsection 4.1.4 of this annex should be followed.

4.3.4 CTUs with strong cargo space boundaries favour the method of blocking or shoring for securing a particular package or article. This method will minimize cargo mobility. Care should be taken that the restraining forces are transferred to the CTU boundaries in a way that excludes local overloading. Forces acting to CTU walls should be transferred by means of load spreading cross beams (see subsections 2.3.1 to 2.3.3 of this annex). Very heavy packages or articles, e.g. steel coils or blocks of marble, may require a combination of blocking and lashing, however with

observation of the restrictions lined out in subsection 4.1.6 of this annex (see figure 7.45). Articles with sensitive surfaces may rule out the blocking method and should be secured by lashings only.



Figure 7.45 Transverse blocking of steel slab

4.3.5 Individual securing of packages or articles in CTUs with weak cargo space boundaries and in CTUs without boundaries requires predominantly the method of lashing. Where applicable, blocking or shoring may be additionally applied, but if used in parallel with lashings, the restrictions set out in subsection 4.1.6 of this annex should be observed. Although the provision of good friction in the bedding of a package or article is recommended in any case, the use of top-over lashings for sliding prevention is discouraged unless the cargo has limited mass. Top-over lashings may be suitable for tipping prevention. In particular over-width packages or articles, often shipped on flat bed CTUs, should not be secured solely by top-over lashings (see figure 7.46). The use of half loops and/or spring lashings is strongly recommended (see figures 7.47 and 7.48).

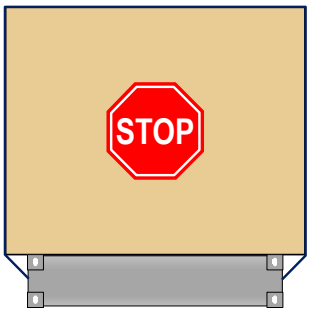


Figure 7.46 Top-over lashing

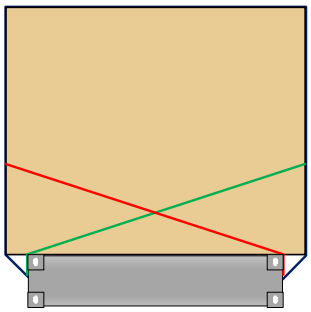


Figure 7.47 Top-over and horizontal half-loop

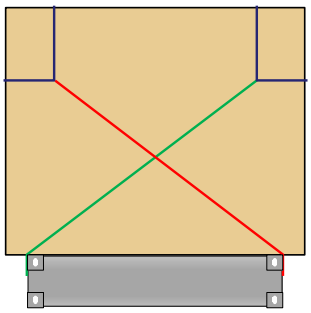


Figure 7.48 Transverse spring lashing

4.3.6 Where horizontal half loops are used, a means should be provided to prevent the loops from sliding down the package/article.

4.3.7 Alternatively an over-width package or article can be secured by half-loops over the corners as shown in figure 7.49.

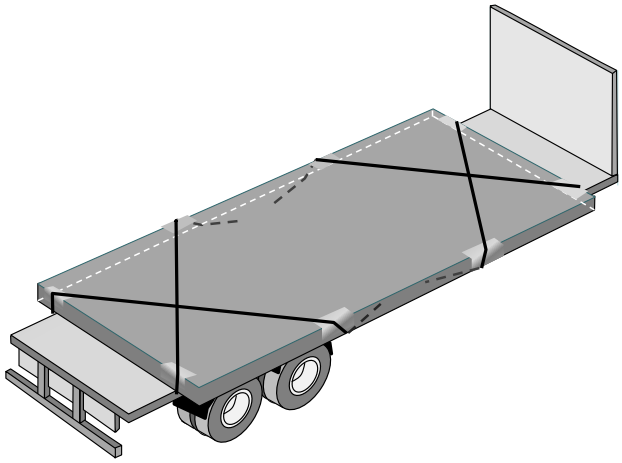


Figure 7.49 Over-width package secured by half-loops

4.4 Evaluation of securing arrangements

4.4.1 Evaluation of securing arrangements means making up a balance of expected external forces and moments against the securing potential of the planned or implemented securing arrangement. Expected external forces should be determined by multiplying the applicable acceleration coefficient, given in chapter 5 of this Code, with the weight of the package or block of packages in question.

$$F_{x,y} = m \cdot g \cdot c_{x,y} \quad [kN]$$

$F_{x,y}$ = expected external force [kN]

m = mass of cargo to be evaluated [t]

g = gravity acceleration 9.81m/s^2

$c_{x,y}$ = horizontal acceleration coefficient in the relevant mode of transport (see chapter 5 of this Code)

Chapter 5 distinguishes three modes of transport, road, rail and sea. The sea transport mode is further subdivided into three categories of severity of ship motions, aligned to the significant wave height of distinguished sea areas. Therefore the selection of the applicable acceleration factor requires the full information on the intended mode and route of transport. Due consideration should be given to possible multimodal transport, in order to identify the acceleration figures for the most demanding mode or leg of the transport route. These figures should be finally used for the evaluation of the securing arrangement.

4.4.2 The assessment of the securing potential includes the assumption of a friction factor, based on the combination of materials (see appendix 2 to this annex) and the character of the securing arrangement (subsection 2.2.2 of this annex), and, if applicable, the determination of the inherent tilting stability of the cargo (subsection 4.3.1 of this annex). Any other securing devices used for blocking, shoring or lashing should be estimated by their strength in terms of MSL and relevant application parameters like securing angle and pre-tension. These figures are required for evaluating the securing arrangement.

4.4.3 In many cases the evaluation of a securing arrangement may be accomplished by means of a simple rule of thumb. However, such rules of thumb may be applicable for certain distinguished conditions of transport only, e.g. for sea transport, and may

overshoot or fall short in other conditions. It is therefore advisable to phrase such rules of thumb for distinguished modes of transport and use them accordingly. Any phrasing of a rule of thumb should undergo a first-time check by means of an advanced assessment method.

4.4.4 Standardized assessment methods for the evaluation of securing arrangements may consist of appropriate pre-calculated tables, based on balance calculations, which give quick answers regarding the adequacy of a securing arrangement[5]. Such methods may be directed to specific modes of transport.

4.4.5 Evaluation of securing arrangements may be carried out by balancing forces and moments by an elementary calculation. However, the particular method used should be approved and suitable for the intended purpose and mode of transport. Specific guidance may be found in the IMO Code of Safe Practice for Cargo Stowage and Securing (CSS Code) and in various other standards and guidelines issued by regional or national authorities and industry groups covering various modes of transport. References:

- IMO CSS Code, Annex 13, for sea transport;
- European standard EN 12195-1:2010, for road transport;
- International Union of Railways (UIC), Agreement governing the exchange and use of wagons between Railway Undertakings (RIV 2000) Annex II, for rail transport.

4.4.6 The suitability of a specific securing arrangement may be evaluated and approved by an inclination test. The test may be used to demonstrate resistance against any specified external acceleration. The corresponding test-angle depends on the existing friction factor for a sliding resistance test, or on the relation between the height and the width of cargo for a tipping resistance test (see appendix 5 to this annex).

5 Packing bulk material

5.1 Non-regulated liquids in tank CTUs

5.1.1 Tank CTUs filled with liquids having a viscosity less than 2,680 mm^2/s at 20°C and to be transported by road, rail or sea should be filled to at least 80% of their volume for avoiding dangerous surging, but never more than 95% of their volume, unless specified otherwise. A filling ratio of maximum 20% is also accepted. A filling ratio of more than 20% and less than 80% should only be permitted when the tank shell is subdivided, by partitions or surge plates, into sections of not more than 7,500 l capacity.

5.1.2 The tank shell and all fittings, valves and gaskets should be compatible with the goods to be carried in that tank. In case of doubt, the owner or operator of the tank should be contacted. All valves should be correctly closed and checked for leak tightness.

5.1.3 For the transport of foodstuffs, the tank should comply with the following requirements:

- All parts of the tank which are in direct contact with the food stuff should be so conditioned that the overall food-grade property of the tank is guaranteed;

[5] One of the assessment methods is the Quick Lashing Guide that can be found in informative material IM 5 (available at www.unece.org/trans/wp24/guidelinespackingctus/intro.html).

- The tank should be easily accessible and suitable for cleaning and disinfection;
- Inspection of the interior should be possible;
- The exterior should be conspicuously marked with a marking "FOR FOODSTUFFS ONLY" or with a similar wording.

5.2 Liquids in flexitanks

5.2.1 Flexitanks used for the transport of bulk liquids by road, rail or sea should carry a label that confirms the type approval by a recognized consultative body. The flexitank manufacturer's fitting instructions should always be followed, and the cargo intended to be carried should be checked for compatibility with the material of the flexitank. The transport of dangerous goods in flexitanks is prohibited.

5.2.2 During transport the contents of a flexitank will be subject to dynamic forces without significant retention from friction. These forces will act upon the boundaries of the CTU and may cause damage or complete failure.

5.2.3 Therefore the payload of a CTU should be appropriately reduced, when it is used for carrying a loaded flexitank. The reduction depends on the type of CTU and on the mode of transport. When a flexitank is loaded into a general purpose CTU, the mass of the liquid in the flexitank should not exceed a value agreed with the CTU operator, to prevent the CTU from suffering bulging damages (see figure 7.50).



Figure 7.50 Damaged CTU side wall

5.2.4 Road vehicles intended to carry loaded flexitanks should have boundaries of a certified strength that is sufficient to confine the weight of the cargo under the accepted load assumptions. The certification of fitness of the vehicle should explicitly address the bulk transport of liquid under the assumption of zero-friction. Nevertheless, the lining of the bottom of the loading area with friction increasing material and the application of over-the-top fibre lashings every two metres is recommended for stabilizing the position and the strength of the flexitank.

5.2.5 Before being fitted with a flexitank, the CTU should be carefully inspected for structural integrity and fully functional locking bars for each door panel. The CTU should then be prepared by thorough cleaning, removing of all obstacles like protruding nails and by lining the bottom and walls with cardboard. In 40-foot containers plywood should be used for lining of the side walls in order to avoid bulging damage. The door end of the CTU should be reinforced by battens, fitted into suitable recesses, and by a strong lining of cardboard or plywood. If the flexitank is equipped with a bottom connection tube, this lining should have an aperture matching with the position of the tube in way of the right hand door. The empty flexitank should be unfolded and laid out accurately to facilitate a smooth filling process.

5.2.6 For filling an empty flexitank the left hand door of the CTU should be firmly closed so that the inserted barrier is appropriately supported (see figure 7.51). The flexitank should be filled at a controlled rate. The use of spill protection devices like collecting bag or drip tray is recommended. After filling and sealing the tank the door of the CTU should be closed and a warning label should be attached on the left hand door panel (see figure 7.52). No part of the flexitank or retaining battens or bulkhead should touch either door when fully loaded.



Figure 7.51 Container fitted with flexitank



Figure 7.52 Flexitank warning label

5.2.7 For unloading a flexitank, the right hand door of the CTU should be opened carefully for getting access to the top or bottom connection tube of the flexitank. The left hand door should be kept closed until the flexitank is substantially empty. The use of spill protection devices like collecting bag or drip tray is recommended. The empty flexitank should be disposed according to applicable regulations.

5.3 Non-regulated solid bulk cargoes

5.3.1 Non-regulated solid bulk cargoes may be packed into CTUs provided the boundaries of the cargo spaces are able to withstand the static and dynamic forces of the bulk material under the foreseeable transport conditions (see chapter 5 of this Code). Freight containers are equipped with shoring slots in the door corner posts which are suitable to accommodate transverse steel bars of 60 mm square cross section. This arrangement is particularly designed to strengthen the freight container door end for taking a load of 0.6 P, as required for solid bulk cargoes. These bars should be properly inserted. The relevant transport capability of the CTU should be demonstrated by a case-related certificate issued by a recognized consultative body or by an independent cargo surveyor. This requirement applies in particular to general purpose freight containers and to similar closed CTUs on road vehicles, which are not explicitly designed to carry bulk cargoes. It may be necessary to reinforce side and front walls of the CTU by plywood or chipboard facing in order to protect them from bulging or scratching (see figure 7.53).



Figure 7.53 Lining a 40-foot container with chipboard panels

5.3.2 The CTU intended to carry a bulk cargo should be cleaned and prepared adequately as described in subsection 5.2.5 of this annex, in particular if a cargo-specific liner will be used for accommodating bulk cargoes like grain, coffee beans or similar sensible materials (see figure 7.54).



Figure 7.54 CTU with liner bag for accommodating a sensitive bulk cargo

5.3.3 If crude or dirty material will be transported, the CTU boundaries should be lined with plywood or chipboard for avoiding mechanical wastage of the CTU. In all cases an appropriate door protection should be installed consisting of battens fitted into suitable recesses and complemented by a strong plywood liner (see figure 7.55).



Figure 7.55 CTU with wall liners and door barrier loaded with scrap

5.3.4 Scrap and similar waste material to be carried in bulk in a CTU should be sufficiently dry to avoid leakage and subsequent contamination of the environment or other CTUs, if stacked ashore or transported in a vessel.

5.3.5 Depending on the internal friction and the angle of repose of the solid bulk cargo, the CTU may be inclined to a certain degree, to facilitate the loading or unloading operation. However, it should always be ensured that the walls of the CTU are not overstressed by the filling operation. It is not acceptable to turn a CTU by 90° to an upright position for filling, unless the CTU is especially approved for this method of handling.

Appendix 1. Packaging marks

Note: The labels and marks required for the transport of dangerous goods can be found in the applicable dangerous goods transport regulations and are not included in this Code.

1 Introduction

1.1 Packages are often marked with handling instructions in the language of the country of origin. While this may safeguard the consignment to some extent, it is of little value for goods consigned to, or through, countries using different languages, and of no value at all if people handling the packages are illiterate.

1.2 Pictorial symbols offer the best possibility of conveying the consignor's intention and their adoption will, therefore, undoubtedly reduce loss and damage through incorrect handling.

1.3 The use of pictorial symbols does not provide any guarantee of satisfactory handling; proper protective packaging is therefore of primary importance.

1.4 The symbols shown in this annex are those most regularly exhibited. These and others are shown in ISO standard 780[6].

2 Symbols

2.1 Display of symbols

2.1.1 Symbols should preferably be stencilled directly on the package or may appear on a label. It is recommended that the symbols be painted, printed or otherwise reproduced as specified in this ISO standard. They need not be framed by border lines.

2.1.2 The graphical design of each symbol should have only one meaning; symbols are purposely designed so that they can also be stencilled without changing the graphics.

2.2 Colour of symbols

2.2.1 The colour used for symbols should be black. If the colour of the package is such that the black symbol would not show clearly, a panel of a suitable contrasting colour, preferably white, should be provided as a background.

2.2.2 Care should be taken to avoid the use of colours which could result in confusion with the labelling of dangerous goods. The use of red, orange or yellow should be avoided unless regional or national regulations require such use.

2.3 Size of symbols

For normal purposes the overall height of the symbols should be 100 mm, 150 mm or 200 mm. The size or shape of the package may, however, necessitate use of larger or smaller sizes for the symbols.

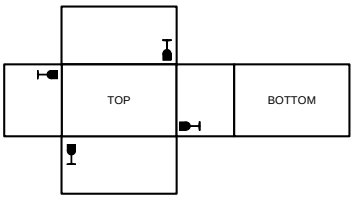
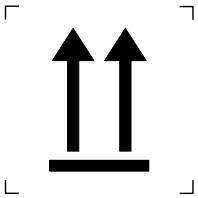
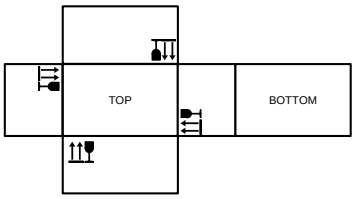
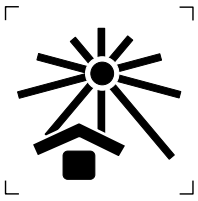
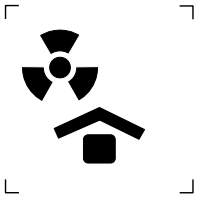
[6] ISO standard 780, Packaging – Pictorial markings for handling of goods.

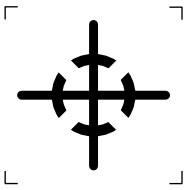
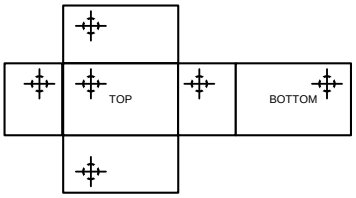
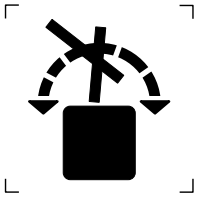
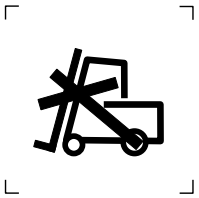
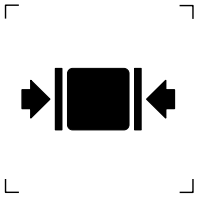
2.4 Positioning of symbols

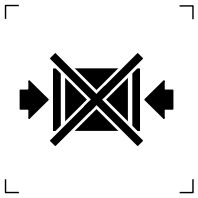
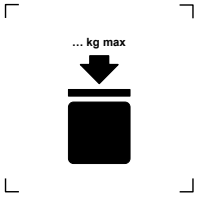
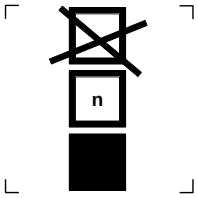
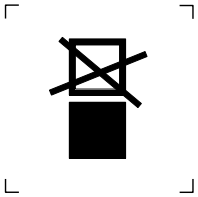
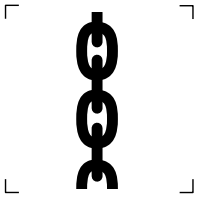
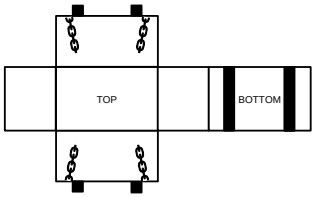
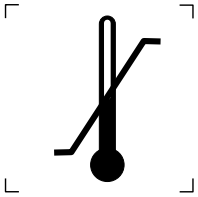
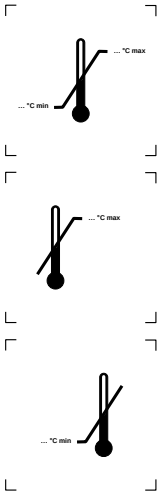
Particular attention should be paid to the correct application of the symbols, as faulty application may lead to misinterpretation. Symbols No. 7 and No. 16 should be applied in their correct respective positions and in appropriate respective places in order to convey the meaning clearly and fully.

3 Handling instructions

Handling instructions should be indicated on transport packages by using the corresponding symbols given in the following table.

No.	Instruction/Information	Symbol	Meaning	Special Instructions
1	FRAGILE		Contents of the package are fragile therefore should be handled with care. 	Shown near the left hand upper corner on all four upright sides of the package.
2	USE NO HAND HOOKS		Hooks should not be used for handling packages	
3	THIS WAY UP		Indicates correct orientation of the package 	Shown as symbol No. 1. Where both symbols are required, symbol No. 3 will appear nearer to the corner
4	KEEP AWAY FROM SUNLIGHT		Package should not be exposed to sunlight.	
5	PROTECT FROM RADIOACTIVE SOURCES		Contents of the package may deteriorate or may be rendered totally unusable by penetrating radiation	
6	KEEP AWAY FROM RAIN		Package should be kept away from rain and dry	

No.	Instruction/Information	Symbol	Meaning	Special Instructions
7	CENTRE OF GRAVITY		Indicates the centre of gravity of the package 	Where possible, "Centre of gravity" should be placed on all six sides but at least on the four lateral sides relating to the actual location of the centre of gravity
8	DO NOT ROLL		Package should not be rolled	
9	DO NOT USE HAND TRUCK HERE		Hand trucks should not be placed on this side when handling	
10	USE NO FORKS		Package should not be handled by forklift trucks	
11	CLAMP AS INDICATED		Clamps should be placed on the sides indicated for handling	The symbol should be positioned on two opposite faces of the package so that it is in the visual range of the clamp truck operator when approaching to carry out operation. The symbol should not be marked on those faces of the package intended to be gripped by the clamps.

No.	Instruction/Information	Symbol	Meaning	Special Instructions
12	DO NOT CLAMP AS INDICATED		Package should not be handled by clamps on the sides indicated	
13	STACKING LIMITED BY MASS		Indicates the maximum stacking load permitted.	
14	STACKING LIMITED BY NUMBER		Maximum number of identical packages that may be stacked above, where "n" is the limiting number.	
15	DO NOT STACK		Stacking the package is not permitted and nothing should be placed on top.	
16	SLING HERE		Slings for lifting should be placed where indicated 	Should be placed on at least two opposite faces of the package
17	TEMPERATURE LIMITS		Indicates the temperature limit within which the package should be stored and handled.	

Appendix 2. Friction factors

Different material contacts have different friction factors. The table below shows recommended values for the friction factors. The values are valid provided that both contact surfaces are "swept clean" and free from any impurities. The values are valid for the static friction. In case of direct lashings, where the cargo has to move little before the elongation of the lashings provides the desired restraint force, the dynamic friction applies, which is to be taken as 75% of the static friction.

Material combination in contact surface	Dry	Wet
SAWN TIMBER/WOODEN PALLET		
Sawn timber/wooden pallet against fabric base laminate/plywood	0.45	0.45
Sawn timber/wooden pallet against grooved aluminium	0.4	0.4
Sawn timber/wooden pallet against stainless steel sheet	0.3	0.3
Sawn timber/wooden pallet against shrink film	0.3	0.3
PLANED WOOD		
Planed wood against fabric base laminate/plywood	0.3	0.3
Planed wood against grooved aluminium	0.25	0.25
Planed wood against stainless steel sheet	0.2	0.2
PLASTIC PALLETS		
Plastic pallet against fabric base laminates/plywood	0.2	0.2
Plastic pallet against grooved aluminium	0.15	0.15
Plastic pallet against stainless steel sheet	0.15	0.15
CARDBOARD (UNTREATED)		
Cardboard against cardboard	0.5	-
Cardboard against wooden pallet	0.5	-
BIG BAG		
Big bag against wooden pallet	0.4	-
STEEL AND SHEET METAL		
Unpainted metal with rough surface against unpainted rough metal	0.4	-
Painted metal with rough surface against painted rough metal	0.3	-
Painted metal with smooth surface against painted smooth metal	0.2	-
Metal with smooth surface against metal with smooth surface	0.2	

Material combination in contact surface	Dry	Wet
STEEL CRATES		
Steel crate against fabric based laminate/plywood	0.45	0.45
Steel crate against grooved aluminium	0.3	0.3
Steel crate against stainless steel sheet	0.2	0.2
CONCRETE		
Concrete with rough surface against sawn wood	0.7	0.7
Concrete with smooth surface against sawn wood	0.55	0.55
ANTI-SLIP MATERIAL		
Rubber against other materials when contact surfaces are clean	0.6	0.6
Materials other than rubber against other materials	as certified or tested according to appendix 3	

Friction factors (μ) should be applicable to the actual conditions of transport. When a combination of contact surfaces is missing in the table above or if its friction factor cannot be verified in another way, the maximum allowable friction factor of 0.3 should be used. If the surface contacts are not swept clean, the maximum allowable friction factor of 0.3 or, when lower, the value in the table should be used. If the surface contacts are not free from frost, ice and snow a static friction factor of 0.2 should be used, unless the table shows a lower value. For oily and greasy surfaces or when slip sheets have been used a friction factor of 0.1 applies.

Appendix 3. Practical methods for the determination of the friction factor μ

To determine the friction factor μ two alternative methods are given. A practical approach to make an assumption on the applicable friction factor is the inclination test which can be carried out by any party involved in the packing of a CTU. The alternative method to determine the exact friction factor is the pulling test which however needs laboratory equipment.

1 Inclination test

The factor μ indicates how easily a cargo will slide if the cargo platform is tilted. A method to find μ is to incline a cargo platform carrying the cargo in question, and measure the angle (α) at which the cargo starts to slide. This gives the friction factor $\mu = 0.925 \cdot \tan \alpha$. Five tests should be done under practical and realistic conditions, the highest and lowest values should be ignored and the average of the remaining three used to determine the friction factor.

2 Pulling test

2.1 The test rig consists of the following components:

- Horizontal floor with a surface representing the cargo platform
- Test device for tensile tests
- Connecting device between the test equipment and the bottom of the package
- PC based evaluation system.

The tensile device should comply with ISO standard 7500-1.

2.2 The test conditions should correspond to real ones; the contact surfaces should be swept clean and free from impurities. Tests should be executed in an atmospheric condition 5 in accordance with ISO 2233:2001 at a temperature of + 20°C and 65% relative humidity.

2.3 The pulling speed should be 100 mm /min, the sampling rate should be at least 50 Hz.

2.4 A measurement of pulling force and way of displacement is made with the same test object in one arrangement with a respective glide path of 50 mm to 85 mm for each stroke. At least three individual strokes should be carried out with an intermediate unloading of at least 30% of the pulling force per measurement (see also figure 7.56).

2.5 A measurement series consists of three measurements for each of three strokes. The test piece and/or anti slip material should be replaced for each measurement, so that any influence of material wear on the result of the measurement can be excluded.

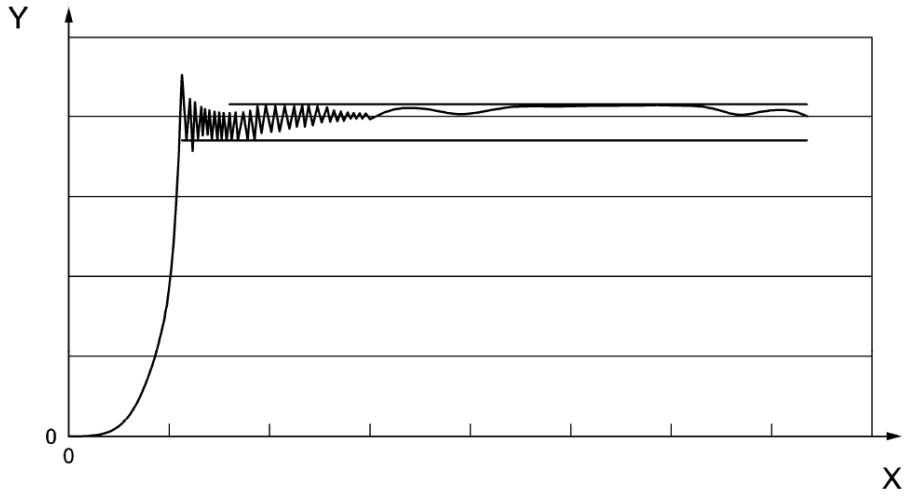


Figure 7.56

Key: Y - Pulling force X - Direction of displacement

2.6 The friction factor μ should be determined according to the equation mentioned below, taking into account the three medium values of each of the three measurements:

$$\mu = (\text{pulling force} \cdot 0.95) / (\text{weight} \cdot 0.925)$$

2.7 For a most realistic determination of frictional forces and friction factors, multiple measurements series should be executed, each with different test samples for cargo area, anti-slip mat and load bearer or load.

2.8 If the measurement condition differs from what is specified above, the test conditions should be documented in the test report.

Appendix 4. Specific packing and securing calculations

1 Resistivity of transverse battens

The attainable resistance forces F of an arrangement of battens may be determined by the formula (see also figure 7.57):

$$F = n \cdot \frac{w^2 \cdot h}{28 \cdot L} \text{ [kN]}$$

n = number of battens
w = thickness of battens [cm]
h = height of battens [cm]
L = free length of battens [m]

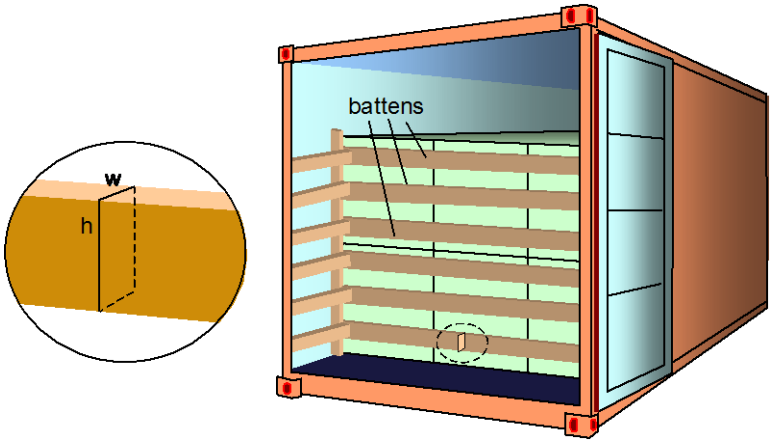


Figure 7.57 Transverse battens in an freight container

Example:

A fence of six battens has been arranged. The battens have a free length L = 2.2 m and the cross section w = 5 cm, h = 10 cm. The total attainable resistance force is:

$$F = n \cdot \frac{w^2 \cdot h}{28 \cdot L} = 6 \cdot \frac{5^2 \cdot 10}{28 \cdot 2.2} = 24\,\text{kN}$$

This force of 24 kN would be sufficient to restrain a cargo mass (m) of 7.5 t, subjected to accelerations in sea area C with 0.4 g longitudinally (c_x) and 0.8 g vertically (c_z). The container is stowed longitudinally. With a friction factor between cargo and container floor of μ = 0.4 the following balance calculation shows:

$$c_x \cdot m \cdot g < \mu \cdot m \cdot (1\text{-}c_z) \cdot g + F \text{ [kN]}$$

$$0.4 \cdot 7.5 \cdot 9.81 < 0.4 \cdot 7.5 \cdot 0.2 \cdot 9.81 + 24 \text{ [kN]}$$

$$29 < 6 + 24 \text{ [kN]}$$

2 Bedding a concentrated load in a general purpose freight container or on a flatrack

Bedding arrangements for concentrated loads in general purpose freight containers and on flatracks should be designed in consultation with the CTU operator.

3 Longitudinal position of the centre of gravity of cargo

The longitudinal position of the centre of gravity of the cargo should be used in connection with specific load distribution rules and diagrams of CTUs[7]. The longitudinal position of the centre of gravity of the cargo within the inner length of a packed CTU is at the distance d from the front, obtained by the formula (see also figure 7.58):

$$d = \frac{\sum(m_n \cdot d_n)}{\sum m_n}$$

d = distance of common centre of gravity of the cargo from the front of stowage area [m]

m_n = mass of the individual packages or overpack [t]

d_n = distance of centre of gravity of mass m_n from front of stowage area [m]

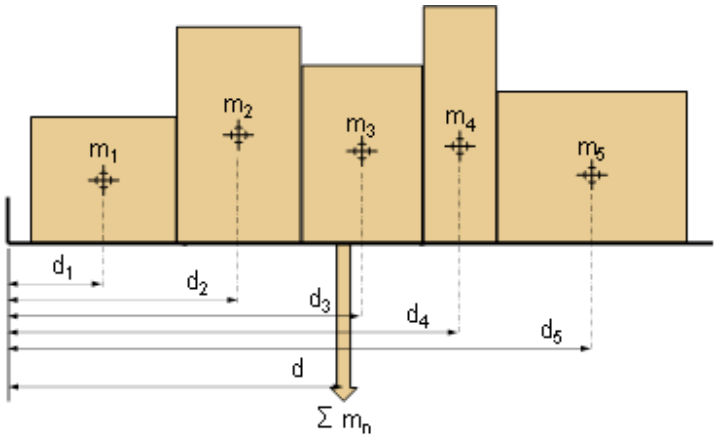


Figure 7.58 Determination of longitudinal centre of gravity

Example:

A 20-foot container is packed with five groups of cargo parcels as follows:

	m_n [t]	d_n [m]	$m_n \cdot d_n$ [t·m]
1	3.5	0.7	2.45
2	4.2	1.4	5.88
3	3.7	3.0	11.10
4	2.2	3.8	8.36
5	4.9	5.1	24.99
	$\Sigma m_n = 18.5$		$\Sigma(m_n \cdot d_n) = 52.78$

$$d = \frac{\sum(m_n \cdot d_n)}{\sum m_n} = \frac{52.78}{18.5} = 2.85 \text{ m}$$

[7] Examples of load distribution diagrams for vehicles are given in section 3.1 of this annex and examples of load distribution diagrams for containers, trailer and railway wagons are provided in informative material IM6 (available at www.unece.org/trans/wp24/guidelinespackingctus/intro.html).

4 Cargo securing with dunnage bags

4.1 Introduction

4.1.1 Accelerations in different directions during transport may cause movements of cargo, either sliding or tipping. Dunnage bags, or air bags, used as blocking devices may be able to prevent these movements.

4.1.2 The size and strength of the dunnage bag are to be adjusted to the cargo weight so that the permissible lashing capacity of the dunnage bag, without risk of breaking it, is larger than the force the cargo needs to be supported with:

$$F_{DUNNAGE\ BAG} \geq F_{CARGO}$$

4.2 Force on dunnage bag from cargo (F_{CARGO})

4.2.1 The maximum force, with which rigid cargo may impact a dunnage bag, depends on the cargo's mass, size and friction against the surface and the dimensioning accelerations according to the formulas below:

Sliding:	Tipping:
$F_{CARGO} = m \cdot g \cdot (c_{x,y} - \mu \cdot 0.75 \cdot c_z)$ [kN]	$F_{CARGO} = m \cdot g \cdot (c_{x,y} - b_p/h_p \cdot c_z)$ [kN]

F_{CARGO} =	force on the dunnage bag caused by the cargo [t]
m =	mass of cargo [t]
$c_{x,y}$ =	Horizontal acceleration, expressed in g, that acts on the cargosideways or in forward or backward directions
c_z =	Vertical acceleration that acts on the cargo, expressed in g
μ =	Friction factor for the contact area between the cargo and the surface or between different packages
b_p =	Package width for tipping sideways, or alternatively the length of the cargo for tipping forward or backward
h_p =	package height [m]

4.2.2 The load on the dunnage bag is determined by the movement (sliding or tipping) and the mode of transport that gives the largest force on the dunnage bag from the cargo.

4.2.3 Only the cargo mass that actually impacts the dunnage bag should be used in the above formulas. If the dunnage bag is used to prevent movement forwards, when breaking for example, the mass of the cargo behind the dunnage bag should be used in the formulas.

4.2.4 If the dunnage bag instead is used to prevent movement sideways, the largest total mass of the cargo that either is on the right or left side of the dunnage bag should be used, that is, either the mass m_1 or m_2 (see figure 7.59).

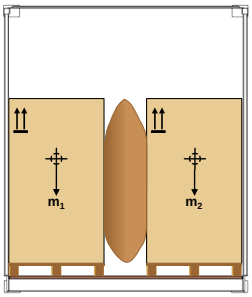


Figure 7.59 Equal height packages

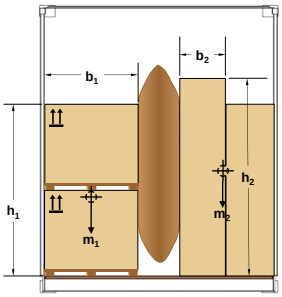


Figure 7.60 Unequal height packages

4.2.5 In order to have some safety margin in the calculations, the lowest friction factor should be used, either the one between the cargo in the bottom layer and the platform or between the layers of cargo.

4.2.6 If the package on each side of the dunnage bag has different forms, when tipping the relationship between the cargo width and height of the cargo stack that has the smallest value of b_p / h_p is chosen.

4.2.7 However, in both cases the total mass of the cargo that is on the same side of the dunnage bag should be used, that is, either the mass m_1 or m_2 in figure 7.60.

4.3 Permissible load on the dunnage bag (F_{DB})

4.3.1 The force that the dunnage bag is able to take up depends on the area of the dunnage bag which the cargo is resting against and the maximum allowable working pressure. The force of the dunnage bag is calculated from:

$$F_{DB} = A \cdot 10 \cdot g \cdot P_B \cdot SF \text{ [kN]}$$

F_{DB} = force that the dunnage bag is able to take up without exceeding the maximum allowable pressure (kN)

P_B = bursting pressure of the dunnage bag [bar]

A = contact area between the dunnage bag and the cargo [m^2]

SF = safety factor

0.75 for single use dunnage bags

0.5 for reusable dunnage bags

4.4 Contact area (A)

4.4.1 The contact area between the dunnage bag and the cargo depends on the size of the bag before it is inflated and the gap that the bag is filling. This area may be approximated by the following formula:

$$A = (b_{DB} - \pi \cdot d/2) \cdot (h_{DB} - \pi \cdot d/2)$$

b_{DB} = width of dunnage bag [m]

h_{DB} = height of dunnage bag [m]

A = contact area between the dunnage bag and the cargo [m^2]

d = gap between packages [m]

π = 3.14

4.5 Pressure in the dunnage bag

4.5.1 Upon application of the dunnage bag it is filled to a slight overpressure. If this pressure is too low there is a risk that the dunnage bag may come loose if the ambient pressure is rising or if the air temperature drops. Conversely, if the filling pressure is too high there is a risk of the dunnage bag bursting or damaging the cargo if the ambient pressure decreases, or if the air temperature rises.

4.5.2 The bursting pressure (P_B) of a dunnage bag depends on the quality and size of the bag and the gap that it is filling. The pressure exerted on a dunnage by the cargo forces should never be allowed to approach bursting pressure of the bag because of the risk of failure. A safety factor should, therefore, be incorporated and, if necessary, a dunnage bag with a higher bursting pressure selected.

Appendix 5. Practical inclination test for determination of the efficiency of cargo securing arrangements

1 The efficiency of a securing arrangement can be tested by a practical inclining test in accordance with the following description.

2 The cargo (alternatively one section of the cargo) is placed on a road vehicle platform or similar and secured in the way intended to be tested.

3 To obtain the same loads in the securing arrangement in the inclining test as in calculations, the securing arrangement should be tested by gradually increasing the inclination of the platform to an angle, α, in accordance with the diagram below.

4 The inclination angle that should be used in the test is a function of the horizontal acceleration $c_{x,y}$ for the intended direction (forward, sideways or backward) and the vertical acceleration c_z.

(a) To test the efficiency of the securing arrangement in the lateral direction, the greatest of the following test angles should be used:

- The angle determined by the friction factor μ (for the sliding effect), or
- The angle determined by the ratio of $\frac{B}{n \cdot H}$ (for the tilting effect).

(b) To test the efficiency of the securing arrangement in the longitudinal direction, the greatest of following test angles should be used:

- The angle determined by the friction factor μ (for the sliding effect), or
- The angle determined by the ratio of $\frac{L}{H}$ (for the tilting effect).

5 The lowest friction factor, between the cargo and the platform bed or between packages if over-stowed should be used. The definition of H, B, L and n is according to the sketches in figures 7.61 and 7.62.

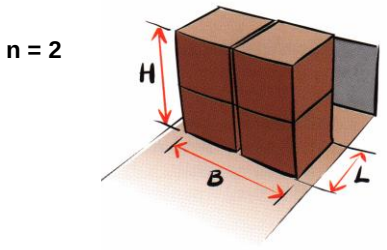


Figure 7.61

Package or section with the centre of gravity close to its geometrical centre (L/2, B/2, H/2).
The number of loaded rows, n, in above section is 2.
L is always the length of one section also when several sections are placed behind each other.

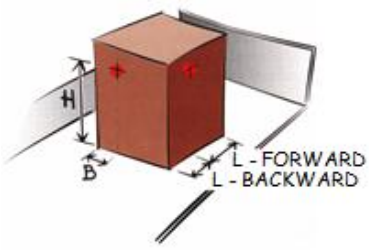


Figure 7.62

Package with the centre of gravity away from its geometrical centre.

The required test angle α as function of $c_{x,y}$ (0.8 g, 0.7 g and 0.5 g) as well as μ, $\frac{B}{n \cdot H}$ and $\frac{L}{H}$ when c_z is 1.0 g is taken from the diagram shown in figure 7.63 or from the table below.

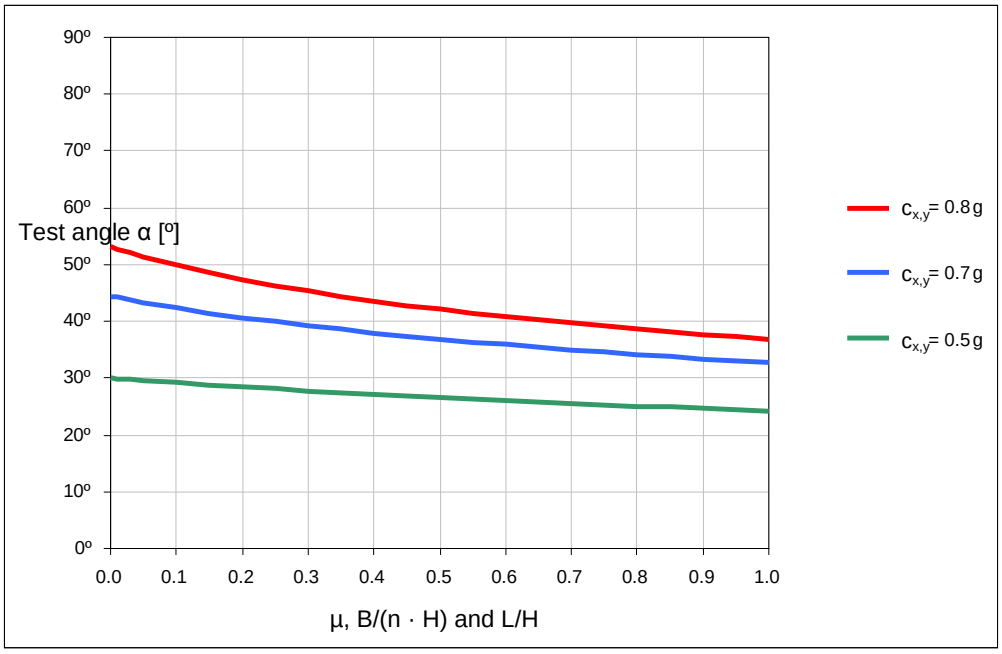


Figure 7.63

Example:

If μ and $\frac{B}{n \cdot H}$ is 0.3 at accelerations sideways at transport in sea area B (c_y = 0.7 g) the cargo securing arrangement should be able to be inclined to approximately 39º, according to the diagram.

In the table below the inclination α is calculated for different γ factors at the horizontal accelerations ($c_{x,y}$ = 0.8 g, 0.7 g and 0.5 g and c_z = 1.0 g).

The γ factor is defined as follows:

μ, B/(n · H) and L/H, as required in section 4 of this appendix.

γ factor \ ah	0.8 g	0.7 g	0.5 g
	Required test angle α in degrees		
0.00	53.1	44.4	30.0
0.05	51.4	3.3	29.6
0.10	49.9	42.4	29.2
0.15	48.5	41.5	28.8
0.20	47.3	40.7	28.4
0.25	46.3	39.9	28.1
0.30	45.3	39.2	27.7
0.35	44.4	38.6	27.4
0.40	43.6	38.0	27.1
0.45	42.8	37.4	26.8
0.50	42.1	36.9	26.6
0.55	41.5	36.4	26.3
0.60	40.8	35.9	26.0
0.65	40.2	35.4	25.8
0.70	39.7	35.0	25.6
0.75	39.2	34.6	25.3
0.80	38.7	34.2	25.1
0.85	38.2	33.8	24.9
0.90	37.7	33.4	24.7
0.95	37.3	33.1	24.5
1.00	36.9	32.8	24.3

6 The securing arrangement is regarded as complying with the requirements if the cargo is kept in position with limited movements when inclined to the prescribed inclination α.

7 The test method will subject the securing arrangement to stresses and great care should be taken to prevent the cargo from falling off the platform during the test. If large masses are to be tested the entire platform should be prevented from tipping as well.



Figure 7.64



Figure 7.65

8 Figure 7.64 and figure 7.65 show tests to confirm the securing arrangements of a large package for acceleration forces in longitudinal and transverse directions.

Annex 8. Access to tank and bulk tops, working at height

1 Risk Assessment

Before accessing tank and bulk CTU tops, management of the packing and unpacking facilities and the transport companies should undertake a thorough risk assessment of the practices. Such assessments should cover:

1.1 Competence of operators

Operators should be fit for duty, having successfully completed all the training necessary to fulfil the legislative requirements and site requirements, in particular regarding the handling of dangerous goods.

1.2 Site Instructions

Site access requirements should be communicated to the hauliers and safety procedures communicated to the drivers upon arrival. Management should promote safety awareness and emphasize that it should be maintained, particularly during product handling. Management should ensure that loading/unloading operations are carried out under supervision.

1.3 Working at height

Safe conditions for working at heights should be provided, as discussed in section 3 of this annex.

1.4 Product Quality

The preferred option is product acceptance on the basis of a Certificate of Analysis. Taking samples from CTUs should be avoided. If the taking of samples is absolutely necessary, management should ensure that sampling is done by qualified site personnel or by appointed surveyors with adequate safety precautions taken.

1.5 Emergency preparedness

Necessary site safety equipment should be available at the loading and unloading locations, e.g.: fire extinguisher(s), eye wash, safety shower, first aid equipment, emergency escape routes, emergency stop, decontamination equipment, and absorbent materials.

1.6 Near miss and incident reporting

There should be a procedure to report all near misses, incidents, loading/discharge problems and unsafe situations or conditions, including follow-up. There should be a system in place to share information on important near misses, incidents or unsafe situations with all parties involved.

2 CTU ladders

2.1 CTUs used for bulk transport will often require access to their tops, in order to gain access to the interiors, to open and close the loading hatches or to sample the cargo. These units usually have some built-in means of access, e.g. ladders or toe-holds, but these are generally for emergency purposes rather than regular use. As such, they may be restrictive with irregularly spaced steps and/or large gaps between ladder rungs.



Figure 8.1 Full frame ladder



Figure 8.2 Partial frame ladder



Figure 8.3 Road tanker

2.2 Tank containers, swap tanks and road tankers will usually have ladders built into their rear frames, some of which may be readily apparent as ladders (see figure 8.3), while others appear to be climbing frames (see figures 8.1 and 8.2).

2.3 Ideally, inbuilt ladders should be constructed with two stiles and should have steps that are at least 300 mm wide with high friction surface and the steps uniformly spaced about 300 mm apart. The pictures above show good and less satisfactory versions.



Figure 8.4 Bulk container rungs

2.4 The designs of tank containers, swap tanks and road tankers generally facilitate placement of feet while accessing their tops. Access to the tops of bulk CTUs is generally far less satisfactory, often only provided by a number of shaped bars attached to the doors (see figure 8.4). The example shows five shaped bars, the bottom and top steps quite narrow and the spacing varies from 480 mm to 640 mm. Operators attempting to climb onto and from the roof may find these steps difficult.



Figure 8.5 Overhead warning sign

2.5 Where routine access to the top of a CTU is necessary, the CTU will bear a warning decal adjacent to the means of access. The decal provides warning of overhead hazards in general and power cables in particular (see figure 8.5). Operators, when deciding whether to access the top of the CTU, should make themselves aware of all potential hazards directly overhead and immediately adjacent to the CTU. This warning is particularly important for operations in rail transfer depots but may affect other handling operations.

2.6 As the process of climbing onto the top of a CTU entails risks of slipping and falling, a built-in ladder should only be used for emergency access. Operational access to tank container tops should be made using suitable mobile steps or from a gantry.

2.7 When a tank or dry bulk CTU is loaded onto a chassis, the bottom of the ladder can be as much as 1,600 mm, and the top of the CTU as much as 4.3 m off the ground. Furthermore on some designs of chassis, the CTU will be slightly inclined with the front end elevated which would mean that the ladder would be inclined backwards towards to the operator.

2.8 The steps/rungs are generally manufactured from steel or aluminium and can be slippery in the cold and wet. Operators can easily miss their step when climbing these ladders.

2.9 When transitioning from the ladder to the walkway on the CTU top, there are limited hand holds available for the operator to grip (see figure 8.6) making the manoeuvre hazardous. An operator climbing onto the top of the tank container shown in figure 8.7 will be presented with either the walkway securing bracket or the miss-stacking plate, neither of which are ideal handholds. Climbing off the top of the CTU can be more hazardous as the operator is attempting to locate rungs/steps which are not visible and in an awkward position.



Figure 8.6 Freight container handhold



Figure 8.7 Transitioning

3 Working at height safety

3.1 Typical health and safety regulations provide that every employer ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height. Where work is carried out at height, every employer should take suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

3.2 The measures should include:

3.2.1 Ensuring that the work is carried out:

- From an existing place of work; or
- (In the case of obtaining access or egress) using an existing means, which complies with guidelines with those regulations, where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and
- Where it is not reasonably practicable for the work to be carried out in accordance with the previous paragraph, sufficient work equipment should be provided to prevent, so far as is reasonably practicable, a fall occurring.

3.2.2 Where the measures taken do not eliminate the risk of a fall occurring, every employer should, so far as it is reasonably practicable, provide sufficient work equipment to minimize:

- The distance and consequences; or
- Where it is not reasonably practicable to minimize the distance, the consequences, of a fall; and
- Without prejudice to the generality of section 3.2, provide such additional training and instruction or take other additional suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

3.3 The regulations can generally be interpreted to mean that wherever possible working at height should be avoided, but where that is not possible, then it should be made as safe as possible by providing facilities and equipment to minimize the risk of injury (see figure 8.8).

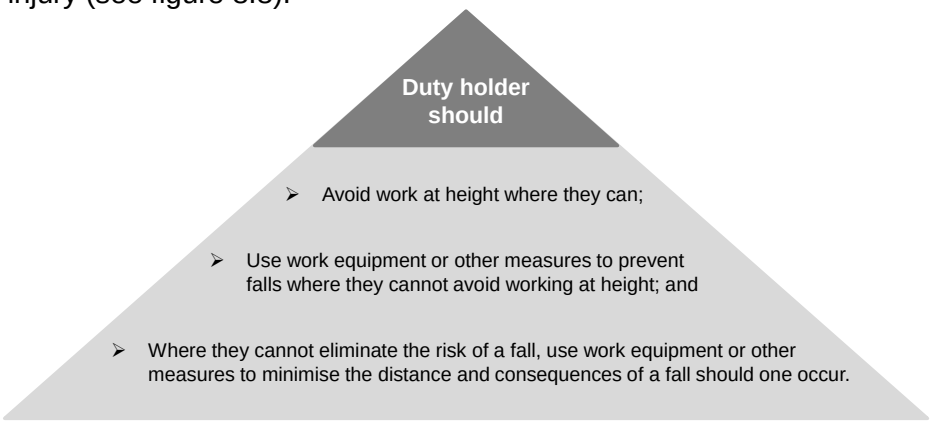


Figure 8.8 Regulations hierarchy

4 Access and safety equipment

4.1 Where regular access to the top of CTUs is required, alternative access solutions should be considered. Some operators have provided more substantial access ladders attached to trailers as shown in figure 8.9. This type of ladder satisfies the step dimension recommendation and can be adjusted so that the lowest step is just off the ground. However there are no guard rails on the ladder or on the work platform so the operator may still be at risk of a fall. As an alternative, mobile steps similar to those shown in figure 8.10 can be used which can be positioned beside the CTU and from which the operator can safely step.



Figure 8.9 Trailer mounted access ladder



Figure 8.10 Mobile access ladder

4.2 At facilities where regular access is required the CTU should be positioned next to a fixed access gantry (see figure 8.11). Once the CTU is positioned next to the gantry the operator can lower the counterbalanced handrail/barrier to provide additional safety while working on the CTU top.



Figure 8.11 Access gantry

4.3 If the CTU is mounted on a chassis, the operator should not attempt to access the top of the CTU unless the tractor unit has been disconnected or immobilized to prevent accidental movement of the CTU.

4.4 A fall arrest system may be the best item of personnel safety equipment that can be employed. Operators should wear an approved harness and attach themselves to the overhead cables. In figure 8.12 a number of "T" shaped stanchions are positioned about the area where an operator will work on the top of the container. The connecting overhead cables have counterbalanced arrest drums supported from them to which the operator will attach a harness.



Figure 8.12 Fall arrest stanchions

4.5 The top of the CTU should not be overcrowded. The walkways are limited in size and strength. Furthermore with too many people on the top of the CTU moving about can be hazardous.

Annex 9. Fumigation

1 General

1.1 Fumigation is a method of pest control that completely fills an area with gaseous pesticides - or fumigants - to suffocate or poison the pests within. It is utilized for control of pests in buildings (structural fumigation), soil, grain, and produce, and is also used during processing of goods to be imported or exported to prevent transfer of exotic organisms. This method also affects the structure itself, affecting pests that inhabit the physical structure, such as woodborers and drywood termites.

1.2 Timber products used for dunnage can be treated by fumigation under the requirements of the International Standards for Phytosanitary Measures, No. 15 (ISPM 15)[7]. Some shippers believe, incorrectly, that they can achieve this by throwing in a fumigation bomb just before the CTU doors are closed. This, however, is not permitted under ISPM 15 and does not achieve the required level of treatment.

1.3 Fumigated CTUs containing no other dangerous goods are subject to a number of provisions of dangerous goods regulations, such as those included in this annex[8].

1.4 When the fumigated CTU is packed with dangerous goods in addition to fumigant, any provision of the dangerous goods regulations (including placarding, marking and documentation) applies in addition to the provisions of this annex.

1.5 Only CTUs that can be closed in such a way that the escape of gas is reduced to a minimum should be used for the transport of cargo under fumigation.

2 Training

Persons engaged in the handling of fumigated CTUs should be trained commensurate with their responsibilities.

3 Marking and placarding

3.1 A fumigated CTU should be marked with a warning mark (see figure 9.1) affixed at each access point in a location where it will be easily seen by persons opening or entering the CTU. This mark should remain on the CTU until the following provisions have been met:

- The fumigated CTU has been ventilated to remove harmful concentrations of fumigant gas; and
- The fumigated goods or materials have been unpacked.

3.2 The fumigation warning mark should comply with the relevant dangerous goods regulations. Below is the fumigation warning mark as shown in the 18th revised edition of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations.

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7 Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations: Regulation of wood packaging material in international trade.

8 See also the latest edition of the UN Recommendations on the Transport of Dangerous Goods, Model Regulations at www.unece.org/trans/danger/publi/unrec/rev13/13nature_e.html, or modal transport regulations such as the IMDG Code.

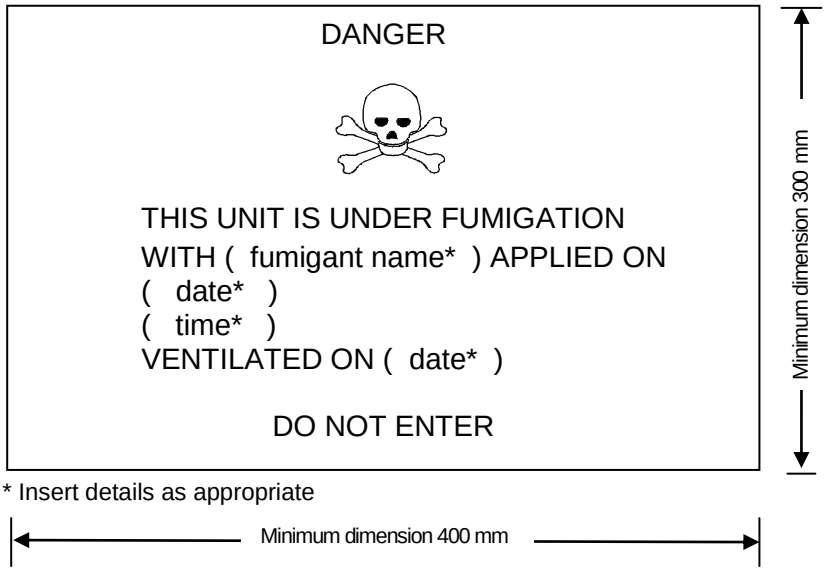

Figure 9.1 Fumigation warning mark

4 Ventilation

4.1 After the fumigant has performed its function it can be ventilated before it is transported if required. When the fumigated CTU has been completely ventilated either by opening the doors of the CTU or by mechanical ventilation after fumigation, the date of ventilation should be marked on the fumigation warning mark.

4.2 Care should be taken even after a CTU has been declared as ventilated. Gas can be held in packages of cargo, then desorbed over a long period of time, even over many days, raising the level of gas inside the cargo transport unit to above the safe exposure level. Bagged cereals and cartons with large air spaces are likely to produce this effect. Alternatively, gas and the fumigant sachets or tablets can become 'trapped' at the far end of a CTU by tightly packed cargo.

4.3 In reality any CTU that has carried dangerous or fumigated goods should not be considered as safe until it has been properly cleaned and all cargo residues, gaseous and solid, have been removed. The consignee for such goods should have the facilities to carry out this cleaning process safely.

4.4 When the fumigated CTU has been ventilated and unpacked, the fumigation warning mark should be removed.

Annex 10. Topics for consideration in a training programme

Topics to be included in a training programme	
1	Consequences of badly packed and secured cargo • Injuries to persons and damage to the environment • Damage to all means of transport and CTUs • Damage to cargo • Economic consequences
2	Liabilities • Different parties involved in cargo transport • Legal responsibility • Goodwill responsibility • Quality assurance
3	Forces acting on the cargo during transport • Road transport • Rail transport • Sea transport
4	Basic principles for cargo packing and securing • Prevention from sliding • Prevention from tipping • Influence of friction • Basic principles for cargo securing • Dimensions of securing arrangements for combined transport
5	CTUs – types • Freight containers • Flats • Swap bodies • Road vehicles • Rail cars/wagons
6	Cargo care consciousness and cargo planning • Choice of transport means • Choice of CTU type • Check of CTU prior to packing • Cargo distribution in CTUs • Requirements from the receiver of cargo regarding cargo packing • Condensation risks in CTUs • Symbols for cargo handling

Topics to be included in a training programme	
7	Different methods for cargo packing and securing • Lashing • Blocking and bracing • Increasing friction
8	Safe handling of packages • Manual handling • Mechanical handling devices • Personal protective equipment
9	Equipment for securing and protection of cargo • Fixed equipment on CTUs • Reusable cargo-securing equipment • One-way equipment • Inspection and rejection of securing equipment
10	On completion of packing • Closing the CTU • Marking and placarding • Documentation • Verifying gross mass
11	Packing and securing unitized cargo • Cases • Palletized cargoes • Bales and bundles • Bags on pallets • Big bags • Slabs and panels • Barrels • Pipes • Cartons
12	Packing and securing of non-unitized cargo • Different types of packaged cargoes packed together • Packing of heavy and light cargoes together • Packing of rigid and non-rigid cargoes together • Packing of long and short cargoes together • Packing of high and low cargoes together • Packing of liquid and dry cargoes together

Topics to be included in a training programme	
13	Packing and securing of paper products • General guidelines for the packing and securing of paper products • Vertical rolls • Horizontal rolls • Sheet paper on pallets
14	Packing and securing of cargo requiring special techniques • Steel coils • Cable drums • Wire rolls • Steel slabs • Steel plates • Big pipes • Stone blocks • Machines
15	Packing and securing of dangerous cargoes • Regulations for the transport of dangerous goods • Definitions • Packing regulations • Packing, separation and securing • Labelling and placarding • Information transfer when transporting dangerous cargoes • Liabilities

***

ANNEX 21

DRAFT AMENDMENT TO SOLAS CHAPTER XI-1

CHAPTER XI-1
SPECIAL MEASURES TO ENHANCE MARITIME SAFETY

1 Add new regulation 7 as follows:

"**Regulation 7**

Atmosphere testing instrument for enclosed spaces

Every ship to which chapter I applies shall carry an appropriate portable atmosphere testing instrument or instruments*. As a minimum, these shall be capable of measuring concentrations of oxygen, flammable gases or vapours, hydrogen sulphide and carbon monoxide prior to entry into enclosed spaces**. Instruments carried under other requirements may satisfy this regulation. Suitable means shall be provided for the calibration of all such instruments.

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* Refer to the *Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS regulation XI-1/7* (MSC.1/Circ.1477).

** Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27)."

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ANNEX 22

DRAFT AMENDMENTS TO THE 2011 ESP CODE

ANNEX A

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

Part A

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

1 The text in paragraph 5.3.2.3 is replaced by the following:

".3 hydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms;"

2 The following new paragraph 5.5 is added after the existing paragraph 5.4:

"5.5 Rescue and emergency response equipment

If breathing apparatus and/or other equipment is used as "Rescue and emergency response equipment" then the equipment should be suitable for the configuration of the space being surveyed."

3 The existing paragraphs 5.5 and 5.6 are renumbered, respectively.

4 The following new paragraph 6.1.3 is added after the existing paragraph 6.1.2:

"6.1.3 For bulk carriers subject to SOLAS regulation II-1/3-10, the owner should arrange the updating of the Ship Construction File (SCF) throughout the ship's life whenever a modification of the documentation included in the SCF has taken place. Documented procedures for updating the SCF should be included within the Safety Management System."

5 The existing text under paragraph 6.3 is numbered as paragraph 6.3.1 and the following new paragraph 6.3.2 is added at the end of paragraph 6.3:

"6.3.2 For bulk carriers subject to SOLAS regulation II-1/3-10, the Ship Construction File (SCF), limited to the items to be retained on board, should be available on board."

6 The existing text under paragraph 6.4 is numbered as paragraph 6.4.1 and the following new paragraphs 6.4.2 and 6.4.3 are added at the end of paragraph 6.4:

"6.4.2 For bulk carriers subject to SOLAS regulation II-1/3-10, on completion of the survey, the surveyor should verify that the update of the Ship Construction File (SCF) has been done whenever a modification of the documentation included in the SCF has taken place.

6.4.3 For bulk carriers subject to SOLAS regulation II-1/3-10, on completion of the survey, the surveyor should verify any addition and/or renewal of materials used for the construction of the hull structure are documented within the Ship Construction File list of materials."

Part B

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

7 The text in paragraph 5.3.2.3 is replaced by the following:

".3 hydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms;"

8 The following new paragraph 5.5 is added after the existing paragraph 5.4:

"5.5 Rescue and emergency response equipment

If breathing apparatus and/or other equipment is used as "Rescue and emergency response equipment" then the equipment should be suitable for the configuration of the space being surveyed."

9 The existing paragraphs 5.5 and 5.6 are renumbered, respectively.

10 The following new paragraph 6.1.3 is added after the existing paragraph 6.1.2:

"6.1.3 For bulk carriers subject to SOLAS regulation II-1/3-10, the Owner should arrange the updating of the Ship Construction File (SCF) throughout the ship's life whenever a modification of the documentation included in the SCF has taken place. Documented procedures for updating the SCF should be included within the Safety Management System."

11 The existing text under paragraph 6.3 is numbered as paragraph 6.3.1 and the following new paragraph 6.3.2 is added at the end of paragraph 6.3:

"6.3.2 For bulk carriers subject to SOLAS regulation II-1/3-10, the Ship Construction File (SCF), limited to the items to be retained on board, should be available on board."

12 The existing text under paragraph 6.4 is numbered as paragraph 6.4.1 and the following new paragraphs 6.4.2 and 6.4.3 are added at the end of paragraph 6.4:

"6.4.2 For bulk carriers subject to SOLAS regulation II-1/3-10, on completion of the survey, the surveyor should verify that the update of the Ship Construction File (SCF) has been done whenever a modification of the documentation included in the SCF has taken place.

6.4.3 For bulk carriers subject to SOLAS regulation II-1/3-10, on completion of the survey, the surveyor should verify any addition and/or renewal of materials used for the construction of the hull structure are documented within the Ship Construction File list of materials."

ANNEX B

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS

Part A

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

13 The text in paragraph 2.6.1 is replaced by the following new text:

"2.6.1 The minimum requirements for ballast tank pressure testing at the renewal survey are given in 2.6.3 and in annex 3.

The minimum requirements for cargo tank testing at renewal survey are given in 2.6.4 and annex 3.

Cargo tank testing carried out by the vessel's crew under the direction of the Master may be accepted by the surveyor provided the following conditions are complied with:

1. tank testing procedure has been submitted by the owner and reviewed by the Administration or Society prior to the testing being carried out;

2. there is no record of leakage, distortion or substantial corrosion that would affect the structural integrity of the tank;

3. the tank testing has been satisfactorily carried out within special survey window not more than 3 months prior to the date of the survey on which the overall or close up survey is completed;

4. the satisfactory results of the testing is recorded in the vessel's logbook; and

5. the internal and external condition of the tanks and associated structure are found satisfactory by the surveyor at the time of the overall and close up survey."

14 The text in paragraph 5.3.2.3 is replaced by the following:

".3 hydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms;"

15 The following new paragraph 5.5 is added after the existing paragraph 5.4:

"5.5 Rescue and emergency response equipment

If breathing apparatus and/or other equipment is used as "Rescue and emergency response equipment" then the equipment should be suitable for the configuration of the space being surveyed."

16 The existing paragraphs 5.5 and 5.6 are renumbered, respectively.

17 The following new paragraph 6.1.3 is added after the existing paragraph 6.1.2:

"6.1.3 For oil tankers subject to SOLAS regulation II-1/3-10, the Owner should arrange the updating of the Ship Construction File (SCF) throughout the ship's life whenever a modification of the documentation included in the SCF has taken place. Documented procedures for updating the SCF should be included within the Safety Management System."

18 The existing text under paragraph 6.3 is numbered as paragraph 6.3.1 and the following new paragraph 6.3.2 is added at the end of paragraph 6.3:

"6.3.2 For oil tankers subject to SOLAS regulation II-1/3-10, the Ship Construction File (SCF), limited to the items to be retained on board, should be available on board."

19 The existing text under paragraph 6.4 is numbered as paragraph 6.4.1 and the following new paragraphs 6.4.2 and 6.4.3 are added at the end of paragraph 6.4:

"6.4.2 For oil tankers subject to SOLAS regulation II-1/3-10, on completion of the survey, the surveyor should verify that the update of the Ship Construction File (SCF) has been done whenever a modification of the documentation included in the SCF has taken place.

6.4.3 For oil tankers subject to SOLAS regulation II-1/3-10, on completion of the survey, the surveyor should verify any addition and/or renewal of materials used for the construction of the hull structure are documented within the Ship Construction File list of materials."

Part B

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

20 The text in paragraph 2.6.1 is replaced by the following new text:

"2.6.1 The minimum requirements for ballast tank pressure testing at the renewal survey are given in 2.6.3 and in annex 3.

The minimum requirements for cargo tank testing at renewal survey are given in 2.6.4 and annex 3.

Cargo tank testing carried out by the vessel's crew under the direction of the Master may be accepted by the surveyor provided the following conditions are complied with:

1. tank testing procedure has been submitted by the owner and reviewed by the Administration or Society prior to the testing being carried out;

2. there is no record of leakage, distortion or substantial corrosion that would affect the structural integrity of the tank;

3. the tank testing has been satisfactorily carried out within special survey window not more than 3 months prior to the date of the survey on which the overall or close up survey is completed;

4. the satisfactory results of the testing is recorded in the vessel's logbook; and

5. the internal and external condition of the tanks and associated structure are found satisfactory by the surveyor at the time of the overall and close up survey."

21 The text in paragraph 5.3.2.3 is replaced by the following:

".3 hydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms;"

22 The following new paragraph 5.5 is added after the existing paragraph 5.4:

"5.5 Rescue and emergency response equipment

If breathing apparatus and/or other equipment is used as "Rescue and emergency response equipment" then the equipment should be suitable for the configuration of the space being surveyed."

23 The existing paragraphs 5.5 and 5.6 are renumbered, respectively.

***

ANNEX 23

DRAFT NEW SOLAS CHAPTER XIV

A new chapter XIV is added after the existing chapter XIII, as follows:

"**CHAPTER XIV**
SAFETY MEASURES FOR SHIPS OPERATING IN POLAR WATERS

Regulation 1 – Definitions

For the purpose of this chapter:

1 *Polar Code* means the International Code for Ships Operating in Polar Waters, consisting of an introduction and part I-A (the provisions of which shall be treated as mandatory) and an introduction and part II-A (the provisions of which should be treated as mandatory under the relevant annexes of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973) and parts I-B and II-B (the provisions of which should be treated as recommendatory), as adopted by resolutions [MSC….(…) and MEPC….(…)], as may be amended by the Organization, provided that:

.1 amendments to the safety-related provisions of the introduction and part I-A of the Polar Code are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I; and

.2 amendments to part I-B of the Polar Code are adopted by the Maritime Safety Committee in accordance with its Rules of Procedure.

2 *Antarctic area* means the sea area south of latitude 60° S.

3 *Arctic waters* means those waters which are located north of a line from the latitude 58º00.0´ N and longitude 042º00.0´ W to latitude 64°37.0´ N, longitude 035°27.0´ W and thence by a rhumb line to latitude 67º03.9´ N, longitude 026º33.4´ W and thence by a rhumb line to Sørkapp, Jan Mayen and by the southern shore of Jan Mayen to the Island of Bjørnøya, and thence by a great circle line from the Island of Bjørnøya to Cap Kanin Nos and hence by the northern shore of the Asian Continent eastward to the Bering Strait and thence from the Bering Strait westward to latitude 60ºN as far as Il'pyrskiy and following the 60th North parallel eastward as far as and including Etolin Strait and thence by the northern shore of the North American continent as far south as latitude 60ºN and thence eastward along parallel of latitude 60ºN, to longitude 56º37.1´ W and thence to the latitude 58º00.0´ N, longitude 042º00.0´ W.

4 *Polar waters* means Arctic waters or the Antarctic area.

5 *Ship constructed* means a ship the keel of which is laid or which is at a similar stage of construction.

6 *At a similar stage of construction* means the stage at which:

.1 construction identifiable with a specific ship begins; and

.2 assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

Regulation 2 – Application

1 Unless expressly provided otherwise, this chapter applies to ships operating in polar waters, certified in accordance with chapter I.

2 Ships constructed before [*date of entry into force*] shall meet the relevant requirements of the Polar Code by the first intermediate or renewal survey, whichever occurs first, after [*one year after the date of entry into force*].

3 In applying part I-A of the Polar Code, consideration should be given to the additional guidance in part I-B of the Polar Code.

4 This chapter shall not apply to ships owned or operated by a Contracting Government and used, for the time being, only in Government non-commercial service. However, ships owned or operated by a Contracting Government and used, for the time being, only in Government non-commercial service are encouraged to act in a manner consistent, so far as reasonable and practicable, with this chapter.

5 Nothing in this chapter shall prejudice the rights or obligations of States under international law.

Regulation 3 – Requirements for ships to which this chapter applies

1 Ships to which this chapter applies shall comply with the requirements of the safety-related provision of the introduction, part I-A of the Polar Code and shall, in addition to the requirements of regulation I/7, I/8, I/9, and I/10, as applicable, be surveyed and certified, as provided for in that Code.

2 Ships to which this chapter applies holding a certificate issued pursuant to the provisions of paragraph 1 shall be subject to the control established in regulations I/19 and XI-1/4. For this purpose, such certificates shall be treated as a certificate issued under regulation I/12 or I/13.

Regulation 4 – Alternative design and arrangement

1 The goal of this regulation is to provide a methodology for alternative design and arrangements for structure, machinery, and electrical installations, fire safety and life-saving appliances and arrangements.

2 Structural arrangements, machinery and electrical installation, fire safety design and arrangement measures and as well as life-saving appliances and arrangements may deviate from the prescriptive requirements set out in chapters 3, 6, 8 and 9 of the Polar Code, provided that the alternative design and arrangements meet the intent of the goal and functional requirements concerned and provide an equivalent level of safety to those chapters.

3 When alternative designs or arrangements deviate from the prescriptive requirements of chapters 3, 6, 8 and 9 of the Polar Code, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out based on the guidelines approved by the Organization[1].

4 Any alternative designs or arrangement deviating from the prescriptive requirements shall be recorded in the Polar Ship Certificate and the ship's Polar Water Operational Manual, as required by the Polar Code, also defining the technical and operational measures and conditions for the allowed deviation."

---

[1] Refer to the *Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments* (MSC.1/Circ.1455), *the Guidelines on alternative design for SOLAS chapters II-1 and III* (MSC.1/Circ.1212) and the *Guidelines on alternative design and arrangements for fire safety* (MSC/Circ.1002), as applicable."

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ANNEX 24

DRAFT INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS

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PREAMBLE

1 The International Code for Ships Operating in Polar Waters has been developed to supplement existing IMO instruments in order to increase the safety of ships' operation and mitigate the impact on the people and environment in the remote, vulnerable and potentially harsh polar waters.

2 The Code acknowledges that polar water operation may impose additional demands on ships, their systems and operation beyond the existing requirements of the International Convention for the Safety of Life at Sea (SOLAS), 1974, the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL), as amended, and other relevant binding IMO instruments.

2bis The Code acknowledges that the Polar Waters impose additional navigational demands beyond those normally encountered. In many areas, the chart coverage may not currently be adequate for coastal navigation. It is recognized even existing charts may be subject to unsurveyed and uncharted shoals.

3 The Code also acknowledges that coastal communities in the Arctic could be, and that polar ecosystems are vulnerable to human activities, such as ship operation.

4 The relationship between the additional safety measures and the protection of the environment is acknowledged as any safety measure taken to reduce the probability of an accident, will largely benefit the environment.

5 While Arctic and Antarctic waters have similarities, there are also significant differences. Hence, although the Code is intended to apply as a whole to both Arctic and Antarctic, the legal and geographical differences between the two areas have been taken into account.

6 The key principles for developing the Polar Code have been to use a risk-based approach in determining scope and to adopt a holistic approach in reducing identified risks.

INTRODUCTION

1 Goal

The goal of this Code is to provide for safe ship operation and the protection of the polar environment by addressing risks present in polar waters and not adequately mitigated by other instruments of the Organization.

2 Definitions

For the purpose of this Code, the terms used have the meanings defined in the following paragraphs. Terms used in part I-A, but not defined in this section shall have the same meaning as defined in SOLAS. Terms used in part II-A, but not defined in this section shall have the same meaning as defined in MARPOL.

2.1 *Category A ship* means a ship designed for operation in polar waters in at least medium first-year ice, which may include old ice inclusions.

2.2 *Category B ship* means a ship not included in category A, designed for operation in polar waters in at least thin first-year ice, which may include old ice inclusions.

2.3 *Category C ship* means a ship designed to operate in open water or in ice conditions less severe than those included in categories A and B.

2.4 *First-year ice* means sea ice of not more than one winter growth developing from young ice with thickness from 0.3-2.0 metre[1].

2.4bis *Ice free waters* means no ice present. If ice of any kind is present this term shall not be used[1].

2.4ter *Ice of land origin* means Ice formed on land or in an ice shelf, found floating in water[1].

2.5 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL), as amended.

2.6 *Medium first-year ice* means first-year ice of 70-120 cm thickness[1].

2.6bis *Old ice* means sea ice which has survived at least one summer's melt; typical thickness up to 3 m or more. It is subdivided into residual first-year ice, second-year ice and multi-year ice[1].

2.7 *Open water* mean a large area of freely navigable water in which sea ice is present in concentrations less than 1/10. No ice of land origin is present[1].

2.8 *Organization* means the International Maritime Organization.

2.9 *Sea ice* means any form of ice found at sea which has originated from the freezing of sea water[1].

2.10 *SOLAS* means the International Convention for the Safety of Life at Sea, 1974, as amended.

[1] Refer to the WMO Sea Ice Nomenclature.

2.11 *STCW Convention* means the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended.

2.12 *Tankers* mean oil tankers as defined in SOLAS regulation II-1/2.22, chemical tankers as defined in SOLAS regulation II-1/3.19 and gas carriers as defined in SOLAS regulation VII/11.2.

2.13 *Thin first-year ice* means first-year ice 30 to 70 cm thick.

3 Sources of hazards

3.1 The Polar Code considers hazards which may lead to elevated levels of risk due to increased probability of occurrence, more severe consequences, or both:

.1 ice as it may affect hull structure, stability characteristics, machinery systems, navigation, the outdoor working environment, maintenance and emergency preparedness tasks, and malfunction of safety equipment and systems;

.2 experiencing topside icing, with potential reduction of stability and equipment functionality;

.3 low temperature as it affects the working environment and human performance, maintenance and emergency preparedness tasks, material properties and equipment efficiency, survival time and performance of safety equipment and systems;

.4 extended periods of darkness or daylight as it may affect navigation and human performance;

.5 high latitude as it affects navigation systems, communication systems and the quality of ice imagery information;

.6 remoteness and possible lack of accurate and complete hydrographic data and information, reduced availability of navigational aids and seamarks with increased potential for groundings compounded by remoteness, limited readily deployable SAR facilities, delays in emergency response and limited communications capability, with the potential to affect incident response;

.7 potential lack of ship crew experience in polar operations, with potential for human error;

.8 potential lack of suitable emergency response equipment, with the potential for limiting the effectiveness of mitigation measures;

.9 rapidly changing and severe weather conditions, with the potential for escalation of incidents; and

.10 the environment with respect to sensitivity to harmful substances and other environmental impacts and its need for longer restoration.

3.2 The risk level within polar waters may differ depending on the geographical location, time of the year with respect to daylight, ice-coverage, etc. Thus, the mitigating measures required to address the above specific hazards may vary within polar waters and may be different in Arctic and Antarctic waters.

4 Structure of the Code

This Code consists of Introduction, parts I and II. The Introduction contains mandatory provisions applicable to both part I and part II. Part I is subdivided into part I-A, which contains mandatory provisions on safety measures, and part I-B containing recommendations on safety. Part II is subdivided into part II-A, which contains mandatory provisions on pollution prevention, and part II-B containing recommendations on pollution prevention.

5 Figures illustrating the Antarctic area and Arctic waters, as defined in SOLAS regulations XIV/1.2 and XIV/1.3, respectively[, and MARPOL Annex I, regulations […]; Annex II, regulations […]; Annex IV, regulation […]; and Annex V, regulation […]]

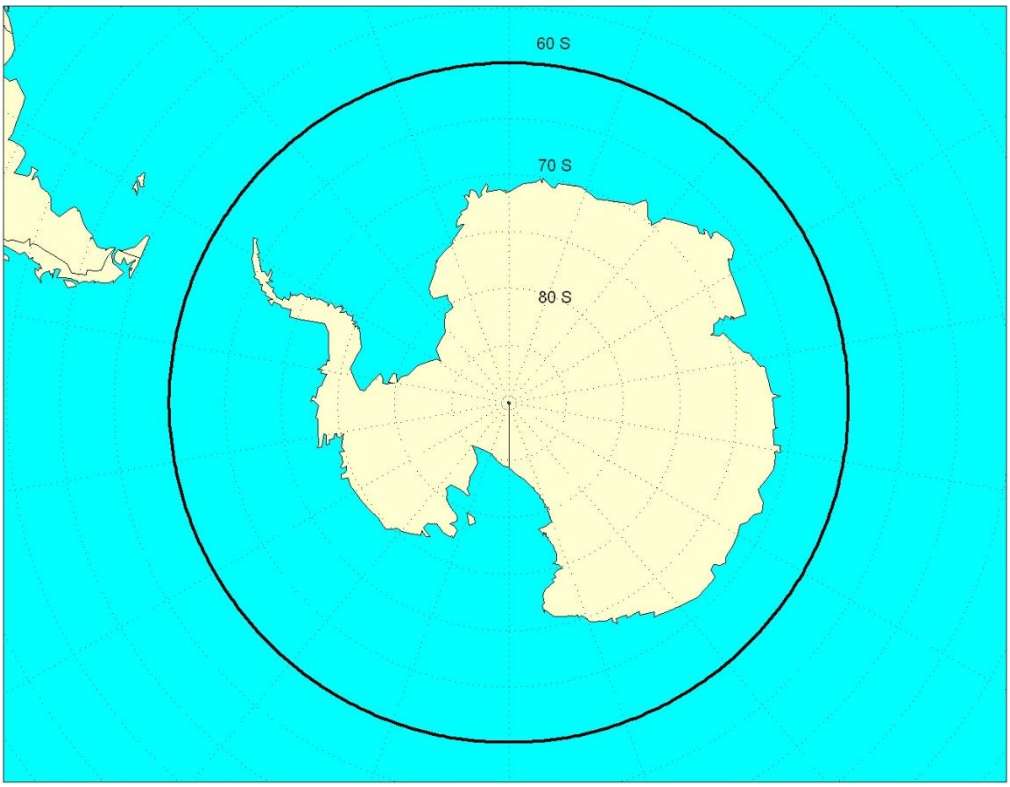

Figure 1 – Maximum extent of Antarctic Waters application[2]

[2] Maps are for illustrative purposes only.

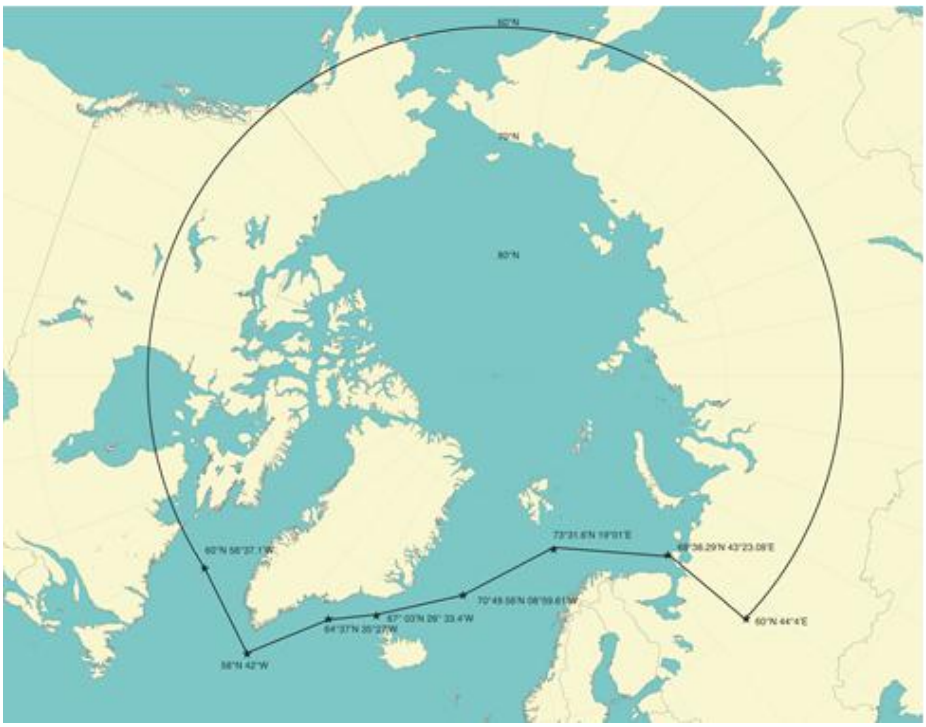

Figure 2 – Maximum extent of Arctic waters application[3]

[3] It should be noted that the figures are for illustrative purposes only.

PART I-A
SAFETY MEASURES

CHAPTER 1 – GENERAL

1.1 Structure of this part

Each chapter in this part consists of the overall goal of the chapter, functional requirements to fulfill the goal, and regulations. A ship shall be considered to meet a functional requirement set out in this part when either:

.1 the ship's design and arrangements comply with all the regulations associated with that functional requirement; or

.2 part(s) or all of the ship's relevant design and arrangements have been reviewed and approved in accordance with regulation 4 of SOLAS chapter XIV, and any remaining parts of the ship comply with the relevant regulations.

1.2 Definitions

In addition to the definitions included in the relevant SOLAS chapters and the introduction of this Code, the following definitions are applicable to this part.

1.2.1 *Escort* means any ship with superior ice capability in transit with another ship.

1.2.2 *Escorted operation* means any operation in which a ship's movement is facilitated through the intervention of an escort.

1.2.3 *Habitable environment* means a ventilated environment that will protect against hypothermia.

1.2.4 *Icebreaker* means any ship whose operational profile may include escort or ice management functions, whose powering and dimensions allow it to undertake aggressive operations in ice-covered waters.

1.2.5 *Ice Class* means the notation assigned to the ship by the Administration or by an organization recognized by the Administration showing that the ship has been designed for navigation in sea-ice conditions.

1.2.6 *Maximum expected time of rescue* means the time adopted for the design of equipment and system that provide survival support. It shall never be taken as less than 5 days.

1.2.7 *Machinery Installations* means equipment and machinery and its associated piping and cabling, which is necessary for the safe operation of the vessel.

1.2.7*bis Mean Daily Low Temperature* (MDLT) means the mean value of the daily low temperature for each day of the year over a minimum 10 year period. A data set acceptable to the Administration may be used if 10 years of data is not available[4].

[4] Refer also to additional guidance in part I-B.

[1.2.7*ter Operation in ice* means for passenger ships or tankers operation in any waters other than open waters or bergy waters and for cargo ships other than tankers operation in water with a total ice concentration of more than 2/10.]

1.2.8 *Polar Class (PC)* means the ice class assigned to the ship by the Administration or by an organization recognized by the Administration based upon IACS Unified Requirements.

1.2.8bis *Polar Service Temperature (PST) means* a temperature specified for a ship which is intended to operate in low air temperature, which shall be set at least 10^0C below the lowest MDLT for the intended area and season of operation in polar waters.

1.2.8ter *Ship intended to operate in low air temperature* means a ship which is intended to undertake voyages to or through areas where the lowest Mean Daily Low Temperature (MDLT) is below -10^0C.

1.3 Certificate and survey

1.3.1 Every ship to which this Code applies shall have on board a valid Polar Ship Certificate.

1.3.2 The Polar Ship Certificate shall be issued after an initial or renewal survey to a ship which complies with the relevant requirements of this Code. The certificate referred to in this regulation shall be issued either by the Administration or by any person or organization recognized by it in accordance with SOLAS regulation XI-1/1. In every case, that Administration assumes full responsibility for the certificate.

1.3.3 The Polar Ship Certificate shall be drawn up in the form corresponding to the model given in annex […] to part I-A of this Code. If the language used is neither English, nor French nor Spanish, the text shall include a translation into one of these languages.

1.3.4 Polar Ship Certificate validity and renewal survey dates shall be harmonized with those related to other SOLAS certificates.

1.3.4bis This certificate shall include a supplement recording additional equipment and [the ship's operational capabilities and limitations under 1.5] that do not appear in the certificate. When there are no limitations in addition to those in the certificate, this shall be indicated in the supplement.

1.4 Performance standards

1.4.1 Unless expressly provided otherwise, ship systems and equipment addressed in this Code shall satisfy at least the same performance standards referred to in SOLAS.

1.4 2 For ships operating in low air temperature, a polar service temperature (PST) shall be specified and shall be at least 10^0C below the lowest MDLT for the intended area and season of operation in polar waters. Systems and equipment required by this Code shall be fully functional at the polar service temperature.

1.4.3 For ships operating in low air temperature, survival systems and equipment shall be fully operational at the polar service temperature during the maximum expected rescue time.

[1.5 Operational limitations

When operational limitations are established, an assessment as required by the Code shall be carried out, taking into consideration the following:

.1 the anticipated range of operating conditions;

.2 hazards as listed in section 3 of the Introduction, as applicable; and

.3 additional hazards, if identified.]

CHAPTER 2 – POLAR WATER OPERATIONAL MANUAL

2.1 Goal

The goal of this chapter is to provide the owner, operator, master and crew with sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process.

2.2 Functional requirements

2.2.1 In order to achieve the goal set out in paragraph 2.1 above, the following functional requirements are embodied in the regulations of this chapter.

[2.2.1bis The Manual shall include the ship-specific capabilities and limitations in relation to the assessment required under section 1.5.]

2.2.2 The Manual shall include or refer to specific procedures to be followed in normal operations and in order to avoid encountering conditions that exceed the ships capabilities.

2.2.3 The Manual shall include or refer to specific procedures to be followed in the event of incidents in polar waters.

2.2.4 The Manual shall include or refer to specific procedures to be followed in the event that conditions are encountered which exceed the ships' specific capabilities and limitations in paragraph 2.2.1.

2.2.5 The Manual shall include or refer to procedures to be followed when using icebreaker assistance, as applicable.

2.3 Regulations

2.3.1 In order to comply with the functional requirements of paragraphs 2.2.1 to 2.2.5, the manual shall be carried on board.

2.3.1bis In order to comply with the functional requirements of paragraph 2.2.1, the manual shall contain relevant information with the ship's capabilities and limitations for:

[.1 operation in ice, as applicable;]

.2 operation in low air temperatures, as applicable;

.3 communication and navigation capabilities in high latitudes; and

.4 voyage duration.

2.3.2 In order to comply with the functional requirements of paragraph 2.2.2, the manual shall include risk-based procedures for the following:

.1 voyage planning to avoid ice and/or temperatures that exceed the ship's design capabilities or limitations;

.2 arrangements for receiving forecasts of the environmental conditions;

.3 means of addressing any limitations of the hydrographic, meteorological and navigational information available;

.4 operation of equipment required under other chapters of this Code; and

.5 implementation of special measures to maintain equipment and system functionality under low temperatures, topside icing and the presence of sea ice, as applicable.

2.3.3 In order to comply with the functional requirements of paragraph 2.2.3, the manual shall include risk-based procedures to be followed for:

.1 contacting emergency response providers for salvage, SAR, spill response, etc. as applicable; and

.2 in the case of ships ice strengthened in accordance with chapter 3, procedures for maintaining life support and ship integrity in the event of prolonged entrapment by ice.

2.3.4 In order to comply with the functional requirements of paragraph 2.2.4, the manual shall include risk-based procedures to be followed for measures to be taken in the event of encountering ice and/or temperatures which exceed the ships design capabilities or limitations.

2.3.5 In order to comply with the functional requirements of paragraph 2.2.5, the manual shall include risk-based procedures for monitoring and maintaining safety during operations in ice, as applicable, including any requirements for escort operations or ice breaker assistance. Different operational limitations may apply depending on whether the ship is operating independently or with icebreaker escort. Where appropriate, the PWOM should specify both options.

CHAPTER 3 – SHIP STRUCTURE

3.1 Goal

The goal of this chapter is to provide that the material and scantling of the structures retain their structural integrity based on global and local response due to environmental loads and conditions.

3.2 Functional requirements

3.2.1 In order to achieve the goal set out in 3.1 above, the following functional requirements are embodied in the regulations of this chapter:

.1 for ships intended to operate in low air temperature, materials used shall be suitable for operation at the ships polar service temperature.

.2 in ice strengthened ships, the structure of the ship shall be designed to resist both global and local structural loads anticipated under the foreseen ice conditions.

3.3 Regulations

3.3.1 In order to comply with the functional requirements of paragraph 3.2.1.1 above, materials of exposed structures in ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[5] or other standards offering an equivalent level of safety based on the polar service temperature.

3.3.2 In order to comply with the functional requirements of paragraph 3.2.1.2 above, the followings apply:

.1 Scantlings of category A ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[6] or other standards offering an equivalent level of safety.

.2 Scantlings of category B ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[7]or other standards offering an equivalent level of safety.

.3 Scantlings of ice strengthened category C ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account acceptable standards adequate for the ice types and concentrations encountered in the area of operation.

.4 Category C ships need not be Ice Strengthened if, in the opinion of the Administration, the ships' structure is adequate for its intended operation.

CHAPTER 4 – STABILITY AND SUBDIVISION

4.1 Goal

The goal of this chapter is to ensure provision of adequate stability and subdivision in intact and damaged conditions.

4.2 Functional requirements

4.2.1 In order to achieve the goal set out in paragraph 4.1 above, the following functional requirements are embodied in the regulations of this chapter:

.1 Ships shall have sufficient stability in intact condition when subject to ice accretion.

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5 Refer to IACS UR S6 Use of Steel Grades for Various Hull Members – Ships of 90 m in Length and Above (latest version) or IACS URI Requirements concerning Polar Class (latest version), as applicable.

6 Refer to Polar Class 1-5 of IACS URI Requirements concerning Polar Class (latest version).

7 Refer to Polar Class 6-7 of IACS URI Requirements concerning Polar Class (latest version).

.2 Ships of category A and B constructed on or after [DD/MM/YYYY] shall have sufficient residual stability to sustain ice-related damages.

4.3 Regulations

4.3.1 Stability in intact conditions

4.3.1.1 In order to comply with the functional requirements of paragraph 4.2.1.1, for ships operating in areas and during periods where ice accretion is likely to occur, the following icing allowance should be made in the stability calculations:

.1 30 kg per square metre on exposed weather decks and gangways;

.2 7.5 kg per square metre for projected lateral area of each side of the vessel above the water plane; and

.3 the projected lateral area of discontinuous surfaces of rail, sundry booms, spars (except masts) and rigging of vessels having no sails and the projected lateral area of other small objects should be computed by increasing the total projected area of continuous surfaces by 5% and the static moments of this area by 10%.

4.3.1.2 Ships operating in areas and during periods where ice accretion is likely to occur should be:

.1 designed to minimize the accretion of ice; and

.2 equipped with such means for removing ice as the Administration may require; for example, electrical and pneumatic devices, and/or special tools such as axes or wooden clubs for removing ice from bulwarks, rails and erections.

4.3.1.3 Information on the ice accretion stipulated in the stability calculations shall be given in the Polar Water Operational Manual.

4.3.1.4 Ice accretion shall be monitored and appropriate measures taken to ensure that the ice accretion does not exceed the values given in the Polar Water Operational Manual.

4.3.2 Stability in damaged conditions

4.3.2.1 In order to comply with the functional requirements of paragraph 4.2.1.2, ships of category A and B constructed on or after [DD/MM/YYYY] shall be able to withstand flooding resulting from hull penetration due to ice impact. The residual stability following ice damage shall be such that the factor s_i, as defined in SOLAS regulation II-1/7-2.2 and 2.3, has $s_i = 1$ for all loading conditions d_s, d_l and d_p as defined in SOLAS regulations II-1/2.10, 2.11 and 2.12. Damage stability GZ, Range and heel at equilibrium criteria contained in instruments applicable to ship types not included in SOLAS chapter II-1, part B should be substituted as the denominators to the GZmax and Range numerators, respectively, and heel at equilibrium used in the calculation of the K factor value in the s_{final},i formula for the purposes of calculating s_i.

4.3.2.2 The ice damage extent to be assumed when demonstrating compliance with paragraph 4.41 shall be such that:

.1 longitudinal extent is 0.045*length of upper ice waterline length if centred forward of the point of maximum beam on the waterline, and 0.015*length of waterline length otherwise;

.2 transverse extent penetration depth is 760 mm measured normal to the shell over the full extent of the damage;

.3 vertical extent is the lesser of 0.2 of draft at the upper ice waterline, or the longitudinal extent;

.4 the centre of the ice damage may be located at any point between the keel and 1.2 times the deepest ice draft; and

.5 the vertical extent of damage may be assumed to be confined between the keel and 1.2 times the deepest ice draft.

4.3.2.3 Damage as defined in paragraph 4.4.2 is to be assumed at any position along the side shell.

CHAPTER 5 – WATERTIGHT AND WEATHERTIGHT INTEGRITY

5.1 Goal

The goal of this chapter is to provide measures to maintain watertight and weathertight integrity.

5.2 Functional requirements

In order to achieve the goal set out in paragraph 5.1 above, all closing appliances and doors relevant to watertight and weathertight integrity of the ship shall be operable.

5.3 Regulations

5.3.1 In order to comply with the functional requirements of paragraph 5.2 above, the following apply:

.1 For ships operating in areas and during periods where ice accretion is likely to occur, means shall be provided to remove or prevent ice and snow accretion around hatches and doors.

.2 In addition, for ships intended to operate in low air temperature the following apply:

.1 if the hatches or doors are hydraulically operated, means shall be provided to prevent freezing or excessive viscosity of liquids; and

.2 watertight and weathertight doors, hatches and closing devices which are not within an habitable environment and require access while at sea shall be designed to be operated by personnel wearing heavy winter clothing including thick mittens.

CHAPTER 6 – MACHINERY INSTALLATIONS

6.1 Goal

The goal of this chapter is to ensure that, machinery installations are capable of delivering the required functionality necessary for safe operation of ships.

6.2 Functional requirements

6.2.1 In order to achieve the goal set out in paragraph 6.1 above, the following functional requirements are embodied in the regulations of this chapter:

6.2.1.1 Machinery installations shall provide functionality under the anticipated environmental conditions, taking into account:

.1 ice accretion and/or snow accumulation;

.2 ice ingestion from seawater;

.3 freezing and increased viscosity of liquids;

.4 seawater intake temperature; and

.5 snow ingestion.

6.2.1.2 In addition, for ships intended to operate in low air temperatures:

.1 machinery installations shall provide functionality under the anticipated environmental conditions, also taking into account:

.1 cold and dense inlet air; and

.2 loss of performance of battery or other stored energy device; and

.2 materials used shall be suitable for operation at the ships polar service temperature.

6.2.1.3 In addition, for ships ice strengthened in accordance with chapter 3, machinery installations shall provide functionality under the anticipated environmental conditions, taking into account loads imposed directly by ice interaction.

6.3 Regulations

6.3.1 In order to comply with the functional requirement of paragraph 6.2.1.1 above, taking into account the anticipated environmental conditions, the following apply:

.1 Machinery installations and associated equipment shall be protected against the effect of ice accretion and/or snow accumulation, ice ingestion from sea water, freezing and increased viscosity of liquids, seawater intake temperature and snow ingestion.

.2 Working liquids shall be maintained in a viscosity range that ensures operation of the machinery.

.3 seawater supplies for machinery systems shall be designed to prevent ingestion of ice[8], or otherwise arranged to ensure functionality.

6.3.2 In additions, for ships intended to operate in low air temperatures, the following apply:

.1 in order to comply with the functional requirement of paragraph 6.2.1.2 above, exposed machinery and electrical installation and appliances shall function at the polar service temperature.

.2 In order to comply with the functional requirement of paragraph 6.2.1.2.1 above, means shall be provided to ensure that combustion air for internal combustion engines driving essential machinery is maintained at a temperature in compliance with the criteria provided by the engine manufacturer.

.3 In order to comply with the functional requirements of paragraph 6.2.1.2.2 above, materials of exposed machinery and foundations shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[9, 10] or other standards offering an equivalent level of safety based on the polar service temperature.

6.3.3 In addition, for ships ice strengthened in accordance with chapter 3, in order to comply with the functional requirements of paragraph 6.2.1.3 above, the following apply:

.1 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of category A ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[9]or other standards offering an equivalent level of safety.

.2 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of category B ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[10] or other standards offering an equivalent level of safety.

.3 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of ice-strengthened category C ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account acceptable standards adequate with the ice types and concentration encountered in the area of operation.

8 Refer to MSC/Circ.504, *Guidance on design and construction of sea inlets under slush ice conditions.*

9 Refer to Polar Class 1–5 of IACS URI Requirements concerning Polar Class (2011).

10 Refer to Polar Class 6–7 of IACS URI Requirements concerning Polar Class (2011).

CHAPTER 7 – FIRE SAFETY/PROTECTION

7.1 Goal

The goal of this chapter is to ensure that fire safety systems and appliances are effective and operable, and that means of escape remain available so that persons on board can safely and swiftly escape to the lifeboat and liferaft embarkation deck under the expected environmental conditions.

7.2 Functional requirements

7.2.1 In order to achieve the goal set out in paragraph 7.1 above, the following functional requirements are embodied in the regulations of this chapter:

.1 all components of fire safety systems and appliances if installed in exposed positions shall be protected from ice accretion and snow accumulation;

.2 local equipment and machinery controls shall be arranged so as to avoid freezing, snow accumulation and ice accretion and their location to remain accessible at all time;

.3 the design of fire safety systems and appliances shall take into consideration the need for persons to wear bulky and cumbersome cold weather gear, where appropriate;

.4 means shall be provided to remove or prevent ice and snow accretion from accesses; and

.5 extinguishing media shall be suitable for intended operation.

7.2.2 In addition, for ships intended to operate in low air temperature, the following apply:

.1 all components of fire safety systems and appliances shall be designed to ensure availability and effectiveness under the polar service temperature; and

.2 materials used in exposed fire safety systems shall be suitable for operation at the polar service temperature.

7.3 Regulations

7.3.1 In order to comply with the requirement of paragraph 7.2.1.1, the following apply:

.1 isolating and pressure/vacuum valves in exposed locations are to be protected from ice accretion and remain accessible at all time; and

.2 all two-way portable radio communication equipment shall be operable at the polar service temperature.

7.3.2 In order to comply with the requirement of paragraph 7.2.1.2, the following apply:

.1 fire pumps including emergency fire pumps, water mist and water spray pumps shall be located in compartments maintained above freezing;

.2 the fire main is to be arranged so that exposed sections can be isolated and means of draining of exposed sections shall be provided. Fire hoses and nozzles need not be connected to the fire main at all times, and may be stored in protected locations near the hydrants;

.3 firefighter's outfits shall be stored in warm locations on the ship; and

.4 where fixed water-based firefighting systems are located in a space separate from the main fire pumps and use their own independent sea suction, this sea suction is to be also capable of being cleared of ice accumulation.

7.3.3 In order to comply with the requirement of paragraph 7.2.2.1, portable and semi-portable extinguishers shall be located in positions protected from freezing temperatures, as far as practical. Locations subject to freezing are to be provided with extinguishers capable of operation under the polar service temperature.

7.3.4 In order to comply with the functional requirements of paragraph 7.2.2.2 above, materials of exposed fire safety systems shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[11] or other standards offering an equivalent level of safety based on the polar service temperature.

CHAPTER 8 – LIFE-SAVING APPLIANCES AND ARRANGEMENTS

8.1 Goal

The goal of this chapter is to provide for safe escape, evacuation and survival.

8.2 Functional requirements

In order to achieve the goal set out in paragraph 8.1 above, the following functional requirements are embodied in the regulations of this chapter:

8.2.1 *Escape*

8.2.1.1 Exposed escape routes shall remain accessible and safe, taking into consideration the potential icing of structures and snow accumulation.

8.2.1.2 Survival craft and muster and embarkation arrangements shall provide safe abandonment of ship, taking into consideration the possible adverse environmental conditions during an emergency.

8.2.2 *Evacuation*

8.2.2.1 All life-saving appliances and associated equipment shall provide safe evacuation and be functional under the possible adverse environmental conditions during the maximum expected time of rescue.

[11] Refer to IACS UR S6 Use of Steel Grades for Various Hull Members – Ships of 90 m in Length and Above (2013) or IACS URI Requirements concerning Polar Class (2011).

8.2.3 *Survival*

8.2.3.1 Adequate thermal protection shall be provided for all persons on board, taking into account the intended voyage, the anticipated weather conditions (cold and wind), and the potential for immersion in polar water, where applicable.

8.2.3.2 Life-saving appliances and associated equipment shall take account of the potential of operation in long periods of darkness, taking into consideration the intended voyage.

8.2.3.3 Taking into account the presence of any hazards, as identified in section 1 (Introduction), resources shall be provided to support survival following abandoning ship, whether to the water, to ice or to land, for the maximum expected time of rescue. These resources shall provide:

.1 a habitable environment;

.2 protection of persons from the effects of cold, wind and sun;

.3 space to accommodate persons equipped with thermal protection adequate for the environment;

.4 means to provide sustenance;

.5 safe access and exit points; and

.6 means to communicate with rescue assets.

8.3 Regulations

8.3.1 *Escape*

In order to comply with the functional requirements of paragraphs 8.2.1.1 and 8.2.1.2 above, the following apply for:

.1 ships exposed to ice accretion, means shall be provided to remove or prevent ice and snow accretion from escape routes, muster stations, embarkation areas, survival craft, its launching appliances and access to survival craft;

.2 ships constructed on or after [*date of entry into force*], exposed escape routes shall be arranged so as not to hinder passage by persons wearing suitable polar clothing; and

.3 ships intended to operate in low air temperatures, adequacy of embarkation arrangements shall be assessed, having full regard to any effect of persons wearing additional polar clothing.

8.3.2 *Evacuation*

In order to comply with the functional requirements of paragraph 8.2.2.1 above, the following apply:

.1 ships shall have means to ensure safe evacuation of persons, including safe deployment of survival equipment, when operating in ice-covered waters, or directly onto the ice, as applicable; and

.2 where the regulations of this chapter are achieved by means of adding devices requiring a source of power, this source shall be able to operate independently of the ship's main source of power.

8.3.3 *Survival*

8.3.3.1 In order to comply with the functional requirements of paragraph 8.2.3.1 above, the following apply:

.1 for passenger ships, a proper sized immersion suit or a thermal protective aid shall be provided for each person on board; and

.2 where immersion suits are required, they shall be of the insulated type.

8.3.3.2 In order to comply with the functional requirements of paragraph 8.2.3.2 above, ships intended to operate in extended periods of darkness, searchlights suitable for continuous use to facilitate operation in ice shall be provided for each lifeboat.

8.3.3.3 In order to comply with the functional requirements of paragraph 8.2.3.3 above, the following apply:

.1 no lifeboat shall be of any type other than partially or totally enclosed type; and

.2 an assessment shall consider the need for ships to be provided with survival resources for use following abandonment, onto ice or land to maximize the probability of survival for the expected time of rescue.

.3 Taking into account the assessment referred to in paragraph .2 above, appropriate survival resources, which address both individual (personal survival equipment) and shared (group survival equipment) needs, shall be provided, as follows:

.1 life-saving appliances and group survival equipment that provide effective protection against direct wind chill for all persons on board;

.2 personal survival equipment in combination with life-saving appliances or group survival equipment that provide sufficient thermal insulation to maintain the core temperature of persons subject to the polar service temperature; and

.3 personal survival equipment that provide sufficient protection to prevent frostbite of all extremities under the polar service temperature.

.4 In addition, whenever the assessment referred to in paragraph 8.3.3.3.1 identifies a potential of abandonment onto ice or land, the following apply:

.1 group survival equipment shall be carried, unless an equivalent level of functionality for survival is provided by the ship's normal life-saving appliances;

.2 when required, personal and group survival equipment sufficient for 110% of the persons on board shall be stowed in easily accessible locations, as close as practical to the muster or embarkation stations;

.3 containers for group survival equipment shall be designed to be easily movable over the ice and be floatable;

.4 whenever the assessment identifies the need to carry personal and group survival equipment, means shall be identified of ensuring that this equipment is accessible following abandonment;

.5 if carried in addition to persons, in the survival craft, the survival craft and launching appliances shall have sufficient capacity to accommodate the additional equipment;

.6 passengers shall be instructed in the use of the personal survival equipment and the action to take in an emergency; and

.7 the crew shall be trained in the use of the personal survival equipment and group survival equipment.

8.3.3.4 In order to comply with the functional requirements of paragraph 8.2.3.3.4 above, adequate emergency rations shall be provided, for the maximum expected time of rescue.

CHAPTER 9 – SAFETY OF NAVIGATION

9.1 Goal

The goal of this chapter is to provide appropriate nautical information and navigational equipment functionality for safe navigation.

9.2 Functional requirements

In order to achieve the goal set out in paragraph 9.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

9.2.1 *Nautical information*

9.2.1.1 Ships shall be equipped to receive up-to-date information including ice information for safe navigation.

9.2.1.2 Systems for providing reference headings and position fixing shall be suitable for the intended areas.

9.2.2 *Navigational equipment functionality*

The navigational equipment and systems shall be designed, constructed, and installed to retain their functionality under the expected environmental conditions in the area of operation.

9.3 Regulations

9.3.1 *Nautical information*

9.3.1.1 In order to comply with the requirements of paragraph 9.2.1 above, the following apply:

.1 ships shall have equipment capable of receiving and displaying information on ice [thickness and concentration]; and

.2 ships shall have two independent echo-sounding devices.

9.3.1.2 In order to comply with the requirements of paragraph 9.2.1.2 above, the following apply:

.1 ships shall have two non-magnetic means to determine and display their heading. Both means shall be independent, and if energy-consuming, they shall be connected to the ship's main and emergency source of power and [to an individual Uninterruptible Power Supply UPS unit with a minimum operating duration of 30 minutes]; and

.2 ships proceeding to latitudes over 80 degrees shall be fitted with at least one GNSS compass or equivalent.

9.3.2 *Navigational equipment functionality*

In order to comply with the requirements of paragraph 9.2.2.1 above, the following apply:

.1 Ships intended to operate low air temperature shall be fitted with a suitable means to de-ice sufficient conning position windows to provide unimpaired forward and astern vision from conning positions.

.2 The windows described in .1 shall be fitted with an efficient means of clearing melted ice, freezing rain, snow, mist and spray from outside and accumulated condensation from inside. A mechanical means to clear moisture from the outside face of a window shall have operating mechanisms protected from freezing or the accumulation of ice that would impair effective operation.

.3 Means to prevent the accumulation of ice on antennas required for navigation, communication and safe operation shall be provided.

.4 Ships shall be equipped with two remotely rotatable, narrow-beam search lights controllable from the bridge to provide lighting over an arc of 360 degrees. If such coverage is not possible to obtain, two supporting searchlights shall be placed one on each side of the bridge wing.

.5 [For ships intended to operate in ice], the following apply:

.1 where equipment required by SOLAS chapter V or this chapter have sensors that project below the hull, such sensors shall be protected against ice;

.2 [in category A ships [constructed on or after [date]] the bridge wings shall be enclosed or designed to protect navigational equipment and operating personnel; and

.3 ships that may be involved in operations with an icebreaker escort shall be equipped with a manually initiated flashing red light visible from astern to indicate when the ship is stopped. This light shall have a range of visibility of at least two (2) nautical miles, the horizontal and vertical arcs of visibility shall conform to the stern light specifications in COLREG.

CHAPTER 10 – COMMUNICATION

10.1 Goal

The goal of this chapter is to provide for effective communication for ships and survival craft during normal operation and in emergency situations taking into account operation in high latitude.

10.2 Functional requirements

In order to achieve the goal set out in 10.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate.

10.2.1 *Ship communication*

10.2.1.1 Two-way voice and data communications [reliable] at all points along the intended operating routes taking account of the limitations of shore stations [and available satellite communications] shall be provided [by the ship borne equipment];

10.2.1.2 Suitable means of communications shall be provided where escort and convoy operations are expected.

10.2.1.3 Appropriate communication equipment to enable telemedical assistance in polar areas shall be provided.

(Note: Need clarifications on what kind of telemedical assistance that is available/possible.)

10.2.2 *Survival craft communications capabilities*

10.2.2.1 [All [rescue boats] and lifeboats, whenever released, shall carry at least one equipment capable of transmitting and receiving GMDSS compatible communications suitable for, distress alerting, locating, [and on-scene communications.; and]

10.2.2.2 All [other] survival craft, whenever released [for evacuation], shall carry equipment suitable for [distress alerting and] locating.

10.3 Regulations

10.3.1 *Ship communication*

10.3.1.1 In order to comply with the functional requirements of paragraph 10.2.1.3 above, ships intended to provide icebreaking escort] shall be equipped with a special sound signaling system mounted to face astern to indicate escort and emergency manoeuvres to following ships as described in the International Code of Signals.

10.3.1.2 In order to comply with the functional requirements of paragraph 10.2.1.4 above, on-scene communications capability in ships, shall include [maritime VHF-DSC equipment. and equipment for voice communications with aircraft on 121.5 and 123.1 MHz.

10.3.2 *Survival craft communications capabilities*

10.3.2.1 In order to comply with the functional requirements of paragraph 10.2.2.1 above, the following apply:

.1 on-scene communications capability in lifeboats, shall include maritime VHF-DSC equipment and equipment for voice communications with aircraft on 121.5 and 123.1 MHz;

.2 all rescue boats and lifeboats, shall carry on-scene communications equipment for use with rescue assets upon evacuation into the water or to ice or to land; and

.3 [Distress alerting and locating equipment required by 10.2.2 shall include [EPIRBs SARTs and AIS-SARTs] [EPIRBs and search and rescue locating devices]. Such equipment shall conform to performance standards referred in SOLAS or other alternative equipment that is compatible with GMDSS and acceptable to the Administration.]

10.3.2.2 [Mandatory communications equipment for use in survival craft and rescue boats shall be capable of operation during the maximum expected time of rescue].

CHAPTER 11 – VOYAGE PLANNING

11.1 Goal

The goal of this chapter is to ensure that the Company, master and crew are provided with sufficient information to enable operations to be conducted with due consideration to safety of ship and persons on board and, as appropriate, environmental protection.

11.2 Functional requirements

In order to achieve the goal set out in paragraph 11.1 above, the voyage plan shall take into account the potential hazards of the intended voyage.

11.3 Requirements

In order to comply with the requirements of paragraph 11.2, the master shall consider a route through polar waters taking into account the following:

.1 the procedures required by the PWOM;

.2 any limitations of the hydrographic information and aids to navigation available;

.3 current information on the extent and type of ice and icebergs in the vicinity of the intended route;

.4 statistical information on ice and temperatures from former years;

.5 places of refuge;

.6 current information and measures to be taken when marine mammals are encountered relating to known areas with densities of marine mammals including seasonal migration areas[12];

.7 current information on relevant ships' routing systems, speed recommendations and vessel traffic services relating to known areas with densities of marine mammals including seasonal migration areas[13];

.8 national and international designated protected areas along the route; and

.9 operation in areas remote from SAR capabilities[14].

[**11.4 Reporting**

Prior to entering Polar waters, ships should report to a recognized position report system accessible by search and rescue authorities.]

12 Refer to MEPC/Circ.674 on Guidance document for minimizing the risk of ship strikes with cetaceans.

13 Refer to MEPC/Circ.674 on Guidance document for minimizing the risk of ship strikes with cetaceans.

14 Refer to MSC.1/Circ.1184 on Enhanced contingency planning guidance for passenger ships operating in areas remote from SAR facilities and A.999(25) *on Guidelines on voyage planning for passenger ships operating in remote areas.*

CHAPTER 12 –MANNING AND TRAINING FAMILIARITY

12.1 Goal

The goal of this chapter is to ensure that ships are appropriately manned by adequately qualified, trained and experienced personnel.

12.2 Functional requirements

12.2.1 In order to achieve the goal set out in paragraph 12.1.1 above, the following functional requirement is embodied in the regulations of this chapter :

.1 Companies shall ensure that masters, chief mates and officers in charge of a navigational watch on board ships operating in polar waters shall have completed training to attain the abilities that are appropriate to the capacity to be filled and duties and responsibilities to be taken up, taking into account the provisions given in the STCW Convention and Code, as amended.

12.3 Regulations

12.3.1 In order to meet the functional requirements of 12.2.1 above while operating in polar waters, masters, chief mates and officers in charge of a navigational watch shall be qualified in accordance with chapter V of the STCW Convention and Code, as amended as follows:

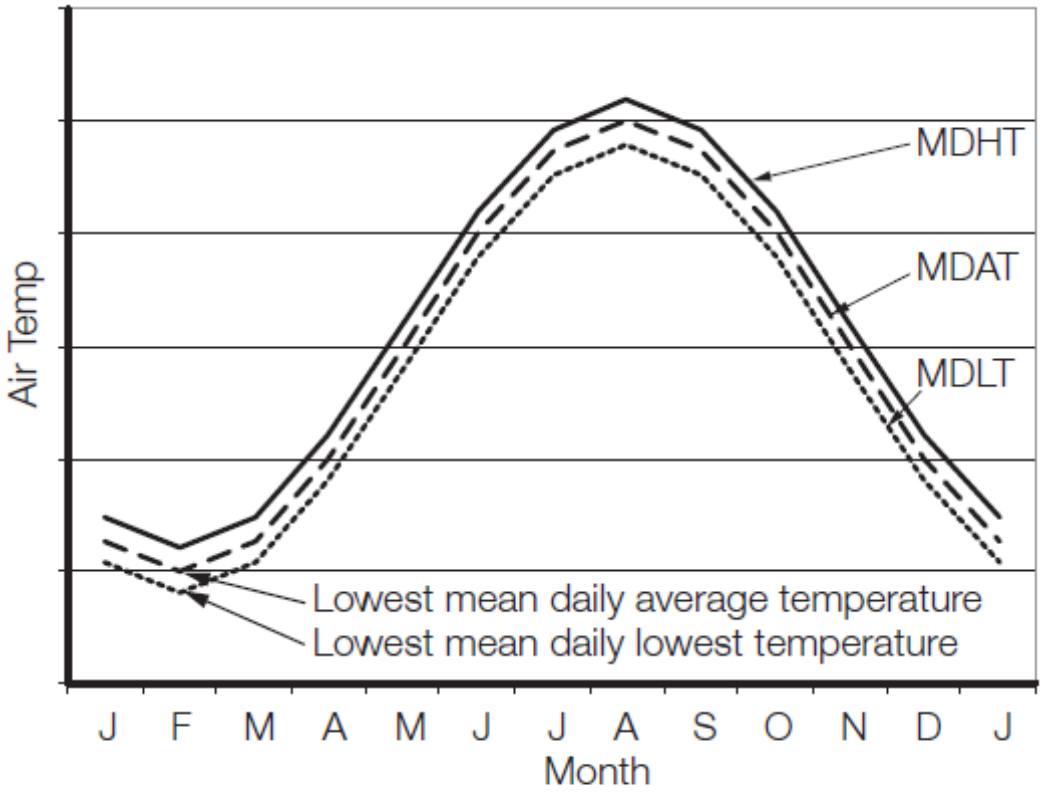
Ice conditions	Tankers	Passenger ships	Other
Ice Free	Not applicable	Not applicable	Not applicable
Open waters	Basic training for master, chief mate and officers in charge of a navigational watch	Basic training for master, chief mate and officers in charge of a navigational watch	Not applicable
Other waters	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch.

12.3.2 Every crew member shall be made familiar with the procedures and equipment contained or referenced in the Polar Water Operational Manual relevant to their assigned duties.

PART I-B

ADDITIONAL GUIDANCE REGARDING THE PROVISIONS OF THE INTRODUCTION AND PART I-A

1 ADDITIONAL GUIDANCE TO THE DEFINITIONS IN THE INTRODUCTION SECTION 2



Definitions used in the figure above

MDHT – Mean Daily High Temperature

MDAT – Mean Daily Average Temperature

MDLT – Mean Daily Low Temperature

Guidance instructions for determining MDLT:

1 Determine the daily low temperature for each day for a 10 year period.

2 Determine the average of the values over the 10 year period for each day.

3 Plot the daily averages over the year.

4 Take the lowest of the averages for the season of operation.

2 ADDITIONAL GUIDANCE TO CHAPTER 1 (GENERAL)

[1 Limiting Ice Capabilities for the Polar Ship Certificate

This guidance is intended to support the assignment of limiting ice capabilities on the Polar Ship Certificate. The basic information covered by the Certificate may be extended by other information included in the ship's Polar Waters Operational Manual, as described in guidance to chapter 2.

Limiting capabilities for structural safety for operations in level continuous ice can be set in accordance with figure 1 and table 1. For operation in other ice conditions, an equivalent ice thickness should be used to establish a threshold for safe operation, in accordance with an operator guidance system acceptable to the Administration.

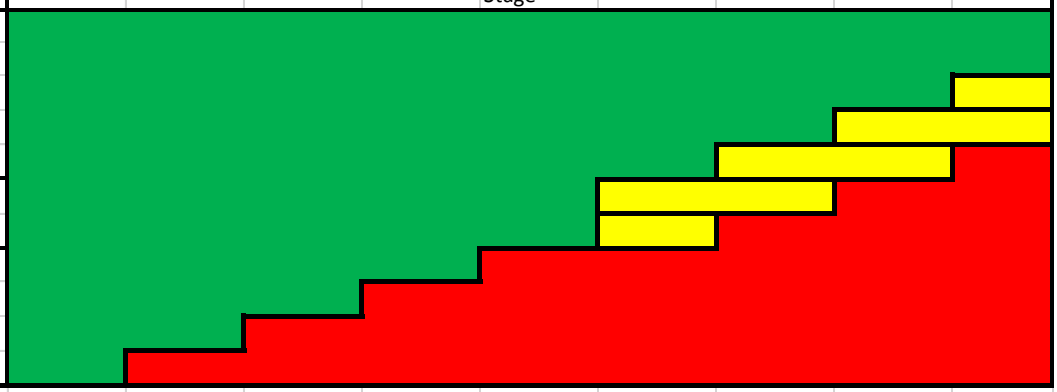
		Upper Limit of Ice Thickness (cm)								
		10	15	30	50	70	120	200	300	
Category	**Ice Class**	New	Young/ Grey	Young/ Grey White	Thin/ First Stage	Thin/ Second Stage	Medium	Thick	Old/ up to 3m	Old/ > 3m
A[1]	PC1									
	PC2									
	PC3									
	PC4									
	PC5									
B[1]	PC6									
	PC7									
C[2]	1B									
	1C									
	II									
	O/W									
		Within capability								
		Marginal capability								
		Outside standard capability								
Notes	1 - Equivalencies can be used as provided for in Part I-B									
	2 - Baltic ice classes shown can be substituted using the equivalencies provided in HELCOM 25/7									

Figure 1: Continuous Ice Capability for Structural Safety

Table 1: Continuous Ice Capabilities and Codes for Structural Safety

Category	Ice Class	Limiting Ice Thickness (m)	Threshold ice Thickness for Low Speed Operation (m)	Code
A[1]	PC1	Any ice		A1
	PC2	Any ice		A2
	PC3	Ice >3m	Any ice	A3
	PC4	2.00	3.00	A4
	PC5	1.20	3.00	A5

Category	Ice Class	Limiting Ice Thickness (m)	Threshold ice Thickness for Low Speed Operation (m)	Code
B[1]	PC6	0.70	2.00	B1
	PC7	0.70	1.20	B2
C[2]	1B	0.50		C1
	1C	0.30		C2
	1D	0.15		C3
	O/W	0.10		C4

Notes 1 - Equivalencies can be used as provided for in part I-B
2 - Baltic ice classes shown can be substituted using the equivalencies provided in HELCOM 25/7

The Certificate should refer to the Capability Code included in the final column of table 1.
Transit in ice thicknesses between the upper and lower values should be undertaken only at speeds limited to:

5 kts, for category A ships

3 kts, for category B ships

0 kts, for category C ships

or as defined by an operator guidance system acceptable to the Administration. These speeds should be adhered to irrespective of the propulsive icebreaking capabilities of the ship.

Ships equipped with ice load measurement and monitoring systems can utilize these systems to calibrate safe operating speeds, subject to the acceptance of the Administration.
All of the guidance above relates to operation in strong ice. For operations in decayed ice, operator guidance can modify the capability levels.]

2 Performance standards

A system previously accepted based on manufacturer certifications, classification society certifications and/or satisfactory service of existing systems may be acceptable for installation on new and existing ships if no performance or testing standards are accepted by the Organization.

3 ADDITIONAL GUIDANCE TO CHAPTER 2 (POLAR WATER OPERATIONAL MANUAL (PWOM))

3.1 Recommendation on the content of the polar water operatiopnal manual

The Polar Waters Operational Manual (PWOM) is intended to address all aspects of operations addressed by chapter 2 of part 1-A of the Polar Code. When appropriate information, procedures or plans exist elsewhere in a ship's documentation, the PWOM itself does not need to replicate this material but may instead cross-reference the relevant reference document.

A model Table of Contents is found in appendix 2.

The model follows the general structure of chapter 2. Not every section outlined below will be applicable to every polar ship. Many category C ships that undertake occasional or limit polar voyages will not need to have procedures for situations with a very low probability of occurrence. However, it may still be advisable to retain a common structure for the PWOM as a reminder that if assumptions change then the contents of the manual may also need to be updated. Noting an aspect as "not applicable" also indicates to the Administration that this aspect has been considered and not merely omitted.

3.2 Guidance on navigation with icebreaker assistance

When navigation with icebreaker assistance, the following should be considered:

.1 while approaching to a starting point of the ice convoy to follow the icebreaker/icebreakers or in case of the escorting by icebreaker of one ship to the point of meeting with icebreaker, the ship should establish radio communication on the VHF channel 16 and act in compliance with icebreaker's instructions;

.2 the icebreaker rendering the icebreaker assistance of ship ice convoy should command ships in the ice convoy;

.3 position of a ship in the ice convoy should be determined by the icebreaker rendering the assistance;

.4 ship within the ice convoy, in accordance with the instructions of the icebreaker rendering the assistance, should establish communication with the icebreaker by VHF channel indicated by the icebreaker;

.5 the ship, while navigating in the ice convoy, should ensure: compliance with the instructions of the icebreaker;

.6 position in the ice convoy, speed and distance to a ship ahead should be as instructed by the icebreaker;

.7 the ship should immediately notify the icebreaker of any difficulties to maintain the position within the ice convoy, speed and/or distance to any other ship in the ice convoy; and

.8 the ship should immediately report to the icebreaker of any damage.

3.3 Guidance on the development of contingency plans

In developing the ship's contingency plans ships should consider damage control measures arrangements for emergency transfer of liquids and access to tanks and spaces during salvage operations.

See also additional guidance to chapter 9.

4 ADDITIONAL GUIDANCE TO CHAPTER 3 (SHIP STRUCTURE)

Method for determining equivalent ice class

1 The guidance presented below is intended to assist in determining equivalency with standards acceptable to the Organization, as referenced in chapters 3 and 6 of the Code.

The methodology is consistent with guidance developed by the Organization[15] while allowing for the use of a simplified approach.

2 The basic approach for considering equivalency for Categories A and B can be the same for both new and existing ships. It involves comparing other ice classes to the IACS Polar Classes. For ice classes under category C, additional information on comparisons of strengthening levels is available for the guidance of owners and Administrations[16]. The responsibility for generating the equivalency request and supporting information required rests with the owner/operator. Review/approval of any equivalency request will be undertaken by the flag State Administration, or by a recognized organization acting on its behalf under the provisions of the RO Code. Several classification societies have developed easy-to-use tools for determination of compliance with the IACS Polar Class structural requirements, as have some administrations and other third parties.

3 The scope of a simplified equivalency assessment [(referring to paragraph 6.1 to 6.3 below)] is expected to be limited to materials selection, structural strength of the hull and propulsion machinery.

4 If there is not full and direct compliance, then an equivalent level of risk can be accepted in accordance with guidance provided by the Organization. An increase in the probability of an event can be balanced by a reduction in its consequences. Alternatively, a reduction in probability could potentially allow acceptance of more serious consequences. Using a hull area example, a local shortfall in strength level or material grade could be accepted if the internal compartment is a void space, for which local damage will not put the overall safety of the ship at risk or lead to any release of pollutants.

5 For existing ships, service experience can assist in risk assessment. As an example, for an existing ship with a record of polar ice operations a shortfall in the extent of the ice belt (hull areas) may be acceptable if there is no record of damage to the deficient area; i.e. a ship that would generally meet PC 5 requirements but in limited areas is only PC 7 could still be considered as a category A, PC 5 ship. In all such cases, the ship's documentation should make clear the nature and scope of any deficiencies.

6 The process includes the following stages of assessment:

.1 Select the target Polar Class for equivalency.

.2 Compare materials used in the design with minimum requirements under the IACS Polar Class URs; identify any shortfalls.

.3 Compare strength levels of hull and machinery components design with requirements under the IACS Polar Class URs; quantify levels of compliance.

7 Where gaps in compliance are identified in steps 1 to 3, additional steps are necessary to demonstrate equivalency, as outlined below:

.4 Identify any risk mitigation measures incorporated in the design of the ship (over and above the requirements of the Code and IACS URs).

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15 Refer to the G*uidelines for the approval of alternatives and equivalents as provided for in various IMO instruments* (MSC.1/Circ.1455).

16 Refer to the annex to HELCOM Recommendation 25/7, Safety of Winter Navigation in the Baltic Sea Area, available at www.helcom.fi

.5 Where applicable, provide documentation of service experience of existing ships, in conditions relevant to the target ice class for equivalency.

.6 Undertake an assessment, taking into account information from steps 1 to 5, as applicable, and on the principles outlined in paragraphs 2 to 6 above.

8 Documentation provided with an application for equivalency should identify each stage that has been undertaken, and sufficient supporting information to validate assessments.

9 Where a ship in categories A or B is provided with an equivalency for ice class by its flag State, this should be noted in its Polar Ship Certificate.

5 A**DDITIONAL GUIDANCE TO CHAPTER 4 (STABILITY AND SUBDIVISION)**

No additional guidance

6 ADDITIONAL GUIDANCE TO CHAPTER 5 (WATERTIGHT AND WEATHERTIGHT INTEGRITY)

No additional guidance.

7 ADDITIONAL GUIDANCE TO CHAPTER 6 (MACHINERY INSTALLATIONS)

Refer to additional guidance to chapter 3.

8 ADDITIONAL GUIDANCE TO CHAPTER 7 (FIRE SAFETY/PROTECTION)

No additional guidance.

9 ADDITIONAL GUIDANCE TO CHAPTER 8 (LIFE-SAVING APPLIANCES AND ARRANGEMENTS)

9.1 Sample personal survival equipment

When considering resources to be included with the personal survival equipment, the following should be taken into account:

Suggested Equipment
Protective clothing (hat, gloves, socks, face and neck protection, etc.)
Skin protection cream
Thermal protective aid
Sunglasses
Whistle
Drinking mug
Penknife
Polar survival guidance
Emergency food
Carrying bag

9.2 **Sample group survival equipment**

When considering resources to be included in the group survival equipment, the following should be taken into account:

Suggested Equipment
Shelter – tents or storm shelters or equivalent – sufficient for maximum number of persons
Thermal protective aids or similar – sufficient for maximum number of persons
Sleeping bags – sufficient for at least one between two persons
Foam sleeping mats or similar – sufficient for at least one between two.
Shovels – at least 2
Sanitation (e.g. toilet paper)
Stove and fuel – Sufficient for maximum number of persons ashore and maximum anticipated time of rescue
Emergency food – Sufficient for maximum number of persons ashore and maximum anticipated time of rescue
Flashlights – one per shelter
Waterproof and windproof matches – two boxes per shelter
Whistle
Signal mirror
Water containers & water purification tablets
Spare set of personal survival equipment
Group survival equipment container (waterproof and floatable)

10 ADDITIONAL GUIDANCE TO CHAPTER 9 (SAFETY OF NAVIGATION)

10.1 Radars equipped with enhanced ice detection capability should be promoted used, in particular, in shallow waters.

10.2 As the chart coverage of polar waters in many areas may not currently be adequate for coastal navigation, navigational officers should:

.1 exercise care to plan and monitor their voyage accordingly, taking due account of the information and guidance in the appropriate nautical publications;

.2 be familiar with the status of hydrographic surveys and the availability and quality of chart information for the areas in which they intend to operate;

.3 be aware of potential chart datum discrepancies with GNSS positioning; and

.4 aim to plan their route through charted areas and well clear of known shoal depths, following established routes whenever possible.

10.3 Any deviations from the planned route should be undertaken with particular caution. For example, and when operating on the continental shelf:

.1 the echo-sounder should be working and monitored to detect any sign of unexpected depth variation, especially when the chart is not based on a full search of the sea floor.

.2 Independent cross-checking of positioning information (e.g. visual and radar fixing and GNSS) should be undertaken at every opportunity. Mariners should ensure to report to the relevant charting authority (Hydrographic Office) any information that might contribute to improving the nautical charts and publications.

11 ADDITIONAL GUIDANCE TO CHAPTER 10 (COMMUNICATION)

No additional guidance

12 ADDITIONAL GUIDANCE TO CHAPTER 11 (VOYAGE PLANNING)

In developing and executing a voyage plan ships should consider the following:

.1 In the event that marine mammals are encountered, any existing best practices should be considered to minimize unnecessary disturbance.

.2 Planning to minimize the impact of the ship's voyage where ships are trafficking near areas of cultural heritage and cultural significance.

See also additional guidance to chapter 9.

13 ADDITIONAL GUIDANCE TO CHAPTER 12 (MANNING AND TRAINING FAMILIARITY)

No additional guidance

[PART II-A
POLLUTION PREVENTION MEASURES [ENVIRONMENTAL PROTECTION MEASURES]

CHAPTER 1 – PREVENTION OF OIL POLLUTION

1.1 Application

1.1.1 Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

[1.1.2 Ships built prior to [date of entry into force] shall meet the requirements of the Code with the exceptions of 1.4.2.2 by [date to be determined]].

1.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts from oil from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

1.3 Functional requirements

In order to achieve the goal set out in paragraph 1.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

.1 Plans, manuals, records and procedures and means shall be provided to avoid environmental impact from oil or oily mixtures during normal operation.

.2 Ships shall be designed and have plans to minimize the risk of any environmental impact from oil or oily mixtures in case of an emergency situation, in particular one that may lead to an oil spill in ice-covered waters.

1.4 Requirements

1.4.1 In order to comply with the functional requirements in paragraph 1.4.1 above, the following apply:

.1 any manuals and records required by MARPOL Annex I shall take into account operation in polar waters; and

.2 any discharge into the sea of oil or oily mixtures from any ship shall be prohibited.

1.4.2 In order to comply with the functional requirements in paragraph 1.4.1.2 above, the following apply:

.1 the shipboard oil pollution emergency plan required by MARPOL Annex I shall take into account operation in polar waters; and

.2 for categories A and B ships, constructed on or after [date of entry into force], all tanks used for carriage of oil or oily mixtures shall be separated from the outer shell by a distance not less than 760 mm. Where this is not practicable, this requirement needs not to be met for tanks containing oil or oily mixtures carried in way of the machinery space with an individual capacity of 20 m^3 or less.

CHAPTER 2 – PREVENTION OF POLLUTION FROM NOXIOUS LIQUID SUBSTANCES

2.1 Application

2.1.1 Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

[2.1.2 Ships built prior to [date of entry into force] shall meet the requirements of the Code with the exception of 2.4.2.2 by [date to be determined]].

2.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts from noxious liquid substances from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

2.3 Functional requirements

In order to achieve the goal set out in paragraph 2.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

.1 records, manuals and means shall be provided to avoid environmental impact from noxious liquid substances during normal operation; and

.2 ships shall be designed and have plans to minimize the risk of environmental impact from noxious liquid substances in case of an emergency situation.

2.4 Requirements

2.4.1 In order to comply with the functional requirements in paragraph 2.3.1 above, the following apply:

.1 the cargo record book and the Procedure and Arrangement Manual required by MARPOL Annex II shall take into account operation in polar waters; and

.2 any discharge into the sea of noxious liquid substances, or mixtures containing these substances, is prohibited.

2.4.2 In order to comply with the functional requirements in paragraph 2.4.2 above, the following apply:

.1 the shipboard marine pollution emergency plan for noxious liquid substances required by MARPOL Annex II shall take into account operation in polar waters; and

.2 for categories A and B ships, constructed on or after [date of entry into force], all tanks used for carriage of noxious liquid substances shall be separated from the outer shell by a distance not less than 760 mm.

CHAPTER 3 – PREVENTION OF POLLUTION BY HARMFUL SUBSTANCES IN PACKAGED FORM

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CHAPTER 4 – PREVENTION OF POLLUTION BY SEWAGE FROM SHIPS

4.1 Application

4.1.1 Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

[4.1.2 Ships built prior to [date of entry into force] shall meet the requirements of the Code with the exceptions of 4.4.1.2 by [date to be determined]].

4.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts by sewage from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

4.3 Functional requirements

In order to achieve the goal set out in paragraph 4.3 above, ships shall be operated to minimize the risk of environmental impact by discharge of sewage from ships.

4.4 Requirements

4.4.1 In order to comply with the functional requirements in paragraph 4.4 above, the following apply:

.1 Subject to the provisions of MARPOL Annex IV, regulation 3, discharges of sewage within polar waters are subject to the following additional requirements in accordance with standards [approved by the Administration based upon guidelines developed by] [acceptable to] the Organization[17]:

.1 discharges of sewage that is comminuted and disinfected and permitted under MARPOL Annex IV, regulation 11.1.1 shall be at a distance of more than 3 nautical miles from any ice shelf or land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10;

.2 discharges of sewage that is not comminuted and disinfected and permitted under MARPOL Annex IV, regulation 11.1.1 shall be at a distance of more than 12 nautical miles from any ice shelf or land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10; and

.3 discharges of sewage permitted under MARPOL Annex IV, regulation 11.1.2 or MARPOL Annex IV, regulation 11.3 shall be as far as practicable from the nearest land, any ice shelf, land-fast ice or areas of ice concentration exceeding 1/10.

[17] Refer to resolution MEPC.2(VI), resolution MEPC.159(55) or resolution MEPC.227(64) as applicable.

.2 Discharge of sewage into the sea is prohibited from cargo ships of category A and B, constructed on or after [date of entry into force],and passenger ships constructed on or after [date of entry into force] except when such discharges have been treated by means of a type-approved sewage treatment plant based upon guidelines developed by the Organization[18]. Such discharges shall be, as far as practicable, from the nearest land, any ice shelf, land-fast ice or areas of ice concentration exceeding 1/10.

.3 Notwithstanding the requirements of paragraph 4.5.1, ships that operate in areas of ice concentrations exceeding 1/10 for extended periods of time may discharge sewage if such sewage has been treated by means of a [type-approved] sewage treatment plant [approved] based upon guidelines developed by the Organization[22]. Such discharge shall be subject to the approval of the Administration, [and shall be noted in the Polar Ship Certificate with supplemental operational information in the Polar Water Operations Manual.] (Note: TYPE-approval based upon guidelines is questioned)

CHAPTER 5 – PREVENTION OF POLLUTION BY GARBAGE

5.1 Application

5.1.1 Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

[5.1.2 Ships built prior to [date of entry into force] shall meet the requirements of the Code by [date to be determined]].

5.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts by discharge of garbage from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

5.3 Functional requirements

In order to achieve the goal set out in paragraph 5.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

.1 records and, plans shall facilitate the minimization of environmental impact by garbage; and

.2 ships shall be operated to minimize the risk of environmental impact by garbage.

5.4 Requirements

5.4.1 In order to comply with the functional requirements in paragraph 5.4.1 above, any plans and records required by MARPOL Annex V shall take into account operation in polar waters.

[18] Refer to the 2012 *Guidelines on implementation of effluent standards and performance tests for sewage treatment plants* (resolution MEPC.227(64)).

5.4.2 In order to comply with the functional requirements in paragraph 5.4.2 above, ships to which the requirements of MARPOL Annex V, regulation 6 do not apply shall comply with the following:

.1 discharge of food waste is only permitted when the ship is en route and as far as practicable from the nearest land, but in any case not less than 12 nm from the nearest land, nearest ice shelf, or nearest land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10;

.2 food waste shall be comminuted or ground and shall be capable of passing through a screen with openings no greater than 25 mm. Food wastes shall not be contaminated by any other garbage type;

.3 food waste shall not be discharged onto the ice; and

.4 discharge of animal carcasses within Arctic waters is prohibited.]

[PART II-B

**[INFORMATION AND ADDITIONAL GUIDANCE TO PART II-A]
[RECOMMENDATORY MEASURES]**

GENERAL INFORMATION

Different from the Arctic, the Antarctic has been specifically regulated under various MARPOL Annexes prior to the entry into force of the Polar Code. Upon entry into force of the Polar Code, there will still be some differences in the environmental protection requirements for ships operating in the Antarctic and ships operating in the Arctic:

MARPOL Annex I

1 The Antarctic area was designated a special area under MARPOL Annex I.

2 Discharge requirements are contained in regulations 15 and 34 of the Annex.

3 Regulation 15.4 provides that any discharge into the sea of oil or oily mixtures from any ship shall be prohibited.

4 Requirements on the reception facilities in special areas are contained in regulation 38.

5 Regulation 43 prohibits the use or carriage of [certain] oils in the Antarctic area.

MARPOL Annex II

Regulation 13.8.2 prohibits any discharge into the sea of noxious liquid substances or mixtures containing such substances.

MARPOL Annex V

1 The Antarctic area was designated a special area under MARPOL Annex V.

2 Discharge requirements for special areas are contained in regulation 6 of the Annex. Regulation 6.1.1 also provides that discharge of introduced avian products, including poultry parts, is not permitted in the Antarctic area unless it has been treated to make sterile.

MARPOL Annex VI

MARPOL VI exempts cargo ships having icebreaking capacity from EEDI requirements.

[1 Additional guidance to chapter 1
(Note: This part is proposed deleted)

In addition to the provisions contained in chapter 1 of this Code, ships shall comply with regulation 43 of MARPOL Annex I, which prohibits the use or carriage of heavy fuel oil in Antarctic area. [Ships may, on a voluntary basis, not use or carry heavy fuel oil in Arctic area.]

2 Additional guidance to chapter 5

To meet the discharge requirements of MARPOL Annex V, due consideration should be given to resolution MEPC.219(63) *2012 Guidelines for the implementation of MARPOL Annex V* and resolution MEPC.220(63) *2012 Guidelines for the development of garbage management plans*. Given that the discharge of animal carcasses is prohibited, consideration should be given to the management, treatment, and storage of animal carcasses and, as appropriate, any future guidelines developed by the Organization.

3 Miscellaneous additional guidance

3.1 Until the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) enters into force, the ballast water management provisions of the ballast water exchange standard, set out in regulation D-1, or the ballast water performance standard, set out in regulation D-2 of the BMW Convention should be considered as appropriate. The provisions of the *Guidelines for ballast water exchange in the Antarctic treaty area* (resolution MEPC.163(56)) should be taken into consideration.

3.2 In selecting the ballast water management system, attention should be paid to limiting conditions specified in the appendix of the Type Approval Certificate and the temperature under which the system has been tested, in order to ensure its suitability and effectiveness in polar waters.

3.3 Non-toxic biodegradable lubricants or water-based systems should be considered for stern tube bearings, stern seals, and other lubricated components located outside the underwater hull.

3.4 In order to minimize the risk of invasive aquatic species transfers via biofouling, measures should be considered to minimize the risk of more rapid degradation of anti-fouling coatings associated with polar ice operations. Reference is made in particular to resolution MEPC.207(62), *2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species.*

Table: Example of matters related to anti-fouling systems taken into consideration by some ice going ships (This table is used by some operators of ice going ships)

	Hull	**Sea Chest**
Year round operation in ice-covered polar waters	Abrasion resistant low friction ice coating No anti-fouling system	Abrasion resistant coating Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.
Intermittent operation in ice-covered polar waters	Abrasion resistant low friction ice coating In sides above bilge keel max thickness of anti-fouling system 75 µm [to protect hull between application of anti-fouling system and next anticipated voyage to ice-covered waters]. In bottom area thickness to be decided by ship owner. Composition of anti-fouling system should be decided	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.
Category B & C vessels	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.

]

APPENDIX 1

Form of Certificate for Ships operating in Polar Waters

POLAR SHIP CERTIFICATE

This Certificate is a supplement to the Passenger Ship Safety Certificate/Cargo Ship Safety Construction Certificate[19]

(Official seal)

(State)

Issued under the provisions of the

International Convention for the Safety of Life at Sea, 1974

under the authority of the Government of

(name of the State)

by _____
(person or organization authorized)

Name of ship……
Distinctive number or letters……..
Port of registry……..
Gross tonnage……..
IMO Number[20] ….....

[19] Delete as appropriate.

[20] In accordance with *IMO ship identification number scheme* adopted by the Organization by resolution A.600(15).

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/7 of the *Safety of Life at Sea*.

2 That the survey showed that the ship complied with the requirements of chapter XIV of the International Convention for the Safety of Life at Sea, 1974.

Category A/B/C[21] ship as follows:

Ship type: tanker/passenger ship/other[30]

[Ship intended to operate in ice: Yes/No[1]]

[Ship restricted to operate in ice free waters Yes/No[1]]

Ship intended to operate in low air temperature: Yes/No[1]

Polar Service Temperature: ……..°C

Maximum expected time of rescue

Ice Class and Ice Waterline Extent

Ice class	Maximum draft		Minimum draft	
	Aft	Fwd	Aft	Fwd

[Other operational limitations for inclusion in the supplement have been determined Yes/No[1]]

3 The ships was/was not[3] subjected to an alternative design and arrangements in pursuance of regulations(s) XIV/4 of the Safety of Life at Sea Convention.

4 Document of approval of alternative design and arrangements for [structural integrity] machinery and electrical installations/fire protection/life-saving appliances and arrangements[3] is/is not[3] appended to this Certificate.

This certificate is valid until . . . . . .

Completion date of the survey on which this certificate is based:. . . . . .
(dd/mm/yyyy)

Issued at . . . . . .
(Place of issue of certificate)

. . . . . .

Record of Additional Equipment and operational limitations for the Polar Ship Certificate[22]

This record shall be permanently attached to the
Polar Ships Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH CHAPTER XIV OF
THE INTERNATIONAL CONVENTION FOR THE SAFETY
OF LIFE AT SEA, 1974

1 Particulars of ship:

Name of ship:……
Distinctive number or letters:……..

2 Record of equipment

2.1 *Life-saving appliances*

1	Immersion suits with insulation:	.....
1.1	for crew	.....
1.2	for passengers	.....
2	Thermal protective aids	.....
3	Personal and Group Survival Equipment	.....
3.1	Personal survival equipment – for number of persons	.....
3.2	Group survival equipment – for number persons	.....
[3.3	Capacity of liferafts in compliance with chapter 9 of the Code	.....
3.4	Capacity of lifeboats in compliance with chapter 9 of the Code]	.....

[2.2 *Navigation equipment*

1	Independent echo-sounding devices	.....
2	Remotely rotatable, narrow-beam search lights controllable from the bridge – Yes/No	.....
3	Manually initiated flashing red light visible from astern – Yes/No[1]	.....
4	Two or more non-magnetic independent means to determine and display heading – Yes/No[1]	.....
5	GNSS compass or equivalent – Yes/No[1]	.....

2.3 *Communication equipment*

1	All rescue boats and lifeboats capable of transmitting and receiving GMDSS compatible communications – Yes/No[1]	.....
2	All other survival craft equipped with equipment suitable for distress alerting and Locating – Yes/No[1]]	.....

[22] This equipment is in addition to other equipment required under the SOLAS Convention and recorded under the relevant SOLAS certificates.

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at……
(Place of issue of the Record)

…….. ……..
(Date of issue) *(Signature of duly authorized official issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

[Record of Operational limitations]

Appendix 2

Model Table of Contents for the Polar Water Operational Manual (PWOM)

PART I

SAFETY MEASURES

1 – Operational capabilities and limitations

Chapter 1 Operation in ice

1.1 Operator guidance for safe operation

Guidance: The PWOM should establish the means by which decisions as to whether ice conditions exceed the ship's design limits should be made, taking into account the operational limitations on the Polar Ship Certificate. An appropriate decision support system, such as the Canada's Arctic Ice Regime Shipping System, and/or the Russian Ice Certificate as described in the Rules of Navigation on the water area of the Northern Sea Route, can be used... Bridge personnel should be trained in the proper use of the system to be utilized. For ships that will operate only in ice-free waters, procedures to ensure that will keep the ship from encountering ice should be established.

1.2 Icebreaking capabilities

Guidance: The PWOM should provide information on the ice conditions in which the ship can be expected to make continuous progress. This may be drawn, for example from numerical analysis, model test or from ice trials. Information on the influence of ice strength for new or decayed ice and of snow cover may be included.

1.3 Manoeuvring in ice

1.4 Special features

Guidance: [Where applicable, the manual PWOM include the results of any equivalency analyses made to determine Polar Ship category/ice class.] The manual should also provide information on the use of any specialized systems fitted to assist in ice operations.

Chapter 2 Operation in low air temperatures

2.1 System design

Guidance: The PWOM should list all ship systems susceptible to damage or loss of functionality by exposure to low temperatures, and the measures to be adopted to avoid malfunction.

Chapter 3 Communication and navigation capabilities in high latitudes

Guidance: The PWOM should identify any restrictions to operational effectiveness of communications and navigational equipment that may result from operating in high latitudes.

Chapter 4 Voyage duration

Guidance: The PWOM should provide information on any limitations on ship endurance such as fuel tankage, fresh water capacity, provision stores, etc. This will normally only be a significant consideration for smaller ships, or for ships planning to spend extended periods in ice.

Division 2 – Ship operations

Chapter 1 Strategic planning

Assumptions used in conducting the analyses referred to below should be included in the Manual.

1.1 Avoidance of hazardous ice

Guidance: For ships operating frequently in polar waters, the PWOM should provide information with respect to periods during which the ship should be able to operate for intended areas of operation. Areas that pose particular problems, e.g. chokepoints, ridging, as well as worst recorded ice conditions should be noted. Where the available information is limited or of uncertain quality, this should be recognized and noted as a risk for voyage planning.

1.2 Avoidance of hazardous temperatures

Guidance: For ships operating frequently in polar waters, the PWOM should provide information with respect to, the daily mean daily low temperature as well as the minimum recorded temperature for each of the days during the intended operating period. Where the available information is limited or of uncertain quality, this should be recognized as a risk for voyage planning.

1.3 Voyage duration and endurance

Guidance: Procedures to establish requirements for supplies should be established, and appropriate safety levels for safety margins determined taking into account various scenarios, e.g. slower than expected steaming, course alterations, adverse ice conditions, places of refuge and access to provisions. Sources for and availability of fuel types should be established, taking into account long lead times required for deliveries.

1.4 Human resources management

Guidance: The PWOM should provide guidance for the human resources management, taking into account the anticipated ice conditions and requirements for ice navigation, increased levels of watch keeping, hours of rest, fatigue and a process that ensures that these requirements will be met.

Chapter 2 Arrangements for receiving forecasts of environmental conditions

Guidance: The PWOM should set out the means and frequency for provision of ice and weather information. Where a ship is intended to operate in or in the presence of ice, the manual should set out when weather and ice information is required and the format for the information.

When available, the information should include both global and localized forecasts that will identify weather and ice patterns/regimes that could expose the ship to adverse conditions.

The frequency of updates should provide enough advance notice that the ship can take refuge or use other methods of avoiding the hazard if the conditions are forecast to exceed its capabilities.

The PWOM may include use of a land based support information provider an effective method of sorting through available information, thereby providing the ship only with information that is relevant, reducing demands on the ship's communications systems. The manual may also indicate instances in which additional images should be obtained and analysed, as well as where such additional information may be obtained.

2.1 Ice information

Guidance: The PWOM should include or refer to guidance on how radar should be used to identify ice floes, how to tune the radar to be most effective, instructions on how to interpret radar images, etc. If other technologies are to be used to provide ice information, their use should also be described.

2.2 Meteorological information

Chapter 3 Verification of hydrographic, meteorological and navigational information

Guidance: The PWOM should provide guidance on the use of hydrographic information as further described in the additional guidance to chapter 10.

Chapter 4 Operation of Special Equipment

4.1 Navigation systems

4.2 Communications systems

Chapter 5 Procedures to maintain equipment and system functionality

5.1 Icing prevention and de-icing

Guidance: The PWOM should provide guidance on how to prevent or mitigate icing by operational means, how to monitor and assess ice accretion, how to conduct de-icing using equipment available on the ship, and how to maintain the safety of the ship and its crew during all of these aspects of the operation.

5.2 Operation of seawater systems

Guidance: The PWOM should provide guidance on how to monitor, prevent or mitigate ice ingestion by seawater systems when operating in ice or in low water temperatures. This may include recirculation, use of low rather than high suctions, etc.

5.3 Procedures for low temperature operations

Guidance: The PWOM should provide guidance on maintaining and monitoring any systems and equipment that are required to be kept active in order to ensure functionality; e.g. by trace heating or continuous working fluid circulation.

Division 3 – Risk management

Chapter 1 Risk mitigation in limiting environmental condition

1.1 Measures to be considered in adverse ice conditions

Guidance: The PWOM should contain guidance for the use of low speeds in the presence of hazardous ice. Procedures should also be set for enhanced watchkeeping and lookout manning in situations with high risks from ice, e.g. in proximity to icebergs, operation at night, and other situations of low visibility. When possibilities for contact with hazardous ice exist, procedures should address regular monitoring, e.g. soundings/inspections of compartments and tanks below the waterline.

1.2 Measures to be considered in adverse temperature conditions

Guidance: The PWOM should contain guidance on operational restrictions in the event that temperatures below the ships polar service temperature are encountered or forecast. These may include delaying the ship, postponing the conduct of certain types of operation, using temporary heating, and other risk mitigation measures.

Chapter 2 Emergency response

Guidance: In general, where the possibility of encountering low air temperatures, sea ice, and other hazards is present, the PWOM should provide guidance on procedures that will increase the effectiveness of emergency response measures.

2.1 Damage control

Guidance: the PWOM should consider damage control measures arrangements for emergency transfer of liquids and access to tanks and spaces during salvage operations.

2.2 Firefighting

2.4 Escape and evacuation

Guidance: Where supplementary or specialized lifesaving equipment is carried to address the possibilities of prolonged durations prior to rescue, abandonment onto ice or adjacent land, or other aspects specific to polar operations, the PWOM should contain guidance on the use of the equipment and provision for appropriate training and drills.

Chapter 3 Coordination with emergency response services

3.1 Ship emergency response

Guidance: The PWOM should include procedures to be followed in preparing for a voyage and in the event of an incident arising.

3.2 Salvage

Guidance: The PWOM should include procedures to be followed in preparing for a voyage and in the event of an incident arising.

3.3 Search and rescue

Guidance: The PWOM should contain information on identifying relevant Rescue Coordination Centres for any intended routes, and should require that contact information and procedures be verified and updated as required as part of any voyage plan.

Chapter 4 Procedures for maintaining life support and ship integrity in the event of prolonged entrapment by ice.

Guidance: Where any ship incorporates special features to mitigate safety or environmental risks due to prolonged entrapment by ice, the PWOM should provide information on how these are to be set up and operated. This may include, for example, adding additional equipment to be run from emergency switchboards, draining systems at risk of damage through freezing, isolating parts of HVAC systems, etc.

4.1 System configuration

4.2 System operation

Division 4 – Joint operations

Chapter 1 Escorted operations

Guidance: The PWOM should contain or reference information on the rules and procedures set out by coastal States who require or offer icebreaking escort services. The manual should also emphasize the need for the master to take account of the ship's limitations in agreeing on the conduct of escort operations.

Chapter 2 Convoy operations

[PART II

POLLUTION PREVENTION MEASURES [ENVIRONMENTAL PROTECTION MEASURES]

Division 1 – Waste Stream Management

Guidance: Procedures for waste stream management should normally be included in other documentation required to be carried on board.

Chapter 1 – Prevention of Oil Pollution

1.1 Discharge of oil and oily mixtures

Chapter 2 – Prevention of Pollution from Noxious Liquid Substances

Chapter 3 – Prevention of Pollution by Harmful Substances in Packaged Form

Kept blank intentionally.

Chapter 4 – Prevention of Pollution by Sewage from Ships

Chapter 5 – Prevention of Pollution by Garbage

Division 2 – Incident Response

1.2 Spill Response

Guidance: Procedures for pollution response should normally be included in other documentation required to be carried on board. .]

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ANNEX 25

DRAFT AMENDMENT TO SOLAS REGULATION II-2/10

Regulation 10 – Firefighting

The title of regulation 10.5.2 is replaced, as follows:

"**5.2 Machinery spaces of category A containing internal combustion machinery**"

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ANNEX 26

GUIDELINES ON THE ORGANIZATION AND METHOD OF WORK OF THE MARITIME SAFETY COMMITTEE AND THE MARINE ENVIRONMENT PROTECTION COMMITTEE AND THEIR SUBSIDIARY BODIES

1 The Maritime Safety Committee, at its ninety-third session (14 to 23 May 2014), and the Marine Environment Protection Committee, at its [sixty-seventh session (13 to 17 October 2014)], reviewed and revised the guidelines for the organization and method of their work, as requested by resolution A.1062(28), *Guidelines on the application of the Strategic Plan and the High-level Action Plan of the Organization*, as appropriate, and taking into account the editorial improvements made by FAL 38, which approved the revised *Guidelines on the organization and method of work of the Facilitation Committee* (FAL.3/Circ.209).

2 The Committees approved the revised guidelines, as set out in the annex.

3 Members are invited to apply the annexed revised guidelines, with immediate effect, as appropriate, and to bring them to the attention of their representatives at relevant IMO meetings, advising them to strictly observe these guidelines.

4 This circular revokes MSC-MEPC.1/Circ.4/Rev.2.

ANNEX

GUIDELINES ON THE ORGANIZATION AND METHOD OF WORK OF THE MARITIME SAFETY COMMITTEE AND THE MARINE ENVIRONMENT PROTECTION COMMITTEE AND THEIR SUBSIDIARY BODIES

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1 INTRODUCTION

Purpose and application

1.1 The purpose of these guidelines is to provide a uniform basis for the Maritime Safety Committee (MSC) and the Marine Environment Protection Committee (MEPC) and their subsidiary bodies to conduct their work in an efficient and effective manner and to strengthen the linkage between the Organization's strategy, the work of the Committees and the biennial budget with a view to achieving IMO objectives and the priorities over a biennium. This in turn will enable the Committees to respond successfully to the needs for enhanced maritime safety, maritime security and protection of the marine environment, thus providing an efficient mechanism towards achieving the desired goals of the Organization.

1.2 Proper application of the guidelines will also enhance the ability of Committee members and delegations to subsidiary bodies of the Committees to cover the full spectrum of IMO activities relevant to their work and thus provide for their effective participation in the rule-making process of the Organization. It is also expected that the guidelines will enable the Committees to further improve their decision-making functions.

1.3 The guidelines are applicable to the work of the Committees and their subsidiary bodies as well as to working groups, drafting groups and correspondence groups set up by these bodies. The Chairmen of the Committees, subsidiary bodies, working groups, drafting groups and correspondence groups should make all efforts to ensure strict compliance with the guidelines.

1.4 The guidelines will be kept under review and will be updated as necessary in the light of experience gained in their application, taking into account the *Guidelines on the application of the Strategic Plan and the High-level Action Plan of the Organization* (resolution A.1062(28)), as may be amended.

Objectives

1.5 The provisions of these guidelines are aimed at achieving the following objectives:

.1 to align and strengthen the planning and reporting processes by linking agenda-setting and reporting more clearly to the Strategic Plan and High-level Action Plan;

.2 to strengthen the linkage between planned outputs and the resources required to deliver the outputs;

.3 to facilitate the efforts of the Committees in controlling and monitoring the Organization's work;

.4 to promote greater understanding and assimilation of the interconnections between the Strategic Plan and High-level Action Plan and planned outputs;

.5 to promote discipline in adherence to the planning procedures and guidelines;

.6 to promote objectivity, clarity and realistic time frames in the establishment of biennial agendas by the Committees and their subsidiary bodies;

.7 to ensure maximum possible participation by all Member States and organizations with observer status in the work of the Committees and their subsidiary bodies; and

.8 to establish responsibilities and promote involvement in the planning and reporting processes of the Organization.

2 DEFINITIONS

For the purposes of these guidelines, the following definitions will apply:

.1 *Strategic Plan* is the Strategic Plan for the Organization for a six-year period as adopted by the Assembly, which includes key strategic directions to enable IMO to achieve its mission objectives.

.2 *High-level Action Plan* is the High-level Action Plan of the Organization and the biennium's priorities, as adopted by the Assembly, which enables the Organization to effectively address strategic directives, identifies high-level actions necessary to achieve the IMO objectives and priorities over a biennium and provides the linkage between the Organization's strategy, the work of the various IMO organs and the biennial budget.

.3 *Planned output* is a product planned in the High-level Action Plan to be delivered by the Organization during a biennium.

.4 *Unplanned output* is a product that may be agreed by the Committees to be delivered during a biennium after the adoption of that biennium's High-level Action Plan.

.5 *Provisional agenda* is a list of outputs for discussion at a particular meeting.

.6 *Biennial agenda* is a list of planned outputs to be delivered during a biennium by a Committee or subsidiary body.

.7 *Post-biennial agenda* is a list of accepted outputs[1] to be delivered or initiated beyond a current biennium.

3 COORDINATION OF WORK

3.1 The Committees should function as policy-making bodies and their subsidiary bodies as purely technical bodies.

3.2 The Committees should routinely examine their planned, unplanned and accepted outputs, allocate work to their subsidiary bodies, review the allocation of meeting weeks to each body and approve their respective biennial and provisional agendas, taking into account any recommendations made by meetings of the Committees' and subsidiary bodies' chairmen convened as provided in paragraph 3.4.

3.3 The Committees should regularly review the status of all conventions, protocols and other major instruments under their purview.

[1] A product that may be agreed by the Committees for delivery during a subsequent biennium is referred to as an "accepted output".

3.4 The Committee chairmen may convene a meeting of chairmen of the Committees' subsidiary bodies at least once a year. This meeting should preferably take place at the spring session of MSC or MEPC, to advise the Committees on subjects such as those referred to in paragraph 3.2, ensure coordination of the work and examine other matters pertinent to the effective conduct of business and management of the work of the Committees and their subsidiary bodies.

3.5 The Committee chairmen should, at the end of the first year of the biennium, submit to their respective Committees a joint plan covering the activities, priorities and meetings of the Committees and their subsidiary bodies for the coming biennium, for consideration in the subsequent year.

3.6 When both Committees have been charged by the Council, Assembly or a conference with considering a specific item and one Committee has finalized its consideration, the other Committee should consider it at its first subsequent session.

3.7 When an issue is transferred to one of the Committees by another committee of the Organization for specific action, the Committee, before including the subject in question in the biennial agenda, should decide that the provisions of section 4, as appropriate, are fully satisfied, even if the issue, in accordance with the criteria of the referring committee, satisfies the requirements of resolutions A.500(XII), A.777(18) and A.900(21).

4 WORK PLANNING AND DELIVERY PROCESS

Planned outputs

4.1 The Committees should identify, in a timely manner, the products to be included as planned outputs in the High-level Action Plan for the coming biennium, and the Secretariat should develop its business plan, as such identification provides a basis for making an estimate of the budget required for that biennium.

4.2 In the process of formulating a proposal for planned outputs for inclusion in the High-level Action Plan, due account should be taken, inter alia, of:

.1 planned outputs the delivery of which has been postponed from a prior biennium;

.2 final outputs that may need to be produced following the delivery of related interim outputs in a prior biennium;

.3 any specific requirement to review the effectiveness of planned outputs delivered in a prior biennium;

.4 accepted outputs on the post-biennial agendas; and

.5 new planned outputs.

Proposals for new planned outputs should comply with the provisions of paragraph 4.7.

4.3 Decisions on the inclusion of planned outputs in the High-level Action Plan for the coming biennium should be guided by the strategic directions and high-level actions established in the Strategic Plan and the High-level Action Plan, and should take due account of:

.1 the anticipated workload of the Committees and their subsidiary bodies in delivering the output;

.2 the demonstrated urgency to deliver the output;

.3 the personnel and budgetary resources available; and

.4 the potential adverse impact that a decision on whether or not to include an output may have on the ability of the Organization to meet its objectives.

4.4 Such planned outputs may be revised during the biennium by the Committees, taking into account the provisions of paragraph 4.3, if subsequently endorsed by the Council.

4.5 An overview of the Organization's strategic planning process and its steering and reporting flows are shown in diagrams 1 and 2 contained in annex 1 to the *Guidelines on the application of the Strategic Plan and the High-level Action Plan of the Organization* (resolution A.1062(28)).

Unplanned outputs

General

4.6 During the course of a biennium, the Committees may receive proposals for unplanned outputs within their domains. The Committees, in determining inclusion of unplanned outputs, should at all times be guided by the strategic directions and high-level actions established in the Strategic Plan and the High-level Action Plan, as shown in diagram 3 contained in annex 1 to the *Guidelines on the application of the Strategic Plan and the High-level Action Plan of the Organization* (resolution A.1062(28)), and should, in particular, take due account of:

.1 the potential impact that inclusion of an unplanned output may have on the timely delivery of outputs planned in the current High-level Action Plan;

.2 the potential impact that inclusion of an unplanned output may have on the workload of the Committees and the subsidiary bodies involved;

.3 the personnel and budgetary resources available; and

.4 the potential adverse impact that a decision on whether or not to accept a proposal for inclusion of an unplanned output may have on the ability of the Organization to meet its objectives.[2]

Submission of proposals for unplanned outputs

4.7 To enable the Committees to carry out a proper assessment of proposals for inclusion of unplanned outputs, submissions containing such proposals should, at a minimum, contain the information, including demonstration and documentation, set out in annex 1 (see also annex 5).

4.8 Member Governments should refrain from submitting to the Committee(s) proposals for unplanned outputs under specific agenda items. The Secretariat should not accept such submissions and should advise the submitting Administrations accordingly.

4.9 Proposals for the inclusion of unplanned outputs should never be submitted to a sub-committee. A sub-committee should not undertake work on unplanned outputs or expand the scope of planned outputs unless directed or authorized to do so by the Committees.

[2] Refer to the IMO Risk Management Framework (C 110/3/5, annex 1).

4.10 Proposals for the inclusion of unplanned outputs submitted to Committees by non-governmental organizations should be co-sponsored by Governments. Notwithstanding the above, such organizations should not be restrained from submitting comments and recommendations on outputs for the provisional agenda of any Committees or subsidiary bodies, thus providing expert advice, contributing to discussion and enabling optimal decisions to be reached by the organs concerned.

4.11 Follow-up action in response to specific requests for action emanating from the Assembly and diplomatic conferences convened by IMO, or from United Nations conferences and bodies, regional intergovernmental conferences and other international and intergovernmental organizations, etc., should be evaluated in the light of paragraph 4.3 of these guidelines, unless they are specifically identified as, and demonstrated to be, urgent matters.

Preliminary assessment by the Committees' chairmen of proposals for unplanned outputs

4.12 In order to facilitate consideration of proposals for inclusion of unplanned outputs by the Committees, the chairman of the Committee concerned should undertake a preliminary assessment[3] of such proposals. The chairman should, for that purpose, be supported by the vice-chairman and the Secretariat and should consult the chairman of any subsidiary body concerned.

4.13 The outcome of the preliminary assessment should be submitted to the Committee for consideration and approval, and should include the chairman's appraisal of:

.1 whether the proposal complies with the requirements for the submission of proposals for unplanned outputs, as specified in paragraph 4.7;

.2 whether the proposal complies with the criteria specified in paragraph 4.14;

.3 whether the demonstrated urgency of the proposal requires its inclusion in the biennial agenda; and, if so,

.4 to what extent the general criteria specified in paragraph 4.6 should be taken into account.

Assessment of proposals for unplanned outputs

4.14 Before deciding to include an unplanned output in its biennial agenda, the Committee concerned should carry out a comprehensive and thorough assessment of such proposals. The assessment should at least include a test against the following criteria:

.1 Is the subject addressed by the proposal considered to be within the scope of IMO objectives and the Strategic Plan for the Organization?

.2 Does the proposal contribute to the high-level actions established in the High-level Action Plan?

.3 Does the proposal involve the exercise of functions conferred upon the Committees by or under any international convention or related instrument?

[3] This preliminary assessment will also include the assessment of proposed planned outputs and new outputs for inclusion in the Committee's post-biennial agenda.

.4 Has a need – or, in the case of proposals calling for new conventions or amendments to existing conventions, a *compelling* need – for the measure been demonstrated and documented?

.5 Has an analysis been provided that demonstrates and documents the practicality, feasibility and proportionality of the proposed measure?

.6 Has the analysis of the issue sufficiently addressed the cost to the maritime industry as well as the relevant legislative and administrative burdens?[4]

.7 Do the benefits in terms of enhanced maritime safety, maritime security or protection of the marine environment that are expected to be derived from the inclusion of the proposed unplanned output justify such action?

.8 Do adequate industry standards exist or are they being developed, thereby reducing the need for action within IMO?

.9 Has the intended output been properly specified in SMART terms (specific, measurable, achievable, realistic, time-bound)?

.10 Does the completed checklist contained in MSC-MEPC.7/Circ.1 demonstrate that the human element has been sufficiently addressed?

.11 Does the proposal properly demonstrate the urgency of the action proposed, and does it plausibly demonstrate why the unplanned output should be included in the biennial agenda?

.12 Would a decision not to accept the proposal pose an unreasonable risk to the Organization's overall objectives?

Nothing in these guidelines should prohibit the Committees from taking immediate action on urgent matters if the risk of not acting will adversely affect the Organization's ability to meet its objectives.[5]

Acceptance and inclusion of unplanned outputs in the biennial or post-biennial agendas of the Committees

4.15 Based on its assessment in accordance with paragraph 4.14, having taken due account of the chairman's appraisal of the proposal in accordance with paragraphs 4.12 and 4.13, the Committee may decide:

.1 to include the proposed unplanned output, together with a target date for completion, in its biennial agenda, if and after it has been satisfied that the implications for the present workload and planning may be considered acceptable; or

.2 to include the proposed unplanned output, together with the timescale for completion, in its post-biennial agenda, if the implications for the present workload and planning are considered to be unacceptable; or

[4] Refer to the checklist in annex 5, which should be completed by all proponents of unplanned outputs and attached to their proposals for consideration by the Committees. The Committees may also use the checklist in annex 5 before adopting new, or amending existing, mandatory instruments, in order to satisfy themselves that administrative requirements have been minimized to the greatest extent possible.

[5] Refer to the IMO Risk Management Framework (C 110/3/5, annex 1)

.3 on concluding that the proposal is *not* within the scope of the current Strategic Plan and should, therefore, not be accepted for inclusion, to invite the proponent(s) to submit the proposal to the Council together with a substantiated proposal for adjustment of the Strategic Plan.

4.16 Upon a decision by a Committee to include a proposed unplanned output in its post-biennial agenda, the Committee should include the accepted output and the timescale for completion in its proposals for the High-level Action Plan of the next biennium.

4.17 In order to maintain a balance between effective control and the need for flexibility in addressing emerging trends, developments and challenges within the Organization's mandate, any decision to include unplanned outputs in the current High-level Action Plan should be endorsed by the Council (see also paragraph 4.18).

4.18 The Committees should report on their decisions on proposals for inclusion of unplanned outputs in their regular reports to the Council, for its endorsement and in order to facilitate Council monitoring of delivery of the current biennial agendas and the planning of future work.

4.19 In pursuance of resolution A.998(25) on *Need for capacity building for the development and implementation of new, and amendments to existing, instruments*, the Committees should assess the implications for capacity building and technical cooperation and assistance, initiated on acceptance of a proposal for the unplanned output concerning new, or amendments to existing, mandatory instruments, against the criteria for identification of capacity-building implications, set out in annex 2.

Acceptance and inclusion of unplanned outputs in the biennial agenda of subsidiary bodies

4.20 Upon consideration of a proposal for inclusion of an unplanned output in the biennial agenda of a subsidiary body and based on the assessment in accordance with paragraph 4.14, and having taken due account of the chairman's appraisal of the proposal in accordance with paragraphs 4.12 and 4.13, the Committee may decide:

.1 to agree, in principle, with the proposal and its inclusion in the biennial agenda, and to leave the detailed consideration of the technical aspects of the proposal and the development of appropriate requirements and/or recommendations to the subsidiary body or other bodies concerned; or

.2 to agree, in principle, with the proposal, but request the subsidiary body or other bodies concerned to consider the proportionality and feasibility of the proposal on a preliminary basis, and to advise the parent organ as to whether, in its opinion, the unplanned output should or should not be included in the subsidiary body's biennial agenda; or

.3 to agree, in principle, with the proposal, but request the subsidiary body or other bodies concerned to prepare a comprehensive plan of work in accordance with paragraph 4.23, and to advise the Committee on efficient organization of the work to be undertaken.

4.21 A decision by a Committee to include an unplanned output in the biennial agenda of a subsidiary body should include clear and detailed instructions for the work to be undertaken by, and the final output expected from, the subsidiary body or bodies concerned, preferably by establishing the terms of reference under which such work should be undertaken. Such instructions or terms of reference should also specify the output expected at the end of the current biennium.

4.22 In deciding to include an unplanned output in the biennial agenda of more than one subsidiary body, the Committee should:

.1 designate the subsidiary body that is to coordinate the work so as to avoid duplication, maintain consistency in the standards being developed and ensure effective communication between the subsidiary bodies concerned;

.2 ensure that the coordinating subsidiary body can complete the work by the date decided;

.3 ensure that only those subsidiary bodies essential for the completion of the work will be involved, in order to avoid superfluous work and documentation; and

.4 ensure that the work is included in the biennial agendas of all the subsidiary bodies concerned.

4.23 For unplanned outputs involving more than one subsidiary body and for which extensive work is required, such as the revision of conventions or the preparation of codes, the chairman of the coordinating subsidiary body, in consultation with the chairmen of the other subsidiary bodies involved and with the support of the Secretariat, may be invited to prepare a comprehensive and coherent plan of work in order to advise the Committee on efficient organization of the work to be undertaken.

Additional considerations

4.24 The High-level Action Plan may specify certain IMO activities that are dictated by the need to take action on specific areas of maritime safety, maritime security, environmental protection and maritime law, irrespective of any order of priority.

4.25 Submissions to the Committees or subsidiary bodies highlighting problems or shortcomings identified in a particular area(s) of maritime safety, maritime security or protection of the marine environment should, in general and where possible, also suggest appropriate solutions.

4.26 When new constructional requirements have been proposed for new ships, the Committees and subsidiary bodies should, in order to minimize the unavoidable gaps in safety standards between new and existing ships, consider applying the proposed new requirements, or any modifications to them, to existing ships using the *Interim guidelines for the systematic application of the grandfather clauses* (MSC/Circ.765-MEPC/Circ.315).

4.27 Recognizing the human factor as an integral part of any effort to enhance maritime safety, maritime security or protection of the marine environment, the subsidiary bodies should consider the human factor whenever new requirements are developed and existing requirements are reviewed, by taking into account the *Human element principles for the work of the Maritime Safety Committee, the Marine Environment Protection Committee and their subsidiary bodies* (MSC/Circ.763-MEPC/Circ.313), particularly when:

.1 reviewing the adequacy of requirements and recommendations for equipment and operating manuals on board ships, including the simplification and standardization of terminology; in this respect, when developing new or amending existing performance standards, careful consideration should be given to including recommendations on:

.1 user-friendliness;

.2 safety of use of the equipment;

.3 harmonization of essential safety features of the equipment; and

.4 the need for clear, easily understandable and updated operating and technical manuals and drawings;

.2 reviewing the adequacy of requirements and recommendations for operational guidelines on board ships, in particular with respect to their being easily understandable;

.3 continuing the simplification and standardization of symbols and signs used on board ships; and

.4 identifying words and phrases used in IMO instruments such as "adequate", "sufficient", "to the satisfaction of the Administration", etc., and determining the extent to which they can be more specifically defined.

4.28 Planned or unplanned outputs for which extensive work is required, such as the preparation of codes, should, when appropriate, be placed on the provisional agendas of alternate sessions of the bodies concerned to allow adequate time for preparatory work by delegations.

4.29 In respect of subjects requiring research, contributions from other organizations and appropriate entities should be encouraged and taken into account. Exchange of information on technological development should be encouraged.

4.30 In the context of resolution A.911(22) on *Uniform wording for referencing IMO instruments*, subsidiary bodies should be guided in their work, as appropriate, by the guidelines annexed thereto.

4.31 Substantial modifications of draft amendments to mandatory instruments being considered by the Committees with a view to adoption should be accepted for discussion only if they have been submitted in writing. However, in exceptional circumstances where the draft amendments under consideration include significant discrepancies or omissions, or where serious difficulties in their application can be foreseen, the Committees may accept to discuss oral proposals aimed at resolving any problems identified.

Management, control and reporting

4.32 In implementing the High-level Action Plan, proper management and control mechanisms should ensure that:

.1 biennial agendas and agendas are both clearly linked to the Strategic Plan and the High-level Action Plan;

.2 the competing demands of the Strategic Plan and the High-level Action Plan can be prioritized within the resource constraints of the Organization and its membership;

.3 the Organization's response to changes in the environment within which it operates is consistent with the Strategic Plan and the High-level Action Plan; and

.4 monitoring and reporting are such that progress on biennial agendas is explicitly linked to progress on the production of planned outputs.

4.33 In order to provide a transparent link between the Strategic Plan and the Organization's work, the following principles should be applied:

.1 the planned outputs included in the High-level Action Plan should explicitly form the basis of the biennial work of the Committees and their subsidiary bodies, taking into account the budget of the Organization;

.2 the planned outputs contained in the agendas and biennial agendas of the Committees and their subsidiary bodies should all be included in the High-level Action Plan;

.3 the biennial agendas of the Committees and their subsidiary bodies should follow format 1 set out in annex 3;

.4 for outputs with a target completion date beyond the current biennium, the High-level Action Plan should specify the planned interim output at the end of the biennium;

.5 target completion dates in the biennial agenda format in annex 3 (format 1) should specify the year of planned completion within the current biennium, or be specified as "annual" for tasks that are to be completed on an annual basis;

.6 continuous outputs are discouraged but in those cases where they are deemed inevitable, efforts should be made to specify their expected interim outputs at the end of the current biennium; and

.7 documents submitted to Committees and subsidiary bodies should clearly demonstrate the direct relation between the proposals that they contain and the planned output to be accomplished under the relevant agenda item, on the basis of the High-level Action Plan.

4.34 Reports on the status of planned outputs included in the High-level Action Plan should follow the format set out in annex 3, format 1, and should constitute or be annexed to the reports of each session of the sub-committees[1] and the Committees, and the biennial report of the Council to the Assembly. Such reports should separately identify unplanned outputs accepted for inclusion in the biennial agendas.

4.35 In preparing their own report, the Committees and sub-committees should incorporate all reports on the status of planned outputs which they have received since their previous report.

4.36 The Committees should establish and maintain post-biennial agendas which should follow format 2 set out in annex 3. These should be annexed to the reports of each session. For planning purposes, the subsidiary bodies should also maintain a list of the accepted outputs in the Committees' post-biennial agendas for outputs under their purview.

Responsibilities

4.37 The Committees, sub-committees and Secretariat should ensure consistency and discipline in the administrative management of the planning and reporting cycle.

[1] If an associated organ has not been requested to consider a planned output during a session in the biennium, that organ is not required to include the specific output in its biennial agenda for that session.

4.38 The chairmen, vice-chairmen and secretaries of the Committees and sub-committees have a specific responsibility for effective management of the planning and reporting cycle and for consistent and rigorous application of these guidelines and the *Guidelines on the application of the Strategic Plan and the High-level Action Plan of the Organization*.

4.39 In order to fulfil the function in paragraph 4.39, well-established cooperation and coordination is expected between the chairmen, vice-chairmen and secretaries of the Committees and sub-committees by all available means, including face-to-face meetings and teleconferences as deemed necessary.

5 WORKING ARRANGEMENTS

Committees and subsidiary bodies

5.1 The subsidiary bodies should, as necessary, operate under the instructions of both MSC and MEPC and should report on specific outputs directly and separately to the Committee that has sought their expert advice, rather than reporting to both Committees.

5.2 The subsidiary bodies should periodically review their terms of reference to ensure that they accurately reflect the work being carried out.

5.3 The Committees should periodically review the necessity for the continued existence of their subsidiary bodies.

5.4 The subsidiary bodies should not recommend the convening of working groups during sessions of the Committee concerned without prior consultation by the chairman of the subsidiary body concerned with the chairman of the Committee.

5.5 A subsidiary body may request contribution from another body, in which case the latter should be allowed sufficient time to prepare its contribution, taking into account its planned outputs.

5.6 The Committees should not, as a rule, permit any subsidiary body to commence work on the review or improvement of provisions already approved by it, until sufficient experience has been gained from the operation of such existing provisions.

5.7 Sub-committees should focus their efforts on carrying out the entrusted technical work and should not without good reason normally reopen discussions on the need or the compelling need for a planned or unplanned output, whether it is on the agenda or not.

5.8 With the aim of facilitating the technical work to be carried out effectively and efficiently, the proponent(s) of proposals for new outputs should ensure that sufficient and relevant information, in line with the need or compelling need as determined by the Committee, is made available to the subsidiary body when embarking on its technical work.

5.9 Subsidiary bodies should not expand the scope of existing outputs unless directed or authorized to do so by a Committee. Subsidiary bodies should not develop amendments to, or interpretations of, any relevant IMO instrument without authorization from a Committee. However, in compliance with paragraph 4.9, when seeking a Committee's authorization to act as provided in the previous two sentences (or when spontaneously proposing an unplanned output for the current biennium or a new output to be accepted for inclusion in a Committee's post-biennial agenda), subsidiary bodies should ensure that their request complies with the provisions of paragraphs 4.6, 4.7 and 4.14, as appropriate. As subsidiary bodies may not have sufficient time to develop the required information, given that their biennial agendas are

usually only discussed at the end of their sessions, interested delegations should, in consultation with the subsidiary-body chairman and the Secretariat, prepare the information which should accompany the proposal necessary for the Committee to decide whether an unplanned output should be included in the subsidiary body's biennial agenda or in a Committee's post-biennial agenda.

5.10 Subsidiary bodies should not, as a rule, issue circulars, which are supposed to be issued only after approval by the Committees. However, in exceptional cases, subsidiary bodies may issue circulars within their area of competence subject to endorsement of their action by the Committee or Committees concerned at their first subsequent session.

5.11 Subsidiary bodies should avoid developing unified interpretations of guidelines. In cases where the existing text of the guidelines is vague and therefore needs modification, the subsidiary body concerned should amend the guidelines accordingly in lieu of developing a unified interpretation.

5.12 When considering their planned outputs and/or their provisional agendas for the following session, subsidiary bodies should seek the advice of the Committees in the case of planned outputs for which no submissions have been received for two consecutive sessions.

Guidance on the selection of outputs for the provisional agenda

5.13 Subsidiary bodies should select outputs for their provisional agenda in a manner that would ensure that proper consideration is given to important and urgent issues, taking into account:

.1 the number of working days of each session; and

.2 the number of working groups and drafting groups that the subsidiary body intends to establish.

5.14 Planned and unplanned outputs should be selected first from the biennial agenda and, where the subsequent session will occur in the coming biennium, from the accepted outputs included in the Committee's post-biennial agenda.

5.15 The total number of selected outputs and the workload of the subsidiary bodies' provisional agendas should be kept at an appropriate, manageable level, ensuring high quality output. Outputs selected from the Committees' post-biennial agendas should be included in the subsidiary bodies' agendas only when outputs from the relevant biennial agenda are completed and the capacity of the subsidiary body allows the inclusion of additional outputs.

5.16 The remaining outputs not selected will be kept in abeyance and will be transferred to the provisional agenda of the subsidiary bodies as and when selected by them and endorsed by the Committee concerned, having regard to the overall workload of the subsidiary bodies responsible for the work in hand.

Working, drafting, correspondence, intersessional working and other groups

Working groups

5.17 The Committees and their subsidiary bodies should keep the number of working groups formed during their sessions to a minimum; however, a maximum of three working groups may be established, where necessary, bearing in mind the difficulties that small delegations experience in being represented in such groups and the fact that such groups

work without interpretation. When a working group has completed its task and has been terminated, no other working group should be convened in its place during the same session. To such an end, subsidiary bodies should endeavour to consider, as appropriate, items on their agenda in plenary, rather than establishing groups to deal with them.

5.18 Where more than three working groups are needed to deal with different subjects in one session, the Committee and subsidiary body should establish an order of priority for possible subject items and decide accordingly. Where more than three unrelated topics need to be covered by independent working groups over several sessions, arrangements may be made for groups concerned to meet at alternate sessions of the Committee and subsidiary body concerned within the maximum of three working groups per session.

5.19 Working groups may start work on the first morning of the session under draft terms of reference presented by the chairman of the Committee or sub-committee concerned, pending formal discussion of those terms of reference under the relevant agenda item. However, these measures should be an option and be decided at the meeting with caution. Whenever possible, terms of reference for working groups should be agreed at the previous sessions of the parent Committee or sub-committee. Another option is for the draft terms of reference of working and drafting groups issued at the beginning of the session, in accordance with paragraph 5.36 of these guidelines, to identify items on which the groups may start working on the first morning of the session, without prior consideration of the related agenda items in plenary.

5.20 In principle, a working group should not have splinter groups. However, where it is necessary to establish one or more splinter groups to facilitate its efficiency, the working group should do so by unanimous agreement, and should consider and agree on the outcome of the splinter group's work before incorporating it in its report. Splinter groups, if established, should meet outside normal working hours, unless the working group decides otherwise in view of the efficiency of the work.

5.21 Subsidiary body working groups, if circumstances and time constraints so dictate, may submit their reports directly to the Committees, if authorized by the parent sub-committee, following consultation among the chairman of the group, the chairman of the parent sub-committee and the chairmen of the Committees concerned.

5.22 When appropriate, working groups should make full use of the five working days of a session in submitting their reports for the next session of their parent body. When working group reports are to be prepared during a session, all efforts should be made to keep them as short as possible.

5.23 Permanent working groups should be avoided but, if there is ever a need for such a group, clear justification and appropriate terms of reference should be provided by the subsidiary body concerned.

Drafting groups

5.24 In addition to working groups, the Committees and their subsidiary bodies may form drafting groups. In no case should more than five groups (e.g. three working and two drafting groups) meet simultaneously during a session. If additional drafting groups are needed, they should meet outside normal working hours.

Other groups

5.25 In addition to working and drafting groups, the Committees and their subsidiary bodies may form other groups, such as technical or review groups as required under the relevant conventions. Depending on the necessity and urgency of the issue to be considered, such groups may meet in addition to or in lieu of working or drafting groups.

Correspondence groups

5.26 To facilitate the consideration of an issue, correspondence groups may be established by a Committee or its subsidiary bodies and instructed to work on a consolidated draft text prepared by a "lead country" or the Secretariat, provided that the Committee has agreed to consider the issue and has endorsed terms of reference for the group (see also paragraph 5.36). Thus, through consultation between interested delegations by correspondence, the volume of documents submitted and processed can be reduced.

5.27 Correspondence groups should utilize modern communications technology, such as the Internet, as much as possible.

5.28 The work of a correspondence group (e.g. the receipt and processing of comments and suggestions) should not pre-empt formal consideration of the relevant issue by the parent body concerned or the positions taken by Member Governments or international organizations participating in the correspondence group.

5.29 In normal circumstances, the Committees and subsidiary bodies should not establish more than three correspondence groups, although this number may be increased where the urgency of the matter under consideration so justifies. Subgroups within a correspondence group should not be established. No official meetings of members of correspondence groups should be held without the prior approval of the Committee(s).

5.30 Participation in correspondence groups is open to all delegations (Governments and organizations) that can provide the necessary expertise on a timely basis or that have a particular interest in the issue under consideration. Any Member Government or international organization can join in the work of the correspondence group once the group is established and the group should accept contributions at any stage of its work.

5.31 When establishing a correspondence group, a "lead country", "lead organization" or the Secretariat should be designated to coordinate the group's work. Responsibilities of group coordinators should include:

.1 preparation, maintenance and circulation of the list of participants;

.2 establishment of deadlines for the preparation of draft texts and receipt of comments and proposals concerning them;

.3 preparation and circulation of draft texts and comments concerning them;

.4 preparation and submission to the Secretariat of the report of the correspondence group including any consolidated draft texts (see paragraph 5.35); and

.5 introduction of the above-mentioned report and consolidated draft texts to the appropriate Committee or subsidiary body.

5.32 Responsibilities of participants should include:

.1 active participation in the work of the group;

.2 compliance with the deadlines established for the submission of comments on draft texts, proposals, etc.; and

.3 relaying to other group members copies of comments, proposals, etc. submitted to the group coordinator.

5.33 The responsibilities of the Secretariat, in cases where the Secretariat acts as a group coordinator, should be the same as those described in paragraph 5.31 above. The Secretariat may also be requested to circulate consolidated draft texts, etc. on behalf of the group coordinator.

5.34 The results of work carried out by correspondence groups should normally take the form of a consolidated draft text reflecting the information received from members of the group. Such texts should be accompanied by a succinct report summarizing the work and indicating which members have provided input to the process. Where it has not been possible to prepare an agreed consolidated draft document, the texts or issues on which there was disagreement should be clearly indicated in the draft document or the report, as appropriate.

5.35 Correspondence groups' reports should be submitted to the first session of the parent body that meets after the conclusion of the groups' work, in time to meet the deadline established for consideration of substantive documents, in accordance with the provisions of paragraph 6.12. Normally the work of the correspondence groups should not overlap with sessions of the parent Committee or subsidiary body. If the group has not finalized its work in time to meet such a deadline, a progress report should be made to the parent body.

Terms of reference of working, drafting and correspondence groups

5.36 When working, drafting and correspondence groups are to be formed, draft terms of reference should be prepared, following consultations between the chairman of the relevant Committee or subsidiary body and the Secretariat, for approval by plenary. In the case of working and drafting groups, these draft terms of reference should be issued by the Secretariat at the beginning of the session for agreement by plenary before the groups in question start their work. Thereafter, the agreed terms of reference should not be modified or extended without the parent body's prior consent.

Intersessional working groups

5.37 Subject to approval by the Council, intersessional meetings of working groups may be convened without interpretation services. Intersessional meetings should be held only if considered to be absolutely essential and after careful consideration of their necessity by the relevant Committee on a case-by-case basis, taking into account the priority and urgency of the specific matter that such meetings will be invited to address. Intersessional meetings of such groups should be held at IMO Headquarters immediately before or after an agreed session of the parent body concerned. Other arrangements may be considered; however, no arrangements should be made in respect of an intersessional meeting until such a meeting has been approved by the Committee. Intersessional working groups and technical groups should not be held at the same time as Committee or sub-committee sessions.

6 PROCEDURES FOR PREPARATION AND SUBMISSION OF DOCUMENTS

Preparation of documents

6.1 Documents should be prepared in single spacing and be as concise as possible so as to facilitate their timely processing. In order to enhance the clear understanding of documents, the following should be observed:

.1 All documents should be preceded by a brief summary prepared in the form, and containing the information, indicated in the table below. Documents – especially proposals for the inclusion of an unplanned output – should demonstrate, where feasible, the linkages to the Strategic and High-level Action Plans by including, in the summary, references to the related strategic direction(s), high-level action(s) and planned output(s):

SUMMARY	
Executive summary:	This description should be brief, outlining the proposed objective (an amendment, an Assembly resolution, a circular, information only, etc.), and include information on whether a proposal will have any financial implications for the shipping industry or for the IMO budget.
Strategic direction:	A reference should be made to one or more relevant strategic directions in the Organization's Strategic Plan.
High-level action:	A reference should be made to one or more corresponding high-level actions in the Organization's High-level Action Plan.
Planned output:	A reference should be made to one or more corresponding planned outputs in the biennial's High-level Action Plan. If there is no corresponding planned output, an appropriate descriptive text should be included.
Action to be taken:	A reference should be made to the paragraph of the document that states the action to be taken by the Committee, sub-committee, etc.
Related documents:	Other key documents should be listed to the extent that they are known to the originator of the document.

.2 Substantive documents should conclude with a summary of the action the relevant body is invited to take; and

.3 Information documents should conclude with a summary of the information that they contain.

6.2 To facilitate their processing, documents should be submitted on a USB flash drive or via email to info@imo.org, preferably in Microsoft Word using Arial font size 11. Hard copies of documents may also be submitted or requested, to facilitate processing of the document, e.g. by attachment of annexes to main texts, and to check that none of the text has been garbled during sending or conversion.

6.3 Documents made available at IMO 13 weeks or more before a session should not be introduced in the plenary unless the chairman decides that this is essential for the proper consideration of the matter concerned. Information documents and documents requiring no action by the Committees or their subsidiary bodies, other than for their contents to be noted, should not be introduced in the plenary.

6.4 Proposed amendments to IMO instruments related to maritime safety, maritime security and protection of the marine environment which have been approved for adoption by the MSC or the MEPC will no longer be printed on pink paper, but it will be appropriate identified in the IMODOCS system.

6.5 Documents containing proposed amendments to mandatory instruments should be presented in a format that permits clear identification of the changes being introduced (e.g. use of underlined and strike-through text).

6.6 Reports of the Committees and their subsidiary bodies should, in general, contain under each section only:

.1 a summary of key documents and a list of other documents submitted by Governments, international organizations and the Secretariat;

.2 a summary of the views expressed during consideration of an item that may have influenced the decision taken by the reporting body (but not allowing the reports to turn into summary records), with statements by delegations included only at their express request during the session; and

.3 a record of the decisions taken.

6.7 In drafting recommendations, codes or guidelines, cross references should, whenever possible, be made to texts and terminology previously developed by IMO or other organizations. This will avoid unnecessary duplication and reduce the need for excessively detailed provisions and for subsequent harmonization.

6.8 The chairmen of subsidiary bodies should not introduce their reports to the Committees as these should be taken as read.

6.9 With respect to urgent matters emanating from sessions of subsidiary bodies or IMO bodies other than the Council and the Assembly, which have taken place less than 13 weeks before a session of a Committee, the Committee should consider only such urgent matters as may be specified by it at a prior session. As a general rule, the Committee would not consider reports or matters emanating from any subsidiary body session that had taken place less than nine weeks prior to the Committee's session. In exceptional cases, a subsidiary body may invite the Committee to take action on a matter that the subsidiary body considers to be urgent and important emanating from a session that took place less than nine weeks prior to the Committee's session. In such cases, the subsidiary body chairman should consult the Committee chairman for approval of the contemplated action.

6.10 All concerned should be continuously aware of the financial and environmental impact of the volume of documentation generated by IMO meetings and should limit, to the greatest possible extent, the number of pages of documents submitted to such meetings. For information, the current arrangements for the production of working papers during meetings are described in annex 5.

6.11 To encourage the action referred to in paragraph 6.10 above, documents other than information documents and reports from the Committees and sub-committees, working, drafting, correspondence and other reporting groups and the Secretariat, and which contain more than 20 pages, should not be translated in their entirety. They should include, for translation purposes, a summary of the document not longer than four pages, with the remaining content submitted as an annex in the language (e.g. English) that may be needed, for example, by working groups.

Submission of documents

6.12 To ensure that all documents are available at IMO Headquarters in all three working languages well in time for a session of a Committee or subsidiary body, and thus to enable the timely study of documents and promote participation by all members in the decision-making process of the Committees and their subsidiary bodies, the following provisions should apply:

.1 as a general rule, documents other than information documents and reports from the Committees and sub-committees, working, drafting, correspondence and other reporting groups and the Secretariat should not contain more than 50 pages. In the case of reports from working, drafting, correspondence or other reporting groups and in other exceptional circumstances, this number of pages may be exceeded, provided that the deadline for receipt of the document by the Secretariat, as specified in subparagraphs .2 and .3 below, is extended by one week for every 20 pages exceeding 50 pages;

.2 documents containing proposals for inclusion of unplanned outputs should be received by the Secretariat not later than 13 weeks before the opening of the relevant Committee session. They should be made available at IMO Headquarters and on the IMO document website in the Organization's three working languages, not later than five weeks before the opening of the session;

.3 documents (including information documents) containing more than six pages of text (bulky documents) should be received by the Secretariat not later than 13 weeks before the opening of the relevant session of a Committee or subsidiary body. However, bulky information documents submitted in electronic format may be accepted by the Secretariat if they are received not later than nine weeks before the session concerned. They should be made available at IMO Headquarters and on the IMO document website in the Organization's three working languages, except for information documents (which should not be translated), not later than five weeks before the opening of the session;

.4 non-bulky documents commenting on those referred to in subparagraphs .2 and .3 above, or on items already on the agenda, should be received by the Secretariat not later than nine weeks before the opening of the relevant session of a Committee or subsidiary body. They should be made available at IMO Headquarters and on the IMO document website in the Organization's three working languages, not later than five weeks before the opening of the session;

.5 notwithstanding the provisions of subparagraph .4 above, documents commenting on those referred to in subparagraphs .2, .3 and .4 above containing four pages or fewer should be processed if received by the

Secretariat not later than seven weeks before the opening of the relevant session of a Committee or subsidiary body. These documents should start with a paragraph clearly indicating the document on which comments are made and stating that the document is submitted in accordance with the provisions of paragraph 6.12.5 of these guidelines. They should be made available at IMO Headquarters and on the IMO document website in the Organization's three working languages, not later than four weeks before the opening of the session;

.6 non-bulky information documents should be received by the Secretariat not later than nine weeks before the opening of the relevant session of a Committee or subsidiary body. They should not be translated and should be made available at IMO Headquarters and on the IMO document website not later than five weeks before the opening of the session. No action will be taken on the basis of an information document only, other than to take note of it;

.7 in addition and with reference to reports of subsidiary bodies on the basis of which a Committee is normally invited to take action, every possible effort should be made to ensure that such reports are made available at IMO Headquarters and on the IMO document website in the Organization's three working languages, not later than five weeks before the opening of the session; and

.8 in the case of basic documents submitted to a Committee reporting on urgent matters emanating from sessions of subsidiary bodies referred to in paragraph 6.9 which met less than 13 weeks before the Committee's session, such basic documents should include as an annex the text (e.g. draft Assembly resolutions, draft MSC circulars, etc.) on which the Committee will be invited to take action.

6.13 The Secretariat should make every effort to ensure the timely posting of documents on the IMO document website. Member Governments and international organizations should also endeavour to submit documents as early as possible and not simply by the relevant deadlines.

6.14 The Secretariat should strictly apply the above provisions concerning the submission of documents and not accept late submissions from Governments or delegations. Any exemption from these provisions should have the prior authorization of the chairman of the Committee concerned, following consultations with the Secretariat. In exceptional circumstances, requiring immediate action by the Committee, a relevant document to that end consisting of no more than four pages should be received by the Secretariat not later than nine weeks before the opening of the session of the body concerned and be made available at IMO Headquarters in the Organization's three working languages, not later than five weeks before the opening of the session. The Committee will consider such a document, if it so decides, at the opening of its session.

6.15 In the exceptional cases referred to in paragraph 6.9, when a subsidiary body invites a Committee to take action on urgent matters emanating from a session that took place less than nine weeks prior to the Committee's session, documents commenting on those urgent matters containing four pages or fewer should be processed if received by the Secretariat not later than seven weeks before the opening of any session of the Committee concerned. Such documents should start with a paragraph clearly indicating the document on which comments are made and stating that the document is submitted in accordance with the provisions of paragraph 6.15 of these guidelines. They should be made available at IMO Headquarters in the three working languages, not later than four weeks before the opening of the session.

7 OBSERVANCE OF THE GUIDELINES

These guidelines should be observed strictly. Such observance will assist delegations in preparing adequately for each meeting and enhance their participation in the debate and decision-making process during meetings. It will also relieve delegations from experiencing difficulties when developing national positions on subjects on the agenda of the two Committees or their subsidiary bodies. In order to promote efficiency in the conduct of work overall, Committee members should ensure that their colleagues attending sessions of other committees are fully informed of the outcome of the meeting that they have attended. Committee members should also ensure that their experts attending meetings of subsidiary bodies, working groups, drafting groups or correspondence groups are adequately informed and instructed about any action necessary to give effect to decisions made by the Committees.

ANNEX 1

INFORMATION TO BE CONTAINED IN PROPOSALS FOR UNPLANNED OUTPUTS

To enable the Committees to carry out a proper assessment of proposals for inclusion of unplanned outputs, submissions containing such proposals should contain, at the minimum, the following information, including demonstration and documentation:

.1 **IMO objectives**: Provide evidence as to whether and how the proposal:

.1 is within the scope of IMO objectives; and

.2 is strictly related to the scope of the Strategic Plan and contributes to the implementation of the high-level actions established in the Strategic Plan.

.2 **(Compelling) need**: Demonstrate and document:

.1 the need for a proposed measure; and

.2 the compelling need addressed by a proposal for a new convention or an amendment to an existing convention.

.3 **Analysis of the issue**: Provide an analysis of the proposed measure, including a plausible demonstration of its practicability, feasibility and proportionality.

.4 **Analysis of implications**: Provide an analysis of the implications of the proposal, addressing the cost to the maritime industry as well as the relevant legislative and administrative burdens.[6]

.5 **Benefits**: Provide evidence that the benefits in terms of enhanced maritime safety, maritime security or protection of the marine environment expected to be derived from the inclusion of the new item justify the proposed action.

.6 **Industry standards**: Provide information on whether adequate industry standards exist or are being developed.

.7 **Output**: Specify the intended output in SMART terms (specific, measurable, achievable, realistic, time-bound). If a final output cannot be specified in the submission for a proposal for inclusion of

[6] See annex 5 – Checklist for identifying administrative requirements and burdens, which should be completed by all proponents of unplanned outputs and attached to their proposals for consideration by the Council and committees. Committees may also use this checklist before adopting new, or amending existing, mandatory instruments, in order to satisfy themselves that administrative requirements have been minimized to the greatest extent possible.

an unplanned output, an interim output to be produced before the end of the current biennium should be specified in SMART terms.

.8 **Human element**: Provide the completed checklist contained in MSC-MEPC.7/Circ.1 to demonstrate that the human element has been sufficiently addressed.

.9 **Priority/urgency**: Provide, with reference to the current Strategic Plan and High-level Action Plan, evidence on:

.1 the urgency of the proposed unplanned output;

.2 the date by which the proposed unplanned output should be completed;

.3 the timescale needed for the IMO organ to complete the work.

.10 **Action required**: Specify the action required of the IMO organ.

ANNEX 2

PROCEDURES FOR ASSESSING THE IMPLICATIONS OF CAPACITY-BUILDING REQUIREMENTS WHEN DEVELOPING NEW, OR AMENDING EXISTING, MANDATORY INSTRUMENTS

1 INTRODUCTION

1.1 Assembly resolution A.998(25) cautions that, unless the Council, the Committees and their subsidiary bodies adopt a *cradle to grave* approach in relation to matters concerning capacity building, technical cooperation and assistance, the chances of success in the ratification and effective implementation of IMO instruments may be reduced by the level of unpreparedness or lack of capacity that Governments, particularly of Small Island Developing States (SIDS) and Least Developed Countries (LDCs), experience at the point when implementation of such instruments is urgently required. Therefore, the development of this procedure is in keeping with the provisions of that resolution.

1.2 The assessment of capacity-building implications for the implementation of new, and/or amendment to existing, instruments is an iterative process that begins with the acceptance of the preliminary proposal and runs in parallel up to the process of its implementation.

1.3 The procedure does not prevent States from taking additional actions in promoting the advancement of the objectives of capacity building through technical assistance or cooperation.

2 DEFINITIONS

For the purposes of this procedure, the following definitions apply:

2.1 *Planned output* is as defined in paragraph 2.3 of these guidelines.

2.2 *Unplanned output* is as defined in paragraph 2.4 of these guidelines.

2.3 *Capacity building* means sustainable social, economical or legal measures undertaken through various means for the purposes of a comprehensive transformation of the performance of an Administration or industry player so as to implement and therefore comply with new or amended instruments.

2.4 *Technical assistance* is a methodology for providing capacity-building through bilateral and/or multilateral exchange of technical knowledge, resources or expertise to a party which has requested such assistance in order to enhance its technical capability to implement existing, new or amended instruments.

2.5 *Technical cooperation* refers to a methodology for providing capacity building, through a multilateral effort, to a group of cooperating countries of a particular region in the form of training and exchange of expertise, knowledge and information, in support of their efforts aimed at promoting the implementation of existing, new and/or amended instruments.

2.6 *Instruments* refers to IMO conventions and other treaties.

3 PURPOSE AND OBJECTIVES

3.1 The purpose of this procedure is to give effect to resolution A.998(25) aimed at enhancing efforts to promote universal implementation of IMO instruments.

3.2 This procedure is intended to assist the identification and assessment of capacity-building implications in the following cases:

.1 when a Committee has accepted a proposal for an unplanned output and/or on approval by a Committee of a new instrument;

.2 during implementation of new instruments or amended instruments; and

.3 during the scheduling of capacity-building measures or activities.

3.3 This procedure applies to the Committees of the Organization and constitutes a specific implementation response to resolution A.998(25).

3.4 This procedure aims at:

.1 promoting universal ratification and compliance with newly adopted IMO instruments;

.2 improving the level and quality of implementation of new and/or amended instruments; and

.3 promoting as far as possible a balanced level of implementation of new instruments.

4 PROCEDURE

4.1 The Committees should conduct an assessment of capacity-building implications by following the procedure in the flow chart in appendix 1.

4.2 Assessments of capacity-building implications should be initiated on the acceptance of a proposal for an unplanned output.

Preliminary assessment of capacity-building implications

4.3 In order to facilitate the assessment of capacity-building implications by a Committee, its vice-chairman should, in consultation with the chairman and assisted by the Secretariat, undertake a preliminary assessment of capacity-building implications, using the checklist for assessing the need for capacity building, contained in appendix 2.

4.4 The outcome of the preliminary assessment should be submitted to the Committee concerned for consideration. This should contain the vice-chairman's appraisal of whether there are or will be capacity-building implications or need for technical assistance; a list of possible implications; and his/her recommendations on the way forward.

Assessment of capacity-building implications

4.5 Following the preliminary assessment, the Committee should, if necessary, decide to convene the Ad hoc Capacity-building Needs Analysis Group (ACAG) to be chaired by the Vice-Chairman of that Committee. The ACAG should consider the preliminary assessment, taking into account comments and any further submissions thereto and, if appropriate, conduct further assessment and present its report and recommendations to the Committee.

4.6 The ACAG may refer a matter through the Committee for further consideration by another organ.

Post-assessment of capacity-building implications for implementation of new measures

4.7 When new measures have been approved, the Committee may request the ACAG to conduct a post-assessment exercise using the criteria and mechanism contained in appendix 3 to identify issues that require special focus when implementing technical cooperation and assistance activities.

4.8 Prepare a draft circular describing the possible capacity-building implications and recommendations of a course of action, for consideration by the Organization, the membership and/or industry.

5 TERMS OF REFERENCE OF THE ACAG

In conducting its assessment of capacity building, the ACAG should be guided by the following terms of reference:

.1 consider a preliminary assessment of capacity building and technical assistance actions;

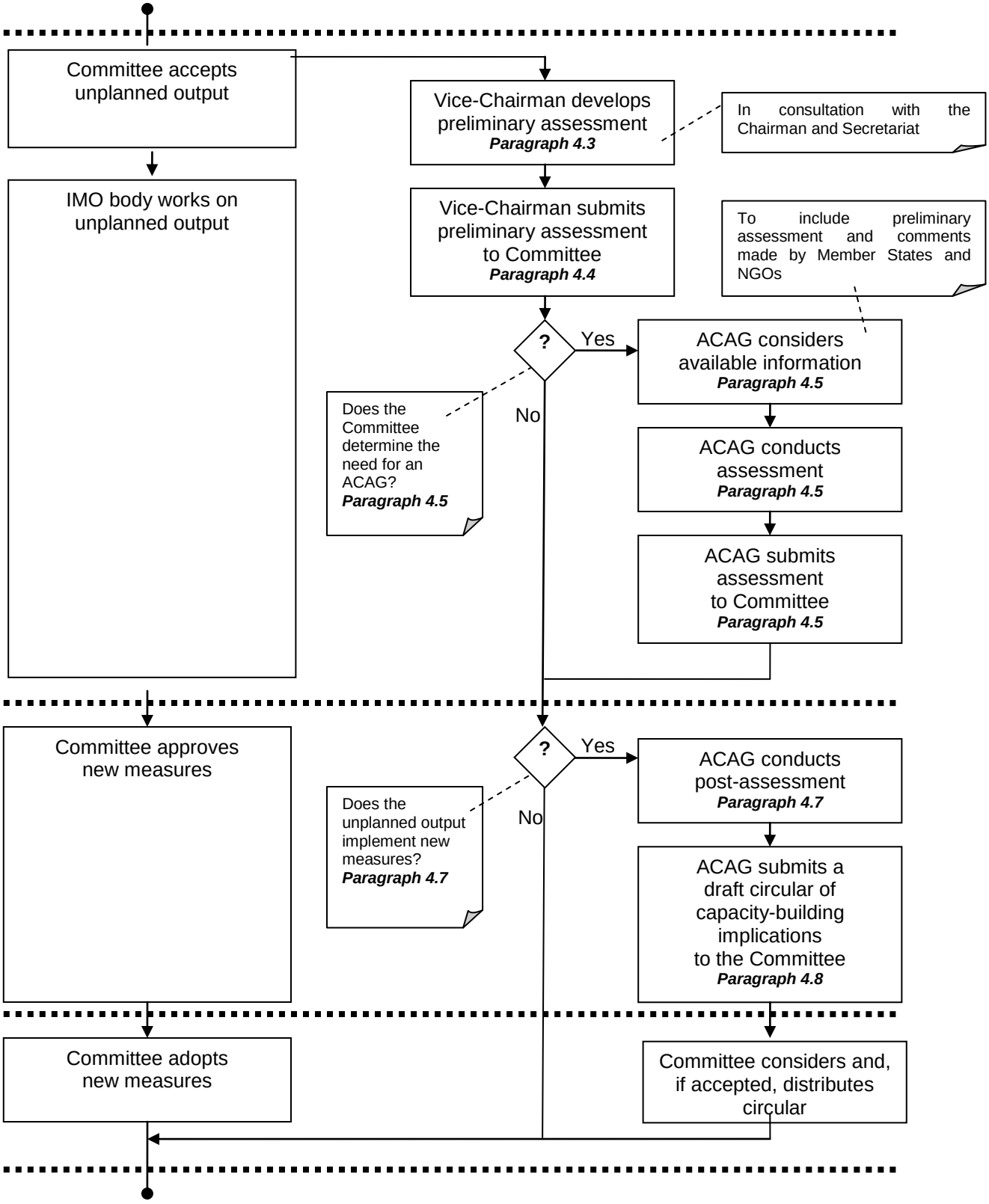
.2 conduct an assessment and, when new measures have been approved, a post-assessment, of the capacity-building actions that may be included in the technical assistance or technical cooperation required by Administrations for the implementation of the instrument;

.3 in consultation with the industry and non-governmental organizations, conduct an assessment and, on implementing new measures, a post-assessment, of the capacity-building actions that may be required or expected of the shipping industry for the implementation of the instrument; and

.4 advise the Committee concerned of the implications for capacity building relating to a new instrument or a proposed amendment to an existing instrument, whichever is being considered.

Appendix 1

IDENTIFICATION OF CAPACITY-BUILDING IMPLICATIONS FLOW CHART



Appendix 2

CHECKLIST FOR THE IDENTIFICATION OF CAPACITY-BUILDING IMPLICATIONS

1 For Administrations

- ☐ Is new legislation required?
- ☐ Is there a requirement for new equipment and or systems?
    - o Does equipment manufacturing capacity exist internationally?
    - o Do equipment repair/servicing facilities exist internationally?
    - o Is there capacity to develop new systems?
- ☐ Will the implementation require additional financial resources?
- ☐ Is there a need for additional human resources or new skills?
- ☐ Will there be a need to upgrade current infrastructure?
- ☐ Is there enough lead time towards implementation?
- ☐ Will a rapid implementation procedure be adopted?
- ☐ Is there a substantial modification of existing standards?
- ☐ Will a guide to implementation be needed?

2 For the industry

- ☐ Would the industry require new and/or enhancement of existing systems?
    - o Does capacity exist internationally to develop new systems?
- ☐ Is there a need for additional training of seafarers?
    - o Do related and validated training courses exist?
    - o Are sufficient simulation training courses available internationally?
- ☐ Will there be a requirement for new equipment?
    - o Does manufacturing capacity exist internationally?
- ☐ Is there repair/servicing and/or retrofitting and does maintenance capacity exist internationally?

Appendix 3

CHECKLIST OF ISSUES REQUIRING SPECIAL FOCUS WHEN DEVELOPING CAPACITY BUILDING RELATED TO THE IMPLEMENTATION OF NEW MEASURES

Capacity-building Measures Form

Instrument _____

Measure number _____ **of** _____

Required for
- ☐ **Administration**
- ☐☐ **Industry**

Implementation
- ☐☐ **Prior to adoption**
- ☐☐ **Once adopted**
- ☐☐ **Prior to entry into force**
- ☐☐ **Once ratified**
- ☐☐ **Phased in**

Description of capacity-building activity needed for the implementation of new measures:

_____

_____

_____

ANNEX 3

FORMAT 1: BIENNIAL STATUS REPORT

[Name of organ]								
Planned output number[a]	**Description**	**Target completion year[b]**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1[c]**	**Status of output for Year 2[c]**	**References[d]**
Notes:								
Notes:								

Notes:

a When individual outputs contain multiple deliverables, the format should report on each individual deliverable.

b The target completion year should be specified as a year, or indicate that the item is annual or continuous. This should not indicate a number of sessions.

c The entries under the "Status of output" columns are to be classified as follows:
- "completed" signifies that the outputs in question have been duly finalized;
- "in progress" signifies that work on the related outputs has been progressed, often with interim outputs (for example, draft amendments or guidelines) which are expected to be approved later in the same biennium;
- "ongoing" signifies that the outputs relate to work of the respective IMO organs that is a permanent or continuous task; and
- "postponed" signifies that the IMO organ has decided to defer the production of relevant outputs to another time (for example, until corresponding submissions have been received).

d If the output consists of the adoption/approval of an instrument (e.g. resolution, circular, etc.), that instrument should be clearly referenced in this column.

FORMAT 2: POST-BIENNIAL AGENDAS OF COMMITTEES

[NAME OF COMMITTEE]								
ACCEPTED POST-BIENNIAL OUTPUTS				Parent organ(s)	Coordinating organ(s)	Associated organ(s)	Timescale	Reference
Number	Biennium[e]	Reference to High-level Actions	Description					

Notes:
e Biennium when the output was placed on the post-biennial agenda

ANNEX 4

CURRENT ARRANGEMENTS IN THE SECRETARIAT FOR THE PRODUCTION OF WORKING PAPERS DURING MEETINGS

1 The details of how to handle the preparation of working papers produced during meetings, which are agreed at the coordination meeting held between the Conference Division (CD) and the relevant technical division(s) during the week preceding each meeting, will be conveyed by the Secretary of the IMO body to the chairman of that body, as well as the chairmen of the working and drafting groups.

2 To ensure that all working papers, including the draft report, are available in all three working languages, all these documents should be as concise as possible, with a limited number of pages containing new text. The following provisions should apply:

.1 Advance text

Whenever possible, for working/drafting group reports, advance text should be provided to the translation sections. This could be whole annexes or documents prior to the meeting, or parts thereof submitted as the work of the groups progresses.

.2 Final text

Final text should be delivered to the translation sections as early as possible in the course of the meeting week as follows:

.1 Working papers – these should be delivered not later than 9 a.m. on the day of the report night, so that they may be processed during the day shift.

.2 Draft report – the night shift is to be dedicated to the processing of the draft report and will end at 1 a.m. on the following day. In order to meet the established deadline, items for the draft report not delivered throughout the week should be sent to the translation sections as early as possible on the report night, with the last remaining item to be delivered not later than 11 p.m.

ANNEX 5

CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS AND BURDENS

The Checklist for Identifying Administrative Requirements and Burdens should be used when preparing the analysis of implications required in submissions of proposals for inclusion of unplanned outputs. For the purpose of this analysis, the terms "administrative requirements" and "burdens" are as defined in resolution A.1043(27), i.e. administrative requirements are an obligation arising from future IMO mandatory instruments to provide or retain information or data, and administrative burdens are those administrative requirements that are or have become unnecessary, disproportionate or even obsolete.

Instructions:

(A) If the answer to any of the questions below is **YES**, the Member State proposing an unplanned output should provide supporting details on whether the burdens are likely to involve start-up and/or ongoing cost. The Member State should also give a brief description of the requirement and, if possible, provide recommendations for further work (e.g. would it be possible to combine the activity with an existing requirement?).

(B) If the proposal for the unplanned output does not contain such an activity, answer **NR** (Not required).

1. Notification and reporting? Reporting certain events before or after the event has taken place, e.g. notification of voyage, statistical reporting for IMO Members, etc.	NR	Yes □ Start-up □ Ongoing
Description: (if the answer is yes)		
2. Record keeping? Keeping statutory documents up to date, e.g. records of accidents, records of cargo, records of inspections, records of education, etc.	NR	Yes □ Start-up □ Ongoing
Description: (if the answer is yes)		
3. Publication and documentation? Producing documents for third parties, e.g. warning signs, registration displays, publication of results of testing, etc.	NR	Yes □ Start-up □ Ongoing
Description: (if the answer is yes)		
4. Permits or applications? Applying for and maintaining permission to operate, e.g. certificates, classification society costs, etc.	NR	Yes □ Start-up □ Ongoing
Description: (if the answer is yes)		
5. Other identified burdens?	NR	Yes □ Start-up □ Ongoing
Description: (if the answer is yes)		

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ANNEX 27

BIENNIAL STATUS REPORTS OF THE SUB-COMMITTEES

SUB-COMMITTEE ON CARRIAGE OF CARGOES AND CONTAINERS (CCC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1.1.2.3	Unified interpretation of provisions of IMO safety, security, and environment related Conventions	Continuous	MSC MEPC		III/PPR/CCC/ SDC/SSE/ NCSR			MSC 78/26, paragraph 22.12
5.2.1.2	Development of international code of safety for ships using gases or other low flashpoint fuels (IGF Code)	2014	MSC	CCC	HTW			MSC 78/26, paragraph 24.11; BLG 17/18, section 8
5.2.3.1	Amendments to CSC 1972 and associated circulars	2014	MSC	CCC				DSC 18/13, section 4
5.2.3.3	Amendments to the IMSBC Code and supplements	Continuous	MSC MEPC		CCC			MSC 93/22, paragraph 9.12
5.2.3.4	Amendments to the IMDG Code and supplements	Continuous	MSC		CCC			MSC 93/22, paragraph 3.82
5.2.3.5	Revised guidelines for packing of cargo transport units	2015	MSC		CCC			MSC 93/22, paragraph 9.19

SUB-COMMITTEE ON CARRIAGE OF CARGOES AND CONTAINERS (CCC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	Annual	MSC MEPC	III	HTW / PPR / CCC / SDC / SSE / NCSR			MSC 92/26, paragraph 22.29
12.3.1.1	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Annual	MSC MEPC	CCC	III			DSC 18/13, section 10

SUB-COMMITTEE ON HUMAN ELEMENT, TRAINING AND WATCHKEEPING (HTW)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.20	Follow-up action to the STCW-F Conference resolutions 6 and 7	2015	MSC	HTW		In progress		HTW 1/21, section 6
5.2.2.1	Guidance for the implementation of the 2010 Manila Amendments	2017	MSC	HTW		In progress		MSC 93/22, paragraph 11.4
5.2.2.2	Review of STCW passenger ship-specific safety training	2015	MSC	HTW		In progress		HTW 1/21, section 13
5.2.2.3	Validated model training courses	Continuous	MSC	HTW		Ongoing		HTW 1/21, section 3
5.2.2.4	Reports on unlawful practices associated with certificates of competency	Annual	MSC	HTW		In progress		HTW 1/21, section 4
5.2.2.6	Revised guidelines for model course development, updating and validation processes	2015	MSC	HTW		In progress		HTW 1/21, section 10
5.2.2.7	Training in hot-work procedures on crude oil tankers	2015	MSC	HTW	SSE	In progress		HTW 1/21, section 8
5.2.2.9	Guidelines for shipowners and seafarers for implementation of relevant IMO instruments in relation to the carriage of dangerous goods in packaged form by sea	2015	MSC	HTW	CCC	In progress		HTW 1/21, section 15
5.2.5.2	First outline of the detailed review of the Global Maritime Distress and Safety System (GMDSS)	2015	MSC	NCSR	HTW	In progress		MSC 90/28, paragraph 25.18; HTW 1/21, section 12

SUB-COMMITTEE ON HUMAN ELEMENT, TRAINING AND WATCHKEEPING (HTW)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.6.1	E-navigation strategy implementation plan	2015	MSC	NCSR	HTW	In progress		HTW 1/21, section 20
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	Annual	MSC MEPC	III	HTW / PPR /CCC / SDC /SSE/NCSR			MSC 92/26, paragraph 22.29; HTW 1/21, paragraph 20.16

SUB-COMMITTEE ON IMPLEMENTATION OF IMO INSTRUMENTS (III)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1.1.1.1	Cooperate with the United Nations on matters of mutual interest, as well as provide relevant input/guidance	Annual	Assembly	Council	MSC/MEPC / FAL / LEG / TCC / III			FSI 19/19, paragraph 7.5
Notes:	Output added to the Sub-Committee's biennial agenda in order to cover the work under the agenda items on IUU fishing-related matters and PSC Guidelines in relation to MLC 2006							
1.1.2.3	Unified interpretation of provisions of IMO safety, security, and environment related Conventions	Continuous	MSC MEPC		III / PPR / CCC / SDC /SSE/NCSR			MSC 78/26, paragraph 22.12
2.0.1.2	Guidelines for port State control under the 2004 BWM Convention, including guidance on ballast water sampling and analysis	2015	MEPC	PPR	III			
Notes:	This output will not be split into two outputs as proposed by PPR 1 (MEPC 66/21, paragraph 18.22)							
2.0.2.1	Analysis of consolidated audit summary reports	2015	Assembly	Council	MSC / MEPC / LEG / III			
4.0.2.1	Endorsed proposals for the development, maintenance and enhancement of information systems and related guidance (GISIS, websites, etc.)	Continuous	Council		MSC / MEPC / FAL / LEG / TCC / III			MSC 87/26, paragraph 21.5; FSI 21/18, paragraphs 3.23, 5.10 and 6.15; MEPC 66/21, paragraph 18.29
Notes:	Output added to the Sub-Committee's biennial agenda in order to cover the work on GISIS, in particular, the module on requirements; this will also be reflected in the biennial status report of MEPC 66 for 2014 - 2015 as it was not included in table 2 of resolution A.1061(28).							

SUB-COMMITTEE ON IMPLEMENTATION OF IMO INSTRUMENTS (III)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.1.2.2	Measures to protect the safety of persons rescued at sea	2014	MSC FAL	NCSR	III			MSC 84/24, paragraph 22.25
5.2.1.3	Review of general cargo ship safety	2015	MSC		III / SDC / NCSR/HTW			MSC 90/28, paragraph 25.10
5.2.1.16	Non-mandatory instrument on regulations for non-convention ships	2015	MSC	III	PPR / SDC / SSE / NCSR/HTW			MSC 92/26, section 12
5.2.1.17	Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC)	Annual	MSC MEPC		III			
5.2.1.29	Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code)	Annual	MSC		III			
5.3.1.1	Harmonization of port State control (PSC) activities	Continuous	MSC MEPC		III			MEPC 66/21, paragraph 18.8
Notes: Output to be referred to parent for consideration of scope; MEPC 66 deferred discussion to MEPC 67 to take into account the outcome of MSC 93.								
7.1.3.1	Consideration and analysis of reports on alleged inadequacy of port reception facilities	Annual	MEPC		III			
8.0.3.1	Requirements for access to, or electronic versions of, certificates and documents, including record books required to be carried on ships	2015	FAL		MSC / LEG / III / MEPC			

SUB-COMMITTEE ON IMPLEMENTATION OF IMO INSTRUMENTS (III)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	Annual	MSC MEPC	III	HTW / PPR / CCC / SDC / SSE / NCSR			MSC 92/26, paragraph 22.29
12.3.1.1	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Annual	MSC MEPC	CCC	III			

SUB-COMMITTEE ON NAVIGATION, COMMUNICATIONS AND SEARCH AND RESCUE (NCSR)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1.1.2.2	Response to matters related to the Radiocommunication ITU R Study Group and ITU World Radiocommunication Conference	Annual	MSC	NCSR				
1.1.2.3	Unified interpretation of provisions of IMO safety, security, and environment related Conventions	Continuous	MSC MEPC		III / PPR / CCC / SDC /SSE/NCSR			MSC 78/26, paragraph 22.12
1.3.4.1	Amendments to the IAMSAR Manual	Continuous	MSC	NCSR				
2.0.3.1	Further development of the Global SAR Plan for the provision of maritime SAR services	2015	MSC	NCSR				
2.0.3.2	Annual list of IMO documents and publications to be held by MRCCs	Annual	MSC	NCSR				
2.0.3.3	Guidelines on harmonized aeronautical and maritime search and rescue procedures, including SAR training matters	2014	MSC	NCSR				
2.0.3.4	Procedures for routeing distress information in the GMDSS	2015	MSC	NCSR				
5.1.2.2	Measures to protect the safety of persons rescued at sea	2014	MSC FAL	NCSR	III			MSC 84/24, paragraph 22.25
5.2.1.3	Review of general cargo ship safety	2015	MSC		III / SDC / NCSR/HTW			MSC 90/28, paragraph 25.10
5.2.1.15	Mandatory Code for ships operating in polar waters	2014	MSC MEPC	SDC	HTW / PPR /SSE/NCSR			MSC 93/22, paragraph 10.49

SUB-COMMITTEE ON NAVIGATION, COMMUNICATIONS AND SEARCH AND RESCUE (NCSR)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.23	Guidelines for wing-in-ground craft	2015	MSC	SDC	SSE/NCSR / HTW			MSC 88/26, paragraph 23.30
5.2.2.11 (UO)	Recognition of Galileo as a component of the WWRNS	2016	MSC	NCSR				MSC 93/22, paragraph 20.22
5.2.4.1	Routeing measures and mandatory ship reporting systems	Continuous	MSC	NCSR				
5.2.4.2	Updates to the LRIT system	Continuous	MSC	NCSR				
5.2.4.3	New symbols for AIS aids to navigation	2014	MSC	NCSR				
5.2.4.4	Revised guidelines for the on board operational use of shipborne automatic identification systems (AIS)	2014	MSC	NCSR				
5.2.4.5	Consolidation of ECDIS-related IMO circulars	2014	MSC	NCSR				
5.2.4.6	Explanatory footnotes to SOLAS regulations V/15, V/18, V/19 and V/27	2014	MSC	NCSR				MSC 90/28, paragraph 25.27
5.2.4.7	Approved satellite navigation system "BeiDou" in the maritime field	2014	MSC	NCSR				MSC 91/22, paragraph 19.20
5.2.4.8	Guidelines on the carriage of ECDIS	2014	MSC	NCSR				
5.2.4.9	Performance standards for multi-system shipborne navigation systems	2015	MSC	NCSR				
5.2.5.1	Guidelines on MSI (maritime safety information) provisions	Continuous	MSC	NCSR				

SUB-COMMITTEE ON NAVIGATION, COMMUNICATIONS AND SEARCH AND RESCUE (NCSR)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.5.2	First outline of the detailed review of the Global Maritime Distress and Safety System (GMDSS)	2015	MSC	NCSR	HTW			MSC 90/28, paragraph 25.18
5.2.5.3	Analysis of developments in maritime radiocommunication systems and technology	2014	MSC	NCSR				
5.2.5.4	Analysis of information on developments in Inmarsat and Cospas-Sarsat	Continuous	MSC	NCSR				
5.2.6.1	E-navigation strategy implementation plan	2015	MSC	NCSR	HTW			
7.1.2.2	Designated Special Areas and PSSAs and their associated protective measures	Continuous	MEPC	NCSR				
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	Annual	MSC MEPC	III	HTW / PPR /CCC / SDC /SSE/NCSR			MSC 92/26, paragraph 22.29

SUB-COMMITTEE ON SHIP DESIGN AND CONSTRUCTION (SDC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1.1.2.3	Unified interpretation of provisions of IMO safety, security, and environment related Conventions	Continuous	MSC MEPC		III / PPR / CCC / SDC / SSE / NCSR	Ongoing		MSC 78/26, paragraph 22.12; SDC 1/26, section 21
2.0.1.1	Provisions to ensure the integrity and uniform implementation of the 1969 TM Convention	2015	MSC	SDC	HTW	In progress		MSC 89/25, paragraph 22.34; SDC 1/26, section 4
2.0.1.7	Amendments to the ESP Code	Continuous	MSC	SDC		Ongoing		SDC 1/26, section 10
5.1.1.1	Guidelines on safe return to port for passenger ships	2015	MSC	SDC		In progress		MSC 81/25, paragraph 23.54; SDC 1/26, section 8
5.1.1.3 (EO)	Amendments to SOLAS and FSS Code to make evacuation analysis mandatory for new passenger ships and review of the Recommendation on evacuation analysis for new and existing passenger ships	2015	MSC	SDC		In progress		MSC 83/28, paragraph 25.25; SDC 1/26, section 13
5.1.1.5	Review of conditions under which passenger ship watertight doors may be opened during navigation and prepare amendments to SOLAS regulation II-1/22 and MSC.1/Circ.1380	2015	MSC	SDC		In progress		MSC 92/26, paragraph 23.17; SDC 1/26, section 25

SUB-COMMITTEE ON SHIP DESIGN AND CONSTRUCTION (SDC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.1.1.6 (UO)	Amendments to SOLAS chapter II-1 and associated guidelines on damage control drills for passenger ships	2016	MSC	SDC	HTW			MSC 93/22, paragraph 20.22.3
5.2.1.1	Amendments to the criterion for maximum angle of heel in turns of the 2008 IS Code	2015	MSC	SDC		In progress		
5.2.1.3	Review of general cargo ship safety	2015	MSC		III / SDC / NCSR / HTW	In progress		MSC 93/22, paragraph 15.7
5.2.1.4	Guidelines addressing the carriage of more than 12 industrial personnel on board vessels engaged on international voyages	2015	MSC	SDC		In progress		MSC 92/26, paragraph 23.19; SDC 1/26, section 19
5.2.1.12	Second generation intact stability criteria	2015	MSC	SDC		In progress		SDC 1/26, section 5
5.2.1.13	Amendments to SOLAS chapter II 1 subdivision and damage stability regulations	2015	MSC	SDC		In progress		MSC 85/26, paragraph 23.35; SDC 1/26, section 7
5.2.1.18	Interpretation of SOLAS regulation II-1/13.6 on means of escape ro-ro cargo spaces	2015	MSC	SDC		In progress		MSC 90/28, paragraph 25.13; SDC 1/26, section 17
5.2.1.19	Classification of offshore industry vessels and a review of the need for a non-mandatory code for offshore construction support vessels	2015	MSC	SDC		In progress		MSC 85/26, paragraph 23.27; SDC 1/26, section 18

SUB-COMMITTEE ON SHIP DESIGN AND CONSTRUCTION (SDC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.21	Guidelines for use of Fibre Reinforced Plastics (FRP) within ship structures.	2015	MSC	SDC		In progress		MSC 93/22, paragraph 10.10; SDC 1/26, section 11
5.2.1.23	Guidelines for wing-in-ground craft	2015	MSC	SDC	SSE / NCSR / HTW	In progress		MSC 88/26, paragraph 23.30; SDC 1/26, section 20
5.2.1.24	Amendments to part B of the 2008 IS Code on towing, lifting and anchor handling operations	2015	MSC	SDC		In progress		MSC 88/26, paragraph 23.36; SDC 1/26, section 15
5.2.1.26	Amendments to SOLAS regulation II-1/11 and development of associated Guidelines to ensure the adequacy of testing arrangements for watertight compartments	2015	MSC	SDC		In progress		MSC 86/26, paragraph 23.36; SDC 1/26, section 9
5.2.1.27	Amendments to SOLAS chapter II 2, the FTP Code and MSC/Circ.1120 to clarify the requirements for plastic pipes on ships	2015	MSC	SDC		In progress		MSC 88/26, paragraph 23.12; SDC 1/26, section 12
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	Annual	MSC MEPC	III	HTW / PPR / CCC / SDC / SSE / NCSR			MSC 92/26, paragraph 22.29; SDC 1/26, paragraphs 24.6

SUB-COMMITTEE ON SHIP SYSTEMS AND EQUIPMENT (SSE)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for year 1**	**Status of output for year 2**	**References**
1.1.2.3	Unified interpretation of provisions of IMO safety, security, and environment related Conventions	Continuous	MSC MEPC		III / PPR / CCC / SDC / SSE / NCSR	Ongoing		MSC 78/26, paragraph 22.12; SSE 1/21, section 17
5.1.1.4	Development of life safety performance criteria for alternative design and arrangements for fire safety (MSC/Circ.1002)	2015	MSC	SSE		In progress		MSC 90/28, paragraph 25.12; SSE 1/21, section 7
5.1.2.1	New framework of requirements for life-saving appliances	2015	MSC	SSE		In progress		MSC 82/24, paragraph 21.49; SSE 1, section 8
5.2.1.7	Considerations related to the double sheathed low-pressure fuel pipes for fuel injection systems in engines on crude oil tankers	2015	MSC	SSE		In progress		MSC 91/22, paragraph 19.13; SSE 1/21, section 14
5.2.1.8	Smoke control and ventilation	2015	MSC	SSE		In progress		FP 46/16, section 4; SSE 1/21, section 5
5.2.1.10	Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III	2015	MSC	SSE		In progress		MSC 84/24, paragraph 3.92; SSE 1/21, section 8

SUB-COMMITTEE ON SHIP SYSTEMS AND EQUIPMENT (SSE)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for year 1**	**Status of output for year 2**	**References**
5.2.1.14	Amendments to SOLAS regulation II-2/20 and associated guidance on air quality management for ventilation of closed vehicle spaces, closed ro-ro and special category spaces	2015	MSC	SSE		In progress		MSC 88/26, paragraph 23.11 and SSE 1/21, section 6
5.2.1.22	Requirements for onboard lifting appliances and winches	2015	MSC	SSE		In progress		MSC 89/25, paragraph 22.26; SSE 1/21, section 13
5.2.1.28	Amendments to the requirements for foam-type fire extinguishers in SOLAS regulation II 2/10.5	2015	MSC	SSE		In progress		MSC 89/25, paragraph 22.9; SSE 1/21, section 16
5.2.1.32 (UO)	Review MODU Code, LSA Code and MSC.1/Circ.1206/Rev.1	2016	MSC	SSE	HTW			MSC 93/22, paragraph 20.17
5.2.1.33	Development of amendments to the Guidelines for vessels with dynamic positioning (DP) systems (MSC/Circ.645)	2015	MSC	SSE				MSC 90/28, paragraph 25.34; SSE 1/21, annex 16
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	Annual	MSC MEPC	III	HTW/PPR /CCC/SDC /SSE/NCSR			MSC 92/26, paragraph 22.29; SSE 1/21, paragraph 20.10

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ANNEX 28

PROVISIONAL AGENDAS FOR THE SUB-COMMITTEES

Provisional agenda for CCC 1*

Opening of the session and election of Chairman and Vice-Chairman for 2014

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Amendments to CSC 1972 and associated circulars (5.2.3.1)

4 Development of international code of safety for ships using gases or other low-flashpoint fuels (IGF Code) (5.2.1.2)

5 Amendments to the IMSBC Code and supplements (5.2.3.3)

6 Amendments to the IMDG Code and supplements (5.2.3.4)

7 Unified interpretation to provisions of IMO safety, security and environment related Conventions (1.1.2.3)

8 Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas (12.3.1.1)

9 Revised Guidelines for packing of cargo transport units (5.2.3.5)

10 Biennial agenda and provisional agenda for CCC 2

11 Election of Chairman and Vice-Chairman for 2015

12 Any other business

13 Report to the Committees

* The order of the items in the proposed provisional agenda remains the same as that proposed by DSC 18 (DSC/18/13 annex 10). The titles and numbers in parentheses correspond to the planned outputs in the Organization's High-level Action Plan for the 2014-2015 biennium, as adopted by resolution A.1061(28).

Provisional agenda for HTW 2

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Validated model training courses (5.2.2.3)

4 Reports on unlawful practices associated with certificates of competency (5.2.2.4)

5 Revised guidelines for model course development, updating and validation processes (5.2.2.6)

6 Guidance for the implementation of the 2010 Manila Amendments (5.2.2.1)

7 Follow-up action to the STCW-F Conference resolutions 6 and 7 (5.2.1.20)

8 Role of the human element

9 Mandatory Code for ships operating in polar waters (5.2.1.15)

10 Review of STCW passenger ship specific safety training (5.2.2.2)

11 Training in hot-work procedures on crude oil tankers (5.2.2.7)

12 First outline of the detailed review of the Global Maritime Distress and Safety System (GMDSS) (5.2.5.2)

13 E-navigation strategy implementation plan (5.2.6.1)

14 Guidelines for shipowners and seafarers for implementation of relevant IMO instruments in relation to the carriage of dangerous goods in packaged form by sea (5.2.2.9)

15 Non-mandatory instrument on regulations for non-convention ships (5.2.1.16)

16 Biennial agenda and provisional agenda for HTW 3

17 Election of Chairman and Vice-Chairman for 2016

18 Any other business

19 Report to the Maritime Safety Committee

Provisional agenda for III 1

Opening of the session and election of Chairman and Vice-Chairman for 2014

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Responsibilities of Governments and measures to encourage flag State compliance

4 Mandatory reports under MARPOL

5 Casualty analysis and statistics

6 Harmonization of port State control activities

7 PSC Guidelines on seafarers' hours of rest and PSC guidelines in relation to the Maritime Labour Convention, 2006

8 Development of guidelines on port State control under the 2004 BWM Convention

9 Comprehensive analysis of difficulties encountered in the implementation of IMO instruments

10 Review and update of the Survey Guidelines under the Harmonized System of Survey and Certification (HSSC) and the non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code)

11 Consideration of IACS Unified Interpretations

12 Measures to protect the safety of persons rescued at sea

13 Illegal, unregulated and unreported (IUU) fishing and related matters

14 Review of general cargo ship safety

15 Biennial agenda and provisional agenda for III 2

16 Election of Chairman and Vice-Chairman for 2015

17 Any other business

18 Report to the Committees

Provisional agenda for NCSR 1

Opening of the session and election of Chairman and Vice-Chairman for 2014

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Routeing of ships, ship reporting and related matters

4 Consideration of ECDIS matters related to the implementation of the carriage requirements in SOLAS regulations V/19.2.10 and V/19.2.11

5 Consolidation of ECDIS-related IMO circulars

6 Consideration of the application of the satellite navigation system "BeiDou" in the maritime field

7 Development of explanatory footnotes to SOLAS regulations V/15, V/18, V/19 and V/27

8 Consideration of LRIT-related matters

9 Development of an e-navigation strategy implementation plan

10 Development of performance standards for multi-system shipborne navigation receivers

11 Revision of the Guidelines for the onboard operational use of shipborne automatic identification systems (AIS)

12 Developments in maritime radiocommunication systems and technology

13 Review and modernization of the Global Maritime Distress and Safety System (GMDSS)

14 Further development of the GMDSS master plan on shore-based facilities

15 Consideration of operational and technical coordination provisions of maritime safety information (MSI) services, including the development and review of related documents

16 Consideration of radiocommunication ITU-R Study Group matters

17 Consideration of ITU World Radiocommunication Conference matters

18 Consideration of developments in Inmarsat and Cospas-Sarsat

19 Development of guidelines on harmonized aeronautical and maritime search and rescue procedures, including SAR training matters

20 Further development of the Global SAR Plan for the provision of maritime SAR services, including procedures for routeing distress information in the GMDSS

21 Development of amendments to the IAMSAR Manual

22 Development of measures to protect the safety of persons rescued at sea

23 Development of a mandatory Code for ships operating in polar waters

24 Consideration of IACS unified interpretations

25 Biennial agenda and provisional agenda for NCSR 2

26 Election of Chairman and Vice-Chairman for 2015

27 Any other business

28 Report to the Maritime Safety Committee

Provisional agenda for SDC 2

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Amendments to SOLAS chapter II-1 subdivision and damage stability regulations (5.2.1.13)

4 Guidelines on safe return to port for passenger ships (5.1.1.1)

5 Second-generation intact stability criteria (5.2.1.12)

6 Amendments to the criterion for maximum angle of heel in turns of the 2008 IS Code (5.2.1.1)

7 Amendments to part B of the 2008 IS Code on towing, lifting and anchor handling operations (5.2.1.24)

8 Guidelines addressing the carriage of more than 12 industrial personnel on board vessels engaged on international voyages (5.2.1.4)

9 Classification of offshore industry vessels and a review of the need for a non-mandatory code for offshore construction support vessels (5.2.1.19)

10 Amendments to SOLAS regulation II-1/11 and development of associated Guidelines to ensure the adequacy of testing arrangements for watertight compartments (5.2.1.26)

11 Provisions to ensure the integrity and uniform implementation of the 1969 TM Convention (2.0.1.1)

12 Guidelines for use of Fibre Reinforced Plastic (FRP) within ship structures (5.2.1.21)

13 Amendments to SOLAS chapter II-2, the FTP Code and MSC/Circ.1120 to clarify the requirements for plastic pipes on ships (5.2.1.27)

14 Amendments to SOLAS and FSS Code to make evacuation analysis mandatory for new passenger ships and review of the Recommendation on evacuation analysis for new and existing passenger ships (5.1.1.3)

15 Interpretation of SOLAS regulation II-2/13.6 on means of escape from ro-ro cargo spaces (5.2.1.18)

16 Review of conditions under which passenger ship watertight doors may be opened during navigation and development of amendments to SOLAS regulation II-1/22 and MSC.1/Circ.1380 (5.1.1.5)

17 Amendments to SOLAS chapter II-1 and associated guidelines on damage control drills for passenger ships (5.1.1.6)

18 Guidelines for wing-in-ground craft (5.2.1.23)

19 Review of general cargo ship safety (5.2.1.3)

20 Amendments to the 2011 ESP Code (2.0.1.7)

21 Unified interpretation to provisions of IMO safety, security, and environment-related Conventions (1.1.2.3)

22 Biennial agenda and provisional agenda for SDC 3

23 Election of Chairman and Vice-Chairman for 2016

24 Any other business

25 Report to the Maritime Safety Committee

Provisional agenda for SSE 2

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Smoke control and ventilation (5.2.1.8)

4 Amendments to SOLAS regulation II-2/20 and associated guidance on air quality management for ventilation of closed vehicle spaces, closed ro-ro and special category spaces (5.2.1.14)

5 Development of life safety performance criteria for alternative design and arrangements for fire safety (MSC/Circ.1002) (5.1.1.4)

6 New framework of requirements for life-saving appliances (5.1.2.1)

7 Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (5.2.1.10)

8 Measures for onboard lifting appliances and winches (5.2.1.22)

9 Considerations related to the double sheathed low-pressure fuel pipes for fuel injection systems in engines on crude oil tankers (5.2.1.7)

10 Amendments to the requirements for foam-type fire-extinguishers in SOLAS regulation II-2/10.5 (5.2.1.28)

11 Unified interpretation of provisions of IMO safety, security, and environment related Conventions (1.1.2.3)

12 Review MODU Code, LSA Code and MSC.1/Circ.1206/Rev.1 (5.2.1.32)

13 Amendments to the Guidelines for vessels with dynamic positioning (DP) systems (MSC/Circ.645) (5.2.1.33)

14 Biennial agenda and provisional agenda for SSE 3

15 Election of Chairman and Vice-Chairman for 2016

16 Any other business

17 Report to the Maritime Safety Committee

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ANNEX 29

REPORT ON THE STATUS OF PLANNED OUTPUTS FOR THE 2014-2015 BIENNIUM

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1.1.1.1	Cooperate with the United Nations on matters of mutual interest, as well as provide relevant input/guidance	Annual	Assembly	Council	MSC / MEPC / FAL / LEG / TCC / III			FSI 18/20, paragraph 17.12 and FSI 19/19, paragraph 7.5
Notes: Output added to the Sub-Committee's biennial agenda in order to cover the work under the agenda items on IUU fishing-related matters and PSC Guidelines in relation to MLC 2006								
1.1.2.1	Cooperate with other international bodies on matters of mutual interest, as well as provide relevant input/guidance	Annual	Assembly	Council	MSC / MEPC / FAL / LEG / TCC			
1.1.2.2	Response to matters related to the Radiocommunication ITU-R Study Group and ITU World Radiocommunication Conference	Annual	MSC		NCSR			
1.1.2.3	Unified interpretation of provisions of IMO safety, security, and environment related Conventions	Continuous	MSC / MEPC		III / PPR / CCC / SDC / SSE / NCSR	Ongoing		MSC 78/26, paragraph 22.12
1.3.4.1	Amendments to the IAMSAR Manual	Continuous	MSC		NCSR			

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
2.0.1.1	Provisions to ensure the integrity and uniform implementation of the 1969 TM Convention	2014	MSC	SDC	HTW	In progress		MSC 89/25, paragraph 22.34
Notes:	Extend target completion year to 2015.							
2.0.1.6	Amendments to SOLAS regulation II-1/40.2 concerning general requirements on electrical installations	2014	MSC	SSE		Completed		MSC 86/26, paragraph 23.26 and SSE 1/21, section 4
2.0.1.7	Amendments to the ESP Code	Continuous	MSC	SDC		Ongoing		MSC 91/22, paragraph 19.24
2.0.2.1	Analysis of consolidated audit summary reports	2015	Assembly	Council	MSC / MEPC / LEG / III	In progress		
2.0.2.3	Amendments making the IMO Instruments Implementation Code (III Code) and auditing mandatory	2015	MSC / MEPC			In progress		Resolutions: MEPC.246 (66) and MEPC.247 (66)
2.0.3.1	Further development of the Global SAR Plan for the provision of maritime SAR services	2015	MSC		NCSR			
2.0.3.2	Annual list of IMO documents and publications to be held by MRCCs	Annual	MSC		NCSR			

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
2.0.3.3	Guidelines on harmonized aeronautical and maritime search and rescue procedures, including SAR training matters	2014	MSC		NCSR			
2.0.3.4	Procedures for routeing distress information in the GMDSS	2015	MSC		NCSR			
3.4.1.1	Input on identifying emerging needs of developing countries, in particular SIDS and LDCs to be included in the ITCP	Continuous	TCC		MSC / MEPC / FAL / LEG			
3.5.1.1	Identify thematic priorities within the area of maritime safety and security, marine environmental protection, facilitation of maritime traffic and maritime legislation	Annual	TCC		MSC / MEPC / FAL / LEG			
3.5.1.2	Input to the ITCP on emerging issues relating to sustainable development and achievement of the MDGs	2015	TCC		MSC / MEPC / FAL / LEG			

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
4.0.1.3	Endorsed proposals for unplanned outputs for the 2014-2015 biennium as accepted by the Committees	Annual	Council		MSC / MEPC / FAL / LEG / TCC			
4.0.2.1	Endorsed proposals for the development, maintenance and enhancement of information systems and related guidance (GISIS, websites, etc.)	Continuous	Council		MSC / MEPC / FAL / LEG / TCC / III	Ongoing		MSC 87/26, paragraph 21.5 and FSI 21/18, paragraphs 3.23, 5.10 and 6.15; also MEPC 66/21, paragraph 18.29
Notes: Output added to the Sub-Committee's biennial agenda in order to cover the work on GISIS, in particular, the module on requirements; this will also be reflected in the biennial status report of MEPC 66 for 2014 - 2015 as it was not included in table 2 of resolution A.1061(28).								
4.0.5.1	Revised guidelines on the Application of the Strategic Plan and the High-level Action Plan of the Organization ("GAP") and guidelines on organization and method of work of the commitees, as appropriate	2015	Assembly	Council	MSC / MEPC / FAL / LEG / TCC			MSC 93/22, paragraph 19.6
5.1.1.1	Guidelines on safe return to port for passenger ships	2014	MSC	SDC		In progress		MSC 81/25, paragraph 23.54
Notes: Extend target completion year to 2015.								

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.1.1.2	A review of damage stability regulations for ro-ro passenger ships	2014	MSC	SDC		Completed		MSC 84/24, paragraph 22.59
5.1.1.3	Amendments to SOLAS and FSS Code to make evacuation analysis mandatory for new passenger ships and review of the Recommendation on evacuation analysis for new and existing passenger ships	2015	MSC	SDC		In progress		MSC 83/28, paragraphs 8.7 and 25.25
Notes: MSC 93 amended the description of the output - was originally "A review of the recommendations on evacuation analysis for new and existing passenger ships"								
5.1.1.4	Development of life safety performance criteria for alternative design and arrangements for fire safety (MSC/Circ.1002)	2014	MSC	SSE		In progress		MSC 90/28, paragraph 25.12 and SSE 1/21, section 7
Notes: Target completion year extended to 2015								

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.1.1.5	Review of conditions under which passenger ship watertight doors may be opened during navigation and prepare amendments to SOLAS regulation II-1/22 and MSC.1/Circ.1380	2015	MSC	SDC		In progress		MSC 92/26, paragraph 23.17
Notes:	Extend target completion year to 2015.							
5.1.1.6 (UO)	Amendments to SOLAS chapter II-1 and associated guidelines on damage control drills for passenger ships	2015	MSC	SDC	HTW			MSC 93/22, paragraph 20.22.3
Notes:	Unplanned output accepted by MSC 93 - to be endorsed by C112 - TCY 2016							
5.1.2.1	New framework of requirements for life-saving appliances	2015	MSC	SSE		In progress		MSC 82/24, paragraph 21.49 and SSE 1, section 8
5.1.2.2	Measures to protect the safety of persons rescued at sea	2014	MSC / FAL	NCSR	III			MSC 84/24, paragraph 22.25
5.2.1.1	Amendments to the criterion for maximum angle of heel in turns of the 2008 IS Code	2014	MSC		SDC			

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.2	Development of international code of safety for ships using gases or other low flashpoint fuels (IGF Code)	2014	MSC	CCC	HTW			MSC 78/26, paragraph 24.11; BLG 17/18, section 8
5.2.1.3	Review of general cargo ship safety	2014	MSC		III / SDC / NCSR / HTW	In progress		MSC 90/28, paragraph 25.10
Notes:	Extend target completion year to 2015.							
5.2.1.4	Guidelines addressing the carriage of more than 12 industrial personnel on board vessels engaged on international voyages	2015	MSC	SDC		In progress		MSC 92/26, paragraph 23.19
5.2.1.5	Amendments to the provisions of SOLAS chapter II-2 relating to secondary means of venting cargo tanks	2015	MSC	SSE	CCC	Completed		MSC 90/28, paragraph 25.5
5.2.1.6	Amendments to the 2009 MODU Code concerning lifeboat drills	2015	MSC	SSE		Completed		MSC 89/25, paragraph 22.24
5.2.1.7	Considerations related to the double sheathed low-pressure fuel pipes for fuel injection systems in engines on crude oil tankers	2015	MSC	SSE		In progress		MSC 91/22, paragraph 19.13 SSE 1/21, section 14

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.8	Smoke control and ventilation	2015	MSC	SSE		In progress		FP 46/16, section 4 and MSC 91/22/Add.2, annex 38
5.2.1.9	Requirements for ships carrying hydrogen and compressed natural gas vehicles.	2014	MSC	SSE		Completed		MSC 83/28, paragraph 25.23
5.2.1.10	Safety objectives and functional requirements of the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III	2015	MSC	SSE		In progress		MSC 84/24, paragraph 3.92
5.2.1.11	Amendments to the LSA Code for thermal performance of immersion suits	2014	MSC	SSE		Postponed		MSC 84/24, paragraph 22.48 and SSE 1/21, section 9
Notes: Moved to the Committee's post-biennial agenda								
5.2.1.12	Second generation intact stability criteria	2015	MSC	SDC		In progress		MSC 85/26, paragraph 12.7
5.2.1.13	Amendments to SOLAS chapter II 1 subdivision and damage stability regulations	2014	MSC	SDC		In progress		MSC 85/26, paragraph 23.35
Notes: Extend target completion year to 2015.								

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.14	Amendments to SOLAS regulation II-2/20 and associated guidance on air quality management for ventilation of closed vehicle spaces, closed ro-ro and special category spaces	2014	MSC	SSE		In progress		MSC 88/26, paragraph 23.11 and SSE 1/21, section 6
Notes: Target completion year extended to 2015								
5.2.1.15	Mandatory Code for ships operating in polar waters	2015	MSC / MEPC	SDC	HTW / PPR / SSE / NCSR	In progress		MSC 86/26, paragraph 23.32 MSC 93/22, paragraph 10.44
5.2.1.16	Non mandatory instrument on regulations for non convention ships	2015	MSC	III	PPR / SDC / SSE / NCSR / HTW	In progress		MSC 92/26, section 12
5.2.1.17	Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC)	Annual	MSC / MEPC		III			
5.2.1.18	Interpretation of SOLAS regulation II-1/13.6 on means of escape from ro-ro cargo spaces	2014	MSC	SDC		In progress		MSC 90/28, paragraph 25.13
Notes: Extend target completion year to 2015.								

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.19	Classification of offshore industry vessels and a review of the need for a non-mandatory code for offshore construction support vessels	2015	MSC	SDC		In progress		MSC 85/26, paragraph 23.27
5.2.1.20	Follow-up action to the STCW-F Conference resolutions 6 and 7	2015	MSC		HTW			
5.2.1.21	Guidelines for use of Fibre Reinforced Plastics (FRP) within ship structures.	2014	MSC	SDC		In progress		MSC 87/26, paragraph 24.14
Notes: Extend target completion year to 2015.								
5.2.1.22	Requirements for onboard lifting appliances and winches	2015	MSC	SSE		In progress		MSC 89/25, paragraph 22.26 and SSE 1/21, section 13
5.2.1.23	Guidelines for wing-in-ground craft	2015	MSC	SDC	SSE / NCSR / HTW	In progress		MSC 88/26, paragraph 23.30
5.2.1.24	Amendments to part B of the 2008 IS Code on towing, lifting and anchor handling operations	2014	MSC	SDC		In progress		MSC 88/26, paragraph 23.36
Notes: Extend target completion year to 2015.								

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.25	Revised recommendation on conditions for the approval of servicing stations for inflatable liferafts (resolution A.761(18))	2014	MSC	SSE		Completed		MSC 87/26, paragraph 24.30 and SSE 1/21, section 12
5.2.1.26	Amendments to SOLAS regulation II-1/11 and development of associated Guidelines to ensure the adequacy of testing arrangements for watertight compartments	2015	MSC	SDC		In progress		MSC 86/26, paragraph 23.36
5.2.1.27	Amendments to SOLAS chapter II 2, the FTP Code and MSC/Circ.1120 to clarify the requirements for plastic pipes on ships	2014	MSC	SDC		In progress		MSC 88/26, paragraph 23.12
Notes: Extend target completion year to 2015.								
5.2.1.28	Amendments to the requirements for foam-type fire extinguishers in SOLAS regulation II 2/10.5	2014	MSC	SSE		In progress		MSC 89/25, paragraph 22.9
Notes: Target completion year extended to 2015								

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.1.29	Non exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code)	Annual	MSC		III			
5.2.1.30	Adoption of the revised IGC Code	2014	MSC			Completed		MSC 93/22, paragraph 3.82
5.2.1.32 (UO)	Review MODU Code, LSA Code and MSC.1/Circ.1206/Rev.1	2015	MSC	SSE	HTW			
Notes:	Unplanned output agreed by MSC 93 – for endorsement by C 112 - TCY 2016							
5.2.1.33	Amendments to the Guidelines for vessels with dynamic positioning (DP) systems (MSC/Circ.645)	2015	MSC		SSE			MSC 90/28, paragraph 25.34, MSC/Circ.645
Notes:	Moved from post-biennial – TCY 2016							
5.2.2.1	Guidance for the implementation of the 2010 Manila Amendments	2014	MSC		HTW	In progress		MSC 93/22, paragraph 11.4
Notes:	MSC 93 extended the target completion date to 2017.							
5.2.2.2	Review of STCW passenger ship-specific safety training	2015	MSC		HTW	In progress		
5.2.2.3	Validated model training courses	Continuous	MSC		HTW	Ongoing		

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.2.4	Reports on unlawful practices associated with certificates of competency	Annual	MSC		HTW			
5.2.2.5	Reports to the MSC on information communicated by STCW Parties	Annual	MSC					
5.2.2.6	Revised guidelines for model course development, updating and validation processes	2015	MSC		HTW	In progress		
5.2.2.7	Training in hot-work procedures on crude oil tankers	2015	MSC	HTW	SSE	In progress		
5.2.2.8	Guidance for personnel involved with tug-barge operations	2014	MSC	HTW	SDC	Completed		MSC 90/28, paragraph 25.42
5.2.2.9	Guidelines for shipowners and seafarers for implementation of relevant IMO instruments in relation to the carriage of dangerous goods in packaged form by sea	2015	MSC		HTW	In progress		
5.2.2.10	A globally consistent format for the certificate of training and education issued under the STCW Convention	2015	MSC		HTW	Completed		HTW 1/21, paragraph 16.4

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.2.11 (UO)	Recognition of Galileo as a component of the WWRNS	2015			NCSR			MSC 93/22, paragraph 20.22.1
Notes:	Unplanned output agreed by MSC 93 - to be endorsed by C 112 - TCY 2016							
5.2.3.1	Amendments to CSC 1972 and associated circulars	2014	MSC		CCC			
5.2.3.2	Measures to prevent loss of containers	2014	MSC	CCC	SDC / HTW	In progress		
5.2.3.3	Amendments to the IMSBC Code and supplements	Continuous	MSC / MEPC		CCC			
5.2.3.4	Amendments to the IMDG Code and supplements, including harmonization of the IMDG Code with the UN Recommendations on the Transport of Dangerous Goods	Continuous	MSC		CCC			
5.2.3.5	Revised Guidelines for packing of cargo transport units	2015	MSC		CCC			

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.3.7	Adoption of amendments to SOLAS and the relevant codes concerning mandatory carriage of appropriate atmosphere testing instruments on board ships	2014	MSC			Completed		MSC 93/22, paragraphs 9.21 to 9.27
5.2.4.1	Routeing measures and mandatory ship reporting systems	Continuous	MSC		NCSR			
5.2.4.2	Updates to the LRIT system	Continuous	MSC		NCSR			
5.2.4.3	New symbols for AIS aids to navigation	2014	MSC		NCSR			
5.2.4.4	Revised guidelines for the on board operational use of shipborne automatic identification systems (AIS)	2014	MSC		NCSR			
5.2.4.5	Consolidation of ECDIS-related IMO circulars	2014	MSC		NCSR			
5.2.4.6	Explanatory footnotes to SOLAS regulations V/15, V/18, V/19 and V/27	2014	MSC		NCSR			MSC 90/28, paragraph 25.27
5.2.4.7	Approved satellite navigation system "BeiDou" in the maritime field	2014	MSC		NCSR			MSC 91/22, paragraph 19.20

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
5.2.4.8	Guidelines on the carriage of ECDIS	2014	MSC		NCSR			
5.2.4.9	Performance standards for multi-system shipborne navigation systems	2015	MSC		NCSR			
5.2.5.1	Guidelines on MSI (maritime safety information) provisions	Continuous	MSC		NCSR			
5.2.5.2	First outline of the detailed review of the Global Maritime Distress and Safety System (GMDSS)	2015	MSC	NCSR	HTW			MSC 90/28, paragraph 25.18
5.2.5.3	Analysis of developments in maritime radiocommunication systems and technology	2014	MSC		NCSR			
5.2.5.4	Analysis of information on developments in Inmarsat and Cospas-Sarsat	Continuous	MSC		NCSR			
5.2.6.1	E-navigation strategy implementation plan	2015	MSC	NCSR	HTW			
5.3.1.1	Harmonization of port State control (PSC) activities	Continuous	MSC / MEPC		III			MEPC 66/21, paragraph 18.8
Notes: Output to be referred to parent for consideration of scope; MEPC 66 deferred discussion to MEPC 67 to take into account the outcome of MSC 93.								

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
6.1.1.1	Guidelines and guidance on the implementation and interpretation of SOLAS chapter XI-2 and the ISPS Code	Annual	MSC					
6.2.1.1	Consideration and analysis of monthly and annual reports on piracy	Annual	MSC					
6.2.1.2	Revised guidance relating to the prevention of piracy and armed robbery to reflect emerging trends and behaviour patterns	Annual	MSC		LEG			
7.1.2.13	Code for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels	2015	MSC / MEPC	PPR	SDC / SSE			
8.0.2.1	Consideration and analysis of reports and information on illegal migrants	Annual	MSC / FAL					
8.0.3.1	Requirements for access to, or electronic versions of, certificates and documents, including record books required to be carried on ships	2015	FAL		MSC / LEG / III / MEPC			

MARITIME SAFETY COMMITTEE (MSC)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
10.0.1.1	Goal-based new ship construction standards for tankers and bulk carriers	Continuous	MSC			Ongoing		
Notes:	Output to be referred to parent for consideration of scope							
10.0.1.2	Goal-based ship construction standards for all types of ships, including safety, security and protection of the marine environment	2015	MSC / MEPC					MEPC 66/21, paragraph 18.8
Notes:	Output to be referred to parent for consideration of scope							
12.1.1.1	Review of FSA studies by the FSA Experts' Group	Continuous	MSC					
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	Annual	MSC / MEPC	III	HTW / PPR / CCC / SDC / SSE / NCSR			MSC 92/26, paragraph 22.29
12.3.1.1	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Annual	MSC / MEPC	CCC	III			

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ANNEX 30

POST-BIENNIAL AGENDA OF THE MARITIME SAFETY COMMITTEE

MARITIME SAFETY COMMITTEE (MSC)								
ACCEPTED POST-BIENNIAL OUTPUTS								
Number	**Biennium[e]**	**Reference to High-level Actions**	**Description**	**Parent organ(s)**	**Coordinating organs(s)**	**Associated organ(s)**	**Timescale**	**References**
7	2012-2013	2.0.1	Mandatory application of the Performance standard for protective coatings for void spaces on bulk carriers and oil tankers	MSC		SDC	2	MSC 76/23, paragraphs 20.41.2 and 20.48; DE 50/27, section 4
8	2012-2013	2.0.1	Performance standard for protective coatings for void spaces on all types of ships	MSC		SDC	2	MSC 76/23, paragraphs 20.41.2 and 20.48
9	2012-2013	2.0.1	Revision of the provisions for helicopter facilities in SOLAS and the MODU Code	MSC		SDC	2	MSC 86/26, paragraph 23.39
32	2012-2013	5.2.4	Recommendations related to navigational sonar on crude oil tankers	MSC		SDC	1	MSC 91/22, Paragraph 19.23
38	2012-2013	5.2.5	Approval of the modernization plan of the Global Maritime Distress and Safety System (GMDSS)	MSC	NCSR	HTW	2	MSC 90/28, paragraph 25.18

MARITIME SAFETY COMMITTEE (MSC)								
ACCEPTED POST-BIENNIAL OUTPUTS								
Number	**Biennium[e]**	**Reference to High-level Actions**	**Description**	**Parent organ(s)**	**Coordinating organs(s)**	**Associated organ(s)**	**Timescale**	**References**
42	2012-2013	5.2.1	Review of the 2009 Code on Alerts and Indicators	MSC	SDC	NCSR	2	MSC 89/25, paragraph 22.25
45	2012-2013	5.2.1	Development of a requirement for hoist winches to be tested following any maintenance, repair or modification (MSC.1/Circ.1331)	MSC		SDC	1	MSC 90/28, paragraph 25.31, MSC.1/Circ.1331
58	2012-2013	5.2.1	Finalization of second generation intact stability criteria	MSC		SDC	4	SLF 55/17, paragraph 3.13
62	2012-2013	5.1.1	Passenger ship safety.	MSC			2	New output for 2014-2015 HLAP.
63	2012-2013	5.2.1	Finalization of a non-mandatory instrument on regulations for non-convention ships.	MSC		III	2	Interim output 5.2.1.18 in the 2012-2013 HLAP.
65	2012-2013	5.2.1	Application of amendments to SOLAS and related codes and guidelines.	MSC			2	MSC 91/22, paragraphs 3.16 to 3.35

MARITIME SAFETY COMMITTEE (MSC)								
ACCEPTED POST-BIENNIAL OUTPUTS								
Number	**Biennium[e]**	**Reference to High-level Actions**	**Description**	**Parent organ(s)**	**Coordinating organs(s)**	**Associated organ(s)**	**Timescale**	**References**
68	2012-2013	5.2.4	Interconnection of NAVTEX and Inmarsat SafetyNET receivers and their display on Integrated Navigation Display Systems	MSC		NCSR	1	MSC 92/WP.1, paragraph 23.13
73	2014-2015	5.2.1	Revision of section 3 of the Guidelines for damage control plans and information to the master (MSC.1/Circ.1245) for passenger ships	MSC		SDC	3	MSC 93/22, paragraph 6.28.4
74	2014-2015	5.2.2	Recognition of Galileo as a component of the WWRNS	MSC		NCSR	1	Output 5.2.2.11
75	2014-2015	5.1.1	Amendments to SOLAS chapter II 1, part B-4, Stability Management, and associated guidelines, to include requirements on damage control drills for passenger ships	MSC	SDC	NCSR	1	Output 5.1.1.6

MARITIME SAFETY COMMITTEE (MSC)								
ACCEPTED POST-BIENNIAL OUTPUTS								
Number	**Biennium[e]**	**Reference to High-level Actions**	**Description**	**Parent organ(s)**	**Coordinating organs(s)**	**Associated organ(s)**	**Timescale**	**References**
76	2014-2015	5.2.1	Application of the Mandatory Code to non-SOLAS ships operating in polar waters	MSC			3	Output 5.2.1.15
77	2014-2015	5.2.1	Review MODU Code, LSA Code and MSC.1/Circ.1206/Rev.1	MSC	SSE	HTW	1	Output 5.2.1.32
78	2014-2015	5.2.1	Amendments to the Guidelines for vessels with dynamic positioning (DP) systems (MSC/Circ.645)	MSC			1	Output 5.2.1.33

Notes:
e Biennium when the output was placed on the post-biennial agenda

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ANNEX 31

DRAFT AMENDMENTS TO SOLAS

APPENDIX

CERTIFICATES

Form of Safety Equipment Certificate for Cargo Ships
Form of Safety Certificate for Cargo Ships

The Record of Equipment for the Cargo ship Safety Equipment Certificate (Form E) and the Record of Equipment for the Cargo Ship Safety Certificate (Form C), in section 2, item 2, is amended as follows:

"2 ***Details of life-saving appliances***

1	Total number of persons for which life-saving appliances are provided		
		Port Side	Star-board Side
2	Total number of davit launched lifeboats	……	……
2.1	Total number of persons accommodated by them		
2.2	Number of totally enclosed lifeboats (regulation III/31 and LSA Code, section 4.6)		
2.3	Number of lifeboats with a self-contained air support system (regulation III/31 and LSA Code, section 4.8)		
2.4	Number of fire-protected lifeboats (regulation III/31 and LSA Code, section 4.9)		
2.5	Other lifeboats		
2.5.1	Number		
2.5.2	Type		
3	Total number of freefall lifeboats	……..	
3.1	Total number of persons accommodated by them		
3.2	Number of totally enclosed lifeboats(regulation III/31 and LSA Code, section 4.7)		
3.3	Number of lifeboats with a self-contained air support system (regulation III/31 and LSA Code, section 4.8)		
3.4	Number of fire-protected lifeboats (regulation III/31 and LSA Code, section 4.9)		

"

The subsequent items are renumbered accordingly.

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ANNEX 32

STATEMENTS BY DELEGATIONS AND OBSERVERS*

ITEM 3

Statement by the delegation of Sweden

In the context of the draft amendments to SOLAS regulation II-2/13.4, as circulated, the Committee noted the view expressed by the delegation of Sweden, as stated during MSC 92 (MSC 92/26, paragraph 8.18) that, without objecting to the adoption of the amendments, it favoured the deletion of the term "main workshop" and was concerned that according to the amendments, as drafted, electrical or electronic workshops within machinery spaces and adjacent to a main workshop would not have two escape routes and as a consequence of this, people working in these areas could have difficulties getting out in case of fire.

Statement by the delegation of Greece

"The Hellenic Republic considers that the III Code contains a set of minimum requirements on which States can elaborate and improve as appropriate for the enhancement of maritime safety and the protection of the environment.

In particular, as regards the III Code, the Hellenic Republic wishes to make clear that nothing in the said Code shall be construed to restrict or limit in any way the fulfilment of its obligation under the law of the European Union in relation to:

- The definition of "statutory certificates" and "class certificates";
- The scope of the obligations and criteria laid down for the recognized organizations;
- The duties of the European Commission as regards the recognition, assessment;

and, where appropriate, the imposition of correctives measures or sanctions on recognized organizations.

In the case of an IMO audit, Greece will state that only compliance with those provisions of the relevant international conventions which the Hellenic Republic has accepted, including in the terms of this declaration, shall be verified."

Statement by the delegation of Japan

"This statement is made on behalf of the following members: Australia, the Bahamas, Canada, China, the Cook Islands, Japan, Liberia, the Marshall Islands, New Zealand, Panama, the Philippines, the Republic of Korea, the Russian Federation, Singapore, Tuvalu, the United States and Vanuatu.

* Statements have been included in this annex in the order in which they were given, sorted by agenda items, and in the language of submission (including translation into any other language if such translation was provided).

We are concerned with the ambiguous declaration of the III Code just made by the delegation of Greece to which a number of member states have associated it to. In particular, it is unclear whether in making reference to EU law those member states, intend to uphold their obligations and responsibilities under the III Code. Of particular concern is whether or not they intend to go beyond the provision of the implementation of the III Code and the RO Code with respect to recognition and certification of RO's for the survey and certification of ships outside of their jurisdiction on non EU-flagged ships.

The application of any extra provisions would contravene the harmonised implementation of IMO instruments and the III Code. Member States that seek to address issues not already covered by the III Code, or any IMO instrument, should bring these issues to the Organisation for consideration. The full and effective implementation of the III Code and RO Code would otherwise be jeopardized.

Furthermore, we state, in no uncertain terms, that ROs are performing their functions under the sole authority of laws, rules and regulations set down by the government of the Member State in order to ensure effective jurisdiction and control of ships flying its flag. In this regard, for any RO to operate with other requirements not set out by the government on whose behalf it operates would be an infringement of sovereignty of that government.

We all support the full implementation of the III Code and the RO Code as it will enhance maritime safety and protection of marine environment, and particularly note that many of the member states now associated with the declaration of Greece had a strong hand in promoting the development of the III Code with the understanding of its benefit. In this regard, we all look forward to a clarification on the declaration from the delegation of Greece and other Member States associated with it."

Statement by the delegation of the United States

"The United States welcomes the establishment of a mandatory system of auditing. Adoption of a mandatory IMO Member State Audit Scheme has been a goal for which we have all strived for a long time. This system, particularly where a contracting government develops a program of actions in response to audit findings, will enhance the effective and efficient implementation of applicable IMO instruments. The assistance of the Secretary-General in the administration of this new audit scheme will also be helpful, though of course questions of interpretation and compliance are for States parties to the agreements to determine and not the Organization or an auditor.

The United States wishes to reiterate its understanding that the audit standards reflected in the III Code are intended as benchmarks that are to be used when conducting audits of governments' implementation of the relevant mandatory IMO instruments; the audit standards themselves do not, however, give rise to legal obligations. Similarly, the role of the auditors is to assess the consistency of a government's implementation efforts with the audit standards and not to make conclusions about a Party's implementation of obligations in an underlying instrument.

We continue to have concern that converting the word "should" to "shall" whenever the word appears in the III Code could have the unintended effect of creating additional legal obligations beyond the obligations that will be contained in all of the IMO agreements being amended to make use of the III Code mandatory. For this reason we object to paragraph 2 in each of the relevant adopting resolutions regarding the term "should" in the Code. When using the Code as a benchmark the audit should treat the relevant portions of the Code using

the term "should" as though they were mandatory for purposes of the audit, but the United States does not consider that the provisions contained in the III Code itself give rise to legally binding obligations, and we would object to any contrary reading of the Code, the amendments being considered for adoption at this session of the Committee, or the adopting resolutions. Compliance with the obligations set forth in the agreements being amended is, of course, legally required by each Party to these instruments, and adequate domestic measures are necessary to implement and enforce the obligations under each instrument.

We understand the text of the amendments being adopted to be consistent with our views in this regard, and request that our statement be included in the report of this session."

Statement by the delegation of the Republic of Korea

"The delegation of the Republic of Korea would like to express a deep appreciation to the chairman and members of the drafting group for their hard work. Also, this delegation would like to thank all distinguished Member States who supported our document.

As introduced before, our proposal was to apply "3 dates" scheme, which was also proposed under agenda 17 as well, for elimination of the foreseeable problems on implementation which may occur in the future under existing contract.

Mr. Chairman, this delegation still considers the "3 dates" scheme is more appropriate manner than keel-laying date in the revised IGC Code. Nevertheless, taking into account all the difficulties in application of our proposal at this stage, we are fully understand that the compromise has been reached under this difficult circumstance.

However, we would like to ask interested parties including flag States to share our concerns and to consider proper measures for minimization of the impact to ships with existing contract. We do not believe that all related problems raised in our document can be addressed, although entry into force date based on keel-laying date will be postponed by six months than the original draft amendment.

In this regard, this delegation strongly urges all interest parties including flag states to cooperate to solve this important issues in a wise manner.

Mr. Chairman, we kindly request that this statement be reflected in the final report of this Committee."

ITEM 4

Statement by the observer from ITF

"ITF generally supports MSC 93/4 but have reservations with paragraph 4.8.1 Port Security Incident and agrees that it should go forward to a correspondence group.

ITF want to be on record that, "An organized Industrial Action within the port boundaries should be explicitly exempted from the definition of a Port Security Incident"."

ITEM 6

Statement by the observer from IFSMA

"IFSMA representing ship masters notes the number of papers submitted by CLIA on this agenda item. IFSMA wishes to be associated with the intervention by the distinguished delegate of China. IFSMA believes that the best way to proceed on this important issue would be by an independent analysis focusing upon design and construction, operation and manning, fire fighting and life-saving system; provisions of which should be mandated by this organisation to all passenger vessels.

It is vital that these issues are addressed by regulatory authorities so that in the event of a major incident, loss of life is minimized, since this will surely happen.

IFSMA requests that this statement is recorded in the report of the Committee."

ITEM 11

Statement by the delegation of Canada

"The Canadian delegation recalls the decision of this committee with regards to MSC 93/11/2 but would like to provide additional information on the impact of this decision.

Canada agrees that vessels in many cases will only be able to navigate polar waters so long as their crews are trained and certificated in accordance with the requirements of the draft polar code. Canada supports the two tier approach to additional training requirements. However, we also recognises that many of the ships used in polar waters are only occasional visitors.

Safety may be enhanced by providing such vessels with the flexibility to use certificated personnel to provide the Master and officers of the watch with supplementary expert assistance in ice navigation. This can be in lieu of having the vessel's bridge officers certificated for polar waters.

Ice navigators have been and are being used successfully throughout the Arctic and in the Antarctic. Several major and long-standing operations in both Canada and in other areas now use this approach. In current practice, the ice navigator enhances safe navigation by assisting the Master and Navigating Officers with the evaluation of the ice conditions against the vessel's capability in ice, and provides expert input on route selection, safe speed and other operational decisions. The ice navigator provides the flexibility, choice and the ability for owners to make decisions appropriate for their vessel and their operations.

Most of the voyages involved are carried out only in times when the ice cover is at its seasonal minimum. However, ice of land origin is often present and ice concentrations can be greater than open waters, particularly in the shoulder seasons. These conditions trigger the Code requirements for officer qualifications.

The proposed ice navigator would have provided an option for these types of circumstances. The decision of MSC not to reconsider this option will have several unintended outcome, which will be accentuated by the ongoing increase in polar activities in the resource development sector.

Owners of ships making only occasional voyages in polar waters may be reluctant to commit to specialized training for their officers. Preventing the use of supplementary crew may tend to reduce the general pool of officers available to undertake polar voyages. On the other hand, if personnel are trained but have little opportunity to exercise their training, they may lose capability before an actual voyage. An ice navigator is more likely to offer current expertise and local knowledge.

Operations in polar waters are always challenging, and these outcomes are likely to make them more so on both safety and economic grounds.

Canada would like to thank the Committee for the opportunity to offer additional clarifications and we invite member States who wish to discuss further to contact Canada."

ITEM 12

Statement by the delegation of Norway

"As can be seen in paragraph 3.9 of document SSE 1/21, Norway reserved its position on this circular at SSE 1. We are of the opinion that just because a ship is an existing ship, it should not be allowed to carry vehicles with compressed hydrogen or natural gas in their tanks, if it is only "to the satisfaction of the Administration, taking into account SOLAS regulation II-2/20-1 and SP 961 and SP 962 of the IMDG Code, as applicable"; and to complete an inspection of the cars "to the satisfaction of the Administration, taking into account …" is in our view much too vague and will not ensure uniform implementation. In addition we find it very difficult to see how we can implement and enforce the required inspection. In developing regulations for new ships, risks were identified and mitigated through additional regulations. In our view, as an absolute minimum, sufficient ventilation, operated continuously, should be required also for existing ships; hence we do not support the issuing of this circular."

ITEM 16

Statement by the delegation of Cameroon

"As you are aware, on 24 and 25 June 2013, Cameroon hosted the summit of Heads of State and Government of the Economic Community of Central African States (ECCAS), the Economic Community of West African States (ECOWAS) and the Gulf of Guinea Commission (GGC), on maritime safety and security in the Gulf of Guinea.

One of the key outcomes of the summit was the adoption, by more than 25 Heads of State and Government, of a landmark regional strategy against piracy, armed robbery and unlawful acts at sea based on three main instruments namely:

- The Declaration of Heads of State and Government of Central and West African countries on safety and security in their common maritime space, called the "Yaoundé Declaration";

- The code of conduct for the prevention and repression of acts of piracy and armed robbery against ships and illicit maritime activities in West and Central Africa;

- The Memorandum of Understanding among ECCAS, ECOWAS, and the GGC on maritime safety and security in Central and West Africa.

This Memorandum of Understanding provides for the establishment of an Interregional Coordination Centre with headquarters in Yaoundé, Cameroon.

After the positive outcomes of the Yaoundé Summit, it was important and urgent to monitor the implementation of the strategy. This is so because the said Summit should indeed be considered as a starting point for an ambitious multidimensional programme whose implementation requires a plurality of actions and multifaceted initiatives.

Within this context, on March 19, 2014, stakeholders met in Accra, Ghana and created an Interregional Working Group (IWG) made up of representatives of the three regional bodies, namely the Economic Community of Central African States (ECCAS), the Economic Community of West African States (ECOWAS) and the Gulf of Guinea Commission (GGC).

The setting up of the Interregional Coordination Centre (ICC) is one of the main priorities of the Yaoundé Strategy and a work plan has been adopted for the implementation of this action.

The work plan provides for the holding of three working sessions in Yaoundé, Cameroon to operationalize the Interregional Coordination Centre.

The first session of the Interregional Working Group held from 22 to 26 April 2014 in Yaoundé to draft the requisite instruments for the effective take-off of the Interregional Coordination Centre (ICC).

The session developed a series of draft instruments to be submitted to the three regional organisations (ECCAS, ECOWAS and GGC) and all the concerned stakeholders for possible comments to be considered at the second session. The draft instruments are:

- Additional protocol to the Yaoundé MOU on the organization and functioning of the Interregional Coordination Centre (ICC);
- Headquarters agreement between the Government of Cameroon and the ICC;
- Draft ICC staff regulations;
- Draft ICC internal rules and regulations;
- Action Plan for 2014-2016;
- Roadmap for June - December 2014;
- Communication Strategy;
- Resource mobilization strategy;
- ICC draft budget for June-December 2014.

The second session of the Interregional Working Group held from 10 to 15 May 2014 in Yaoundé and finalized the aforementioned instruments, to which must be added the rules of procedure of the meeting of senior officials of the three regional organizations.

It is worth noting that participants appreciated the remarkable presence of IMO's representative, Chris Trelawny, at the second session of the IWG. Consequently, we would like to avail ourselves of this opportunity to thank the IMO again for its continued support towards the development and implementation of this project.

Following the above mentioned work plan, the Interregional Working Group will hold its third session from 3 to 5 June 2014 in Yaoundé, Cameroon to adopt the requisite instruments for the effective take-off of the ICC presented above.

In order to ensure a smooth and efficient coordination of the implementation of the Yaoundé strategy at the national level, the President of the Republic of Cameroon, His Excellency Paul Biya, has created a National Monitoring Committee for the implementation of this strategy. It works to ensure the smooth functioning of the Interregional Coordination Group.

Mr. Chairman, Honourable Committee Members,

Such is the state of implementation of the strategy against piracy adopted in Yaoundé in June 2013.

Finally, it should be underscored that at the operational level, we need to mobilise adequate resources to effectively finance the Strategy. In this regard, the Cameroonian delegation hereby welcome the establishment by the IMO of a plurilateral Trust Fund for a special programme of capacity building for West Central Africa to effectively combat piracy and illegal acts in the Gulf of Guinea.

Our delegation would like to thank all States and partners who have already started paying in their contributions into the Fund, as the IMO Secretary-General has noted in his opening address.

Indeed, it is very important to put in place sustainable funding mechanisms, based on both national resources and contributions from the international community to sustainably improve the situation in the Gulf of Guinea, which is becoming a new front in the fight against piracy.

Our delegation will explore this concern in greater depth during the 64th session of the IMO Technical Cooperation, to be held from 11 to 13 June 2014."

Statement by the delegation of Angola

"As it's the first time Angola takes the floor today, we wish to express our deepest sympathy for the victims of the recent ferry accident in Bangladesh.

Mr. Chairman, Angola appreciates all efforts by the Organization to Prevent and suppress piracy, armed robbery against ships and other illicit activities in the Gulf of Guinea.

Like Nigeria and Cameroon, we also wish to thank China, Japan, Norway and the United Kingdom, for their significant contributions toward the "IMO West and Central Africa Maritime Security Trust Fund". As this fund is a crucial tool to intensify anti-piracy activities in that region.

As regards the tabletop exercises mentioned in paragraph 8 of the document, Angola believes that they are an encouraging step taken by the Organization. Perhaps another positive step would be for the Committee to receive a report from the Secretariat, explaining whether or not the expected outputs of the tabletop exercises are indeed being met by Member States that have undertaken them.

As document 93/16 clearly states, and the Secretary-General clearly stated in his opening remarks, the situation regarding piracy and other illicit maritime activities in the Gulf of Guinea, must be dealt with swiftly and effectively.

That said Mr. Chairman, it is important to highlight that the countries of that Region, Angola included, are very much engaged in the process of countering such activities.

Furthermore, as the delegation of the Republic of Cameroon has pointed out, some satisfactory progress is being made on the implementation of the Yaoundé Code of Conduct – as we approach the 1-year anniversary of that comprehensive regional strategy's adoption. The ongoing process to form and structure the inter-Regional Coordination Centre in particular, shows the region's commitment to tackle this issue.

It is also encouraging to note that the estimated number of attacks in the region went down in 2013 (54 attacks). Ten less than the 64 reported in 2012. We sincerely hope this downward trend will continue.

We also note that the percentage of ships that have been boarded by perpetrators since 2005 has also shown a downward trend from 90%, to 63% in 2013. Which is a step in the right direction.

That said, like other States of the Gulf of Guinea, Angola is cognisant of the fact that much more work must be carried out in order to harmonize all anti-piracy and illicit maritime activity efforts in the region.

Moreover, we can assure the Committee that Gulf of Guinea States, including Angola, are very much engaged in the process of leading this challenge toward a positive resolution."

Statement by the observer from ReCAAP

"Whilst this session has heard the various updates with regard to the situation in Central and Western Africa, thank you Mr. Chairman for giving the ReCAAP ISC the floor to provide an update on the development of the situation of piracy and armed robbery against ships in Asia.

The ReCAAP ISC was launched since November 2006 to address the challenges of piracy and armed robbery against ships in Asia. We are into our 8th year of operations and have grown to 19 Contracting Parties with Australia joining on 3 August 2013 as our latest member.

As the committee is aware, the ReCAAP model has been emulated in the formulation of the Djibouti Code of Conduct (DCoC), and the ReCAAP ISC had contributed to its development through the sharing of Best Management Practices (BMP) in information sharing, analysis and capacity building; and these are still ongoing.

The overall situation of piracy and armed robbery against ships in Asia in 2013 has improved. Of a total of 150 incidents reported, 77% were petty theft and less significant incidents. The moderately significant and very significant incidents were lowest based on a year-on-year comparison throughout the five year period of 2009-2013. Aside from our Focal Point network, we would like to acknowledge the excellent cooperation and collaboration with the Malaysian Maritime Enforcement Agency (MMEA) in information exchange and responses for several recent incidents.

Other joint collaborations with the shipping community include the production of the maritime security planning chart with the United Kingdom Hydrographic Office (UKHO) and Information Fusion Centre on 17 May 2013; sharing the ReCAAP training video on "The Need to Report" with members of BIMCO on its website, and conduct of the annual ReCAAP ISC Piracy & Sea Robbery Conference on 8 April 2014 with BIMCO, INTERTANKO and S. Rajaratnam School of International Studies (RSIS) which was held in conjunction with the Singapore Maritime Week.

While there has been improvement in the situation of piracy and armed robbery against ships in Asia, there is no room for complacency. To meet future challenges, the ReCAAP ISC will continue to evolve in the view of prevailing situation of incidents involving tug boats and barges, robberies at ports and anchorages etc. Moving forward, the ReCAAP ISC will continue to strengthen its role, stay relevance to the international maritime community, and endeavour to raise its stature as an internationally recognised centre of excellence."

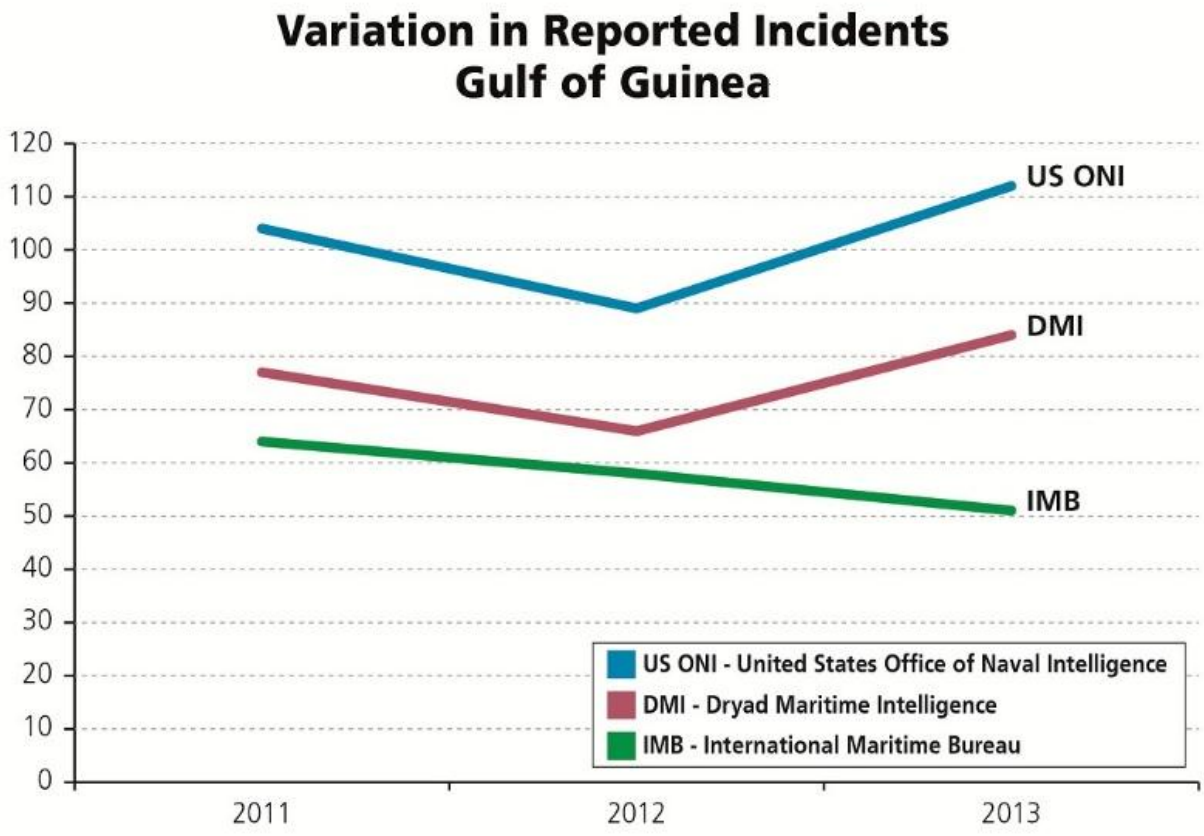
Statement by the observers from BIMCO, ICS, INTERTANKO and INTERCARGO

"The Round Table of Shipping Industries (BIMCO, ICS, INTERTANKO and INTERCARGO) would like to thank IMO for the detailed report on, the Prevention and suppression of piracy, armed robbery against ships and other illicit activity in the Gulf of Guinea (GoG) and indeed, comments on resolution A.1069 (28) of the Assembly. We would thank the delegates for the interventions so far and particularly the report from the Brazilian delegate on the extremely positive and expansive capacity building efforts and actual presence providing counter piracy assistance in the region.

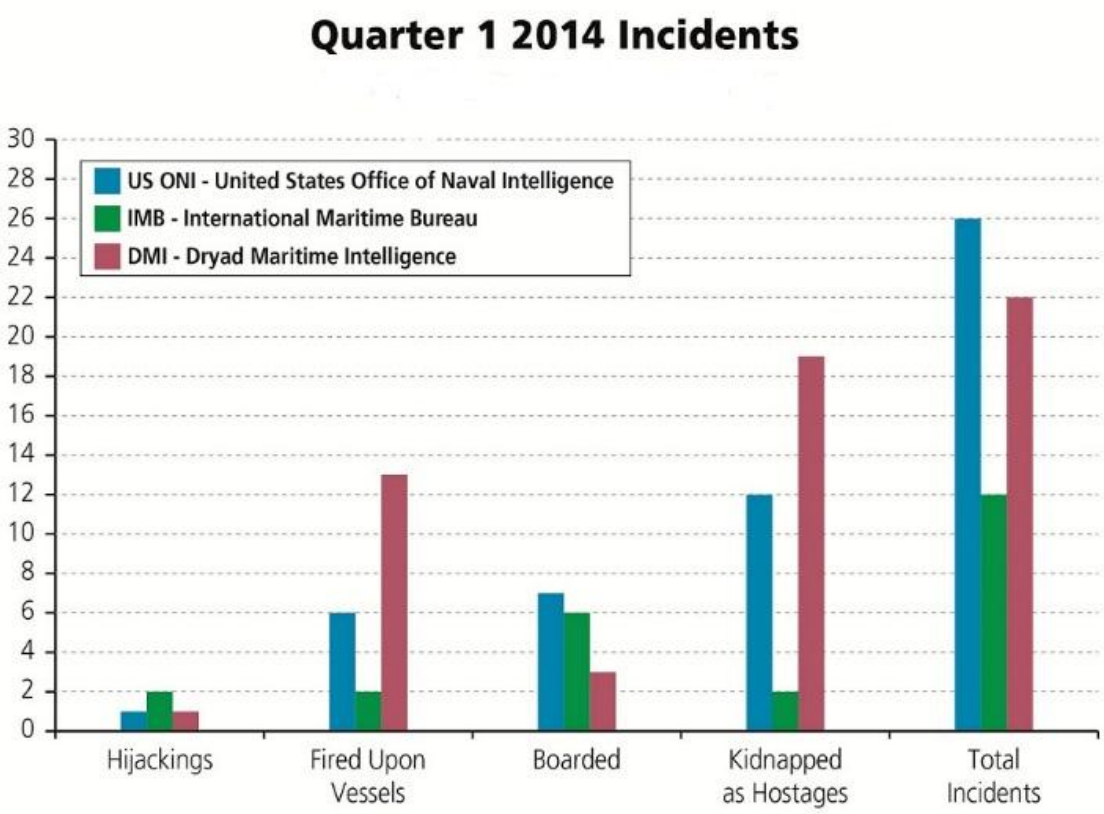
Notwithstanding the positive efforts of IMO as reported in MSC 93/16 it is important to highlight the lack of implementation of effective and practical measures to counter piracy in the region. Noting that the Secretariat suggests in the statistical section of the paper that the real level of attacks can only be estimated, it is our experience that the number of incidents in the region is in fact increasing. We suspect that there is considerable under reporting and that in part this is due to the lack of a clear reporting policy and the likelihood that any report of an attack will not lead to an immediate, if any, response.

We see no hard evidence of significant and sustainable improvement contrary to what is suggested in MSC 93/16 and the situation is more than confused by variations in, and lack of, reporting. This is exacerbated by the lack of a single, international information sharing and centralized reporting structure and the complex relationship between piracy and other illegal maritime activities in West Africa. This need has to be addressed now.

For example when one looks beyond GISIS for data, there is not only a variation in reporting but also in the number of incidents. The IMB estimates that "only one third of incidents are reported" and when comparing their figures with those of the US Office of Naval Intelligence (ONI) and Dryad Maritime Intelligence (DMI – a civilian maritime intelligence organization), they do not show any decline in the number of incidents but over the last four years, a real-time increase in incidents (with just a slight dip recorded in 2012). In 2013 ONI identified an additional 60 incidents and DMI 30 more than recorded in GISIS. We therefore strongly urge the Committee to recognize that the recent general trend is up and not down.

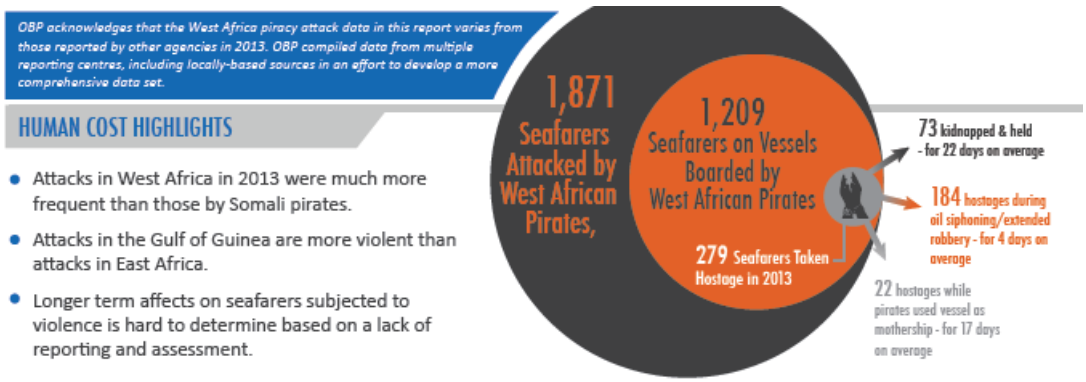


The figures for the first Quarter of 2014 are particularly disconcerting. There is a clear growth in incidence of kidnapping of crew for ransom. The indications are that there have been between 22 and 26 incidents with somewhere in the region of 12 to 18 seafarers kidnapped as hostages.



The recently released Oceans Beyond Piracy (OBP) report "The State of Maritime Piracy 2013" identified this trend as the most prevalent type of attack and not "theft" as suggested in MSC 93/16. We would agree there has been an increase in attacks in open waters but very recent events and Q1 of 2014 would suggest this is not the real underlying trend.

It is the serious growth in the trend of kidnapping that is of the greatest concern to the shipping industry. OBP reports that in 2013 some 1871 seafarers were exposed to attacks of whom 279 were held hostage. Of these 73 were abducted by pirates for ransom. These figures again are at significant variance with the IMO statistics. In short, many more Seafarers lives were put at risk in 2013 than is being suggested. This level of risk is unacceptable.



We suggest therefore that there is an urgent need to review the provisions of resolution A1069 (28) and urge the Committee to take immediate action, in the light of the fact that the resolution itself notes specifically the demand in UNSCR 2039 for the "urgent need to devise and adopt effective and practical measures to counter piracy and armed robbery at sea in the Gulf of Guinea". We are of the firm view that greater and speedier action is required to devise and adopt effective and practical measures to counter piracy in

the region. We suggest as requested by the Secretariat in MSC 93/16, there is an urgent need to review the provisions of resolution A1069(28) and urge the Committee to take immediate action in order to define what additional steps could or should be taken. This should include how coastal States can better meet their obligations under UNCLOS.

The Committee is also respectfully requested to note the above information and include a note and the detail of this intervention in the final report."

Statement by the observer from ISO

"I am pleased to report on the status of ISO 2800 as provided in document MSC 93/16/2. I will offer only a few key comments.

1 At MSC 90 (May 2012) we were tasked by acclamation to develop the standard regarding private maritime security companies providing privately contracted armed security personnel on board ships.

2 Six months later we published the ISO/PAS 28007 and made it available for independent certification on 27 November 2012. At that time we initiated an accreditation scheme pilot under the aegis of the United Kingdom Accreditation Services (UKAS) as a member of the International Accreditation Forum (IAF).

3 The pilot has been successfully concluded under the leadership of UKAS with the full support of the UK Government. Under IAF agreements the process is now open to countries around the world with IAF members for their national accreditation body use.

4 We already have over 30 properly accredited PMSCs around the globe. These members grow daily.

We were honoured to be given the task to develop the ISO Standard 28007 by IMO MSC and for the outstanding cooperation and collaboration from the IMO Secretariat during development with a special note of gratitude to Chris Trelawny and, Tracy Peverett and staff.

We ask the Committee to recognize the contribution that ISO 28007 can make to the assurance of successful anti-piracy operation and ask Member States to be encouraged to identify within their requirements that PMSCs providing armed security personnel on board ships hold properly scoped, accredited certification to ISO 28007. A possible method could be an additional paragraph in MSC.1/Circ.1406/rev.2 with appropriate words determined by IMO. Concluding, the standard as PAS 28007 was voted with 100% "yes" votes. We must acknowledge the great contribution of many governments, IGOs, NGOs and the industry team.

The wording from our paper for MSC.1/Circ.1406/Rev.2 was only a suggestion. During our intervention the UK delegation and others stated that the wording should be modified to say flag States are encouraged for PMSCs employing PCASP on board ships. For paragraph 15 of MSC 93/16/2 the last sentence should be revised to say "encouraged to provide" and "should provide" is to be deleted. It should be noted that ISO Standards are voluntary consensus industry standards. They are not requirements but offer the best advice for consultation. ISO does not accredit or certify its standards. If that is a requirement by the user for implementation recognizing paragraph 1.1 of our requirements from IMO for independent certification we engaged the IAF and their member body UKAS in the United Kingdom."

Statement by the delegation of Oman

في هذا الصدد يود وفد سلطنة عمان ان يتقدم بالشكر الجزيل للمنظمة البحرية الدولية على الجهود والمبادرات التي تقوم بها للحد من عمليات القرصنة.

كما نؤكد على الجهود التى تضطلع بها بلادي في مواجهة ظاهرة القرصنة البحرية والسطو المسلح وتعاونها مع المجتمع الدولي في وضع حد لهذه الظاهرة التى أثرت سلباً على الملاحة الدولية، مؤكدين على دور السلطنة في الألتزام بإتفاقيات المنظمة البحرية الدولية وإتفاقية الأمم المتحدة لقانون البحار لعام 1982م وقرارات مجلس الأمن ذات الصلة لمكافحة القرصنة البحرية قبالة السواحل الصومالية.

سيدي الرئيس
لقد أسهمت تظافر الجهود الدولية في الحد من تفاقم ظاهرة القرصنة البحرية والسطو المسلح ضد السفن والذى بلغت أوجها في المنطقة في عامي 2010 و2011، بل وشهدت تلك الأعمال تراجعاً واضحاً في نهاية 2011 إلى أن تلاشت خلال هذا العام 2014. وهو ما تؤكدة التقارير الصادرة من المنظمة المنظمة البحرية الدولية، وكذلك التقارير الصادرة عن المراكز الاقليمية لتبادل المعلومات. وقد أصبح الوضع هادئا تماما ولا يثير القلق وبالاخص في منطقة بحر عمان.

ونود أن نؤكد من جانبنا على أن شواطئ السلطنة لا سيما في منطقة بحر عمان شهدت هي الأخرى إستقراراً تاماً.

وعليه فان وفد بلادي يطالب من خلال هذا الاجتماع أن يتم الاخذ في عين الاعتبار إستبعاد منطقة بحرعمان من قائمة المناطق عالية الخطورة، والذي ورد في النسخة الرابعة من تقرير افضل الممارسات الادارية وفي بعض التقارير الأخرى. وندعو المجتمع الدولي إلى وقف تسمية منطقة بحر عمان بالمنطقة عالية الخطورة. وأن يعكس ما جاء في هذا البيان الوثائق الرسمية الصادرة عن هذا الإجتماع.

شكرا سيدي الرئيس

Peace be upon you all

Mr. Chairman

I would like at the outset stress our country's efforts to combat maritime piracy and armed robbery, and its cooperation with the international community to prevent such actions that have negative impact on international navigation. We emphasize the Sultanate's commitment with UNCLOS 1982, UN Security Council resolutions and relevant principles of international law within the frame of our efforts to combat piracy off the coast of Somalia.

Mr. Chairman,

Collective international efforts contributed in reducing the intensity of maritime piracy and armed robbery which reached the peak against vessels in the region during 2010 and 2011. Such acts witnessed a remarkable decrease since the end of 2011 until now. This is evident from piracy reports issued by the IMO and by Regional Data Exchange Centers. The situation is completely calm currently with no concern especially in the Sea of Oman which is totally free of maritime piracy and armed robbery.

Therefore, The Sultanate of Oman is requesting the removal of the Sea of Oman from the list of High Risk areas included in BMP 4 and some other reports, and we call upon the international community to refrain from naming the Sea of Oman as a High Risk area.
Finally, our delegation requests that this statement be reflected in your final report.

Thank you Mr. Chairman