

SUB-COMMITTEE ON DANGEROUS
GOODS, SOLID CARGOES AND
CONTAINERS
18th session
Agenda items 5 and 8

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DEVELOPMENT OF MEASURES TO PREVENT LOSS OF CONTAINERS
REVISION OF THE GUIDELINES FOR PACKING OF CARGO TRANSPORT UNITS

Report of the working group

GENERAL

1 The Working Group on Container Safety met from 16 to 18 September 2013 under the chairmanship of Mr. K. Smith (United States).

2 The group was attended by delegations from the following Member Governments:

| | |
|------------------|--------------------|
| BRAZIL | NEW ZEALAND |
| CHINA | NIGERIA |
| CYPRUS | NORWAY |
| DENMARK | PANAMA |
| ESTONIA | PERU |
| FINLAND | REPUBLIC OF KOREA |
| FRANCE | RUSSIAN FEDERATION |
| GERMANY | SLOVAKIA |
| GREECE | SPAIN |
| JAPAN | SWEDEN |
| LIBERIA | UNITED KINGDOM |
| MARSHALL ISLANDS | UNITED STATES |
| NETHERLANDS | |

and the following Associate Member of IMO:

HONG KONG, CHINA

3 The group was also attended by representatives from the following United Nations and specialized agencies:

INTERNATIONAL LABOUR ORGANIZATION (ILO)
UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (UNECE)

and observers from the following non-governmental organizations in consultative status:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)
INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
INTERNATIONAL ASSOCIATION OF PORTS AND HARBORS (IAPH)
BIMCO
ICHCA INTERNATIONAL LIMITED (ICHCA)
EUROPEAN CHEMICAL INDUSTRY COUNCIL (CEFIC)
INSTITUTE OF INTERNATIONAL CONTAINER LESSORS (IICL)
INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS (IADC)
INTERNATIONAL GROUP OF PROTECTION AND INDEMNITY ASSOCIATIONS
(P & I Clubs)
INTERNATIONAL ROAD TRANSPORT UNION (IRU)
THE INTERNATIONAL MARINE CONTRACTORS ASSOCIATION (IMCA)
INTERNATIONAL TRANSPORT WORKERS' FEDERATION (ITF)
WORLD SHIPPING COUNCIL (WSC)
THE NAUTICAL INSTITUTE (NI)

TERMS OF REFERENCE

4 Taking into account the comments and decisions made in plenary, the working group was instructed to:

with regard to agenda item 5

- .1 finalize the draft amendments to SOLAS regulation VI/2 and the draft Guidelines regarding verified gross mass of a container carrying cargo, based on document DSC 18/5;
- .2 further consider the matter related to preventing the use of counterfeit refrigerants, taking into account document DSC 18/5/5, and advise the Sub-Committee on how to deal with the matter of responsibility, related to the proposed modifications of the draft amendment to paragraph 7.3.7.2.4 of the IMDG Code to refer to E&T 20 for finalization;

with regard to agenda item 8

- .3 consider the draft CTU Code (DSC 18/8), taking into account documents DSC 18/8/1, DSC 18/8/2, DSC 18/7/7, DSC 18/INF.4 and DSC 18/INF.7, in particular on how to reduce the volume of the draft Code (e.g. splitting the current draft into two, so that the first part would be the draft Code and the second part would be another document, for example training materials) and on which proposals and comments should be reflected in the draft Code, and advise the Sub-Committee accordingly;
- .4 advise the Sub-Committee on how to finalize the Code (e.g. referring comments and decisions by the Sub-Committee, through the IMO Secretariat, to the Group of Experts), taking into account that the fourth session of the Group of Experts has been tentatively planned for 4 and 5 November 2013; and
- .5 submit a written report by Friday, 20 September 2013.

DEVELOPMENT OF MEASURES TO PREVENT LOSS OF CONTAINERS

Draft amendments to SOLAS chapter VI

5 As instructed by the Sub-Committee, the group considered the draft amendments to SOLAS chapter VI, regarding mandatory verification of gross weight of containers, based on annex 1 to document DSC 18/5, and after an in-depth discussion of all the issues involved, the group finalized the draft amendments to SOLAS regulation VI/2, as set out in annex 1.

Draft Guidelines regarding the verified gross mass of a container carrying cargo

6 Having considered the draft Guidelines regarding the verified gross mass of a container carrying cargo (DSC 18/5, annex 2), the group took action as indicated hereunder.

Scope of application

7 The group considered the comments from the delegation of Spain, made in plenary, regarding paragraph 4 of the draft Guidelines, concerning the scope of application and concluded that there is no contradiction, as the draft Guidelines apply to containers tendered by a shipper and not to single cargo items which are delivered to the ship and packed on board into a container.

Methods for obtaining the verified gross mass of a packed container

8 In considering comments from the delegation of Spain concerning paragraph 7.2.1 of the draft Guidelines, the group agreed that no additional amendments were necessary.

Verified gross mass

9 The group considered the comments from the delegation of Belgium in plenary, that in the draft Guidelines, the mass should not be considered at the time of booking, but after the container is packed, and noted that it is recognized that it is commercial practice for the shipper to provide a gross mass to the carrier at the time of booking. However, in the draft amendments to SOLAS regulation VI/2.5 and paragraph 8 of the draft Guidelines regarding the verified gross mass of a container carrying cargo, as set out in annexes 1 and 2, respectively, it is specified that it is the verified gross mass which must be used on the documentation and as a condition for ship loading. If the gross mass is already verified at the time of booking it can be used for ship stowage purposes.

Equipment

10 In considering section 11 (Equipment) of the draft Guidelines on whether accuracy standards should be defined in the draft Guidelines, as there may be different standards in various States, and noting that IMO guidelines cannot interfere with national regulations, the group decided to keep the draft text as prepared by the correspondence group.

Master's discretion

11 In response to the enquiry from the delegation of Greece about the meaning and scope of paragraph 20 of the draft Guidelines, the consensus view of the group was that the paragraph as drafted embodies and reaffirms the Master's discretion to require an individual packed container to be weighed as condition for ship stowage if the Master has concerns about the validity of the verified gross mass provided in the shipping document. As this already follows from the pertinent SOLAS provisions, the group also agreed that it is not

necessary to amend the proposed amendments to SOLAS regulation VI/2 and/or paragraph 20 of the draft Guidelines further regarding the Master's discretion to accept or deny shipments for ship stowage.

Enforcement

12 The group considered the comments from the delegation of the Bahamas, made in plenary, concerning enforcement and how obligation should be placed on port States to ensure shippers are acting responsibly. In this context, the group reviewed paragraphs 21 and 22 of the draft Guidelines and amended the draft text to reflect that it is a requirement of Contracting Parties to ensure SOLAS requirements are enforced.

Draft Guidelines regarding the verified gross mass of a container carrying cargo

13 After a lengthy discussion of all related matters, the group prepared the draft Guidelines regarding the verified gross mass of a container carrying cargo, as set out in annex 2.

Matters related to preventing the use of counterfeit refrigerants

14 In considering matters related to preventing the use of counterfeit refrigerants, taking into account document DSC 18/5/5 (ICS and WSC), the group agreed to the proposed amendments to paragraph 7.3.7.2.4 and to the new draft paragraph 7.3.7.2.5 of the IMDG Code, with editorial modifications. In this connection, having noted that the aforementioned proposed amendments should be considered in the context of chapter 7 of the IMDG Code, the group agreed to proposed consequential amendments to paragraph 7.3.2.2 regarding the responsibility of the container owner, and that these proposed consequential amendments could impact on other parts of the IMDG Code and, therefore, should be further considered by E&T 20.

15 Consequently, the group prepared draft amendments to chapter 7 of the IMDG Code for submission to E&T 20 for further consideration, with a view to finalization, as set out in annex 3 (see also paragraph 17).

DRAFT CODE OF PRACTICE FOR PACKING OF CARGO TRANSPORT UNITS (CTU CODE)

16 Having considered the draft Code of Practice for Packing of Cargo Transport Units (CTU Code), as contained in the annex to document DSC 18/8, taking into account documents DSC 18/8/1, DSC 18/8/2, DSC 18/7/7, DSC 18/INF.4 and DSC 18/INF.7, comments made in plenary, and after a lengthy discussion of the related issues, the group took action as indicated hereunder.

Conditions for a container packing certificate

17 In considering the proposals by the Republic of Korea (DSC 18/7/7), regarding the confirmation of the CSC Safety Approval Plate and the validity of ACEP or Periodic Examination Scheme of a container/vehicle to mitigate any risk to safety that may be caused by potential structural deficiencies of a container/vehicle, the group was of the view that the proposals would not affect the draft CTU Code, and therefore, no proposed changes were made to the draft Code. However, the group agreed to the proposal for the addition of the two new paragraphs 7.3.2.2.1 and 7.3.2.2.2 to the IMDG Code, as set out in annex 3 (see also paragraph 15).

Recommendations to the Group of Experts for the revision of the IMO/ILO/UNECE guidelines for packing of cargo transport units

18 In consideration of comments made in plenary concerning methods to reduce the volume, the group agreed that the draft CTU Code should be user-friendly (e.g., colour indexed), divided in three parts, as follows:

- .1 main body;
- .2 annexes, which are referenced in the main body; and
- .3 appendices, containing informative material.

19 In light of the above, the group also agreed that the IMO/ILO/UNECE Group of Experts should identify the referenced annexes and informative material and place them accordingly.

20 Additionally, the group decided that the draft Code should be available on the web, free of charge, for ease of dissemination. In order to facilitate the dissemination of the Code, the IMO/ILO/UNECE Secretariat should consider creating a website dedicated to CTUs. In this connection, the representative of the UNECE informed the group that the UNECE could check the possibility of the creation of the website and report to the Group of Experts on this matter. The representative also informed the group that the latest information of the Group of Experts can be found in the following website:

<http://www.unece.org/trans/wp24/guidelinespackingctus/intro.html>

Concrete proposals

21 As instructed by the Sub-Committee, the group considered the proposals contained in documents DSC 18/8/1, DSC 18/8/2, DSC 18/INF.4 and DSC 18/INF.7 and prepared a Recommendation which consists of a consolidation of all proposals, as set out in annex 4, for referral to the IMO/ILO/UNECE Group of Experts meeting on 4 and 5 November 2013, in Geneva. Issues which the working group did not consider in detail due to its very technical nature, or where consensus could not be reached, were put into square brackets for further consideration by the Group of Experts. It should be noted that the Recommendation is not an extensive list of proposed amendments to the draft CTU Code. Therefore, Member Governments and international organizations are encouraged to submit further comments and proposals directly to the UNECE Secretariat*, at the very latest by 8 October, for consideration by the Group of Experts.

22 The majority of the group was of the opinion that the draft CTU Code, as finalized by the Group of Experts, at its fourth meeting, in Geneva, should be submitted directly to MSC 93 for approval. In this context, the group invited the Sub-Committee to request the Secretariat to take action as appropriate.

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23 The observers from ICS and WSC raised concerns with respect to the proposals of Slovakia and Sweden contained in document DSC 18/8/1, noting that tests were conducted on containers in a static state that might not reflect the stresses to which containers would be subjected during sea transport. Furthermore it was noted that the tests produced values lower than those currently recommended by industry best practice, in particular the German Container Handbook. The observers were concerned that the findings could represent a decrease in container safety standards, and could have serious implications for the continued safe operations of containers if included in a globally disseminated guidance document.

24 Following discussion, Slovakia and Sweden have clarified that in the tests described in document DSC 18/INF.4, dynamic forces were considered in the same manner that is prescribed for tests of container floor strength by ISO Standard 1496-1.

25 In considering the continued disagreement on whether to include Option 1 or Option 2, as amended, in appendix 5 to annex 14 to the draft CTU Code, and the industry concerns about possible reduction of container safety, as a result of the formulas described in document DSC 18/8/1, the group was of the view that efforts should be made to try to facilitate an agreement at the Group of Experts meeting. In this context, the group agreed to recommend to the Sub-Committee that the ISO be invited to review, taking into account existing ISO standards, the current Options 1 and 2 and the aforementioned formulas contained in document DSC 18/8/1 and, further, to inform the Group of Experts of the conclusions and recommendations arising from this review.

ACTION REQUESTED OF THE SUB-COMMITTEE

- 26 The Sub-Committee is invited to approve the report in general and, in particular, to:
- .1 agree to the draft amendments to SOLAS regulation VI/2 for submission to MSC 93 for approval, with a view to subsequent adoption (paragraph 5 and annex 1);
 - .2 agree to the draft Guidelines regarding the verified gross mass of a container carrying cargo for submission to MSC 93 for approval (paragraph 13 and annex 2);
 - .3 agree, in principle, to the draft amendments to chapter 7 of the IMDG Code for submission to E&T 20 for further consideration, with a view to finalization (paragraph 15 and annex 3);
 - .4 endorse the group's recommendation to instruct E&T 20 to consider the impact of the draft amendments to paragraph 7.3.2.2 on other parts of the IMDG Code, and to prepare any necessary consequential amendments to the Code, as appropriate (paragraph 14);
 - .5 agree to the recommendations for the Group of Experts for the revision of the IMO/ILO/UNECE Guidelines for Packing of Cargo Transport Units for submission to the IMO/ILO/UNECE Group of Experts meeting, on 4 and 5 November 2013, in Geneva (paragraph 21, annex 4);
 - .6 endorse the groups recommendation to invite Member Governments and international organizations to send further comments and proposals, if any, directly to the to the UNECE Secretariat, for consideration by the Group of Experts (paragraph 21);

- .7 endorse the group's recommendation to submit the draft CTU Code, as finalized by the Group of Experts, at its fourth meeting, in Geneva, to MSC 93 for approval, and request the Secretariat to take action as appropriate (paragraph 22); and
- .8 endorse the group's recommendation to invite ISO to review, taking into account existing ISO standards, the current Options 1 and 2 and the formulas contained in document DSC 18/8/1, and submit the conclusions and recommendations arising from this review directly to the Group of Experts for the revision of the IMO/ILO/UNECE guidelines for packing of cargo transport units (paragraph 25).

ANNEX 1

DRAFT AMENDMENTS TO SOLAS CHAPTER VI

Part A General Provisions

Regulation 2 – Cargo information

The new paragraphs 4, 5 and 6 are added after the existing paragraph 3, as follows:

"4 In the case of cargo carried in a container*, 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.

* 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.[...]).

‡ 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."

ANNEX 2

DRAFT MSC CIRCULAR

**GUIDELINES REGARDING THE VERIFIED GROSS MASS
OF A CONTAINER CARRYING CARGO**

1 The Maritime Safety Committee, at its [ninety-third session (14 to 23 May 2014)], having considered the proposal by the Sub-Committee on Dangerous Goods, Solid Cargoes and Containers, at its eighteenth session (16 to 20 September 2013), approved the *Guidelines regarding the verified gross mass of a container carrying cargo*, as set out in the annex.

2 The Guidelines are intended to establish a common approach for the implementation and enforcement of the SOLAS requirements regarding the verification of the gross mass of packed containers.

3 Member Governments are invited to bring the annexed Guidelines to the attention of all parties concerned.

* * *

ANNEX

GUIDELINES REGARDING THE VERIFIED GROSS MASS OF A CONTAINER CARRYING CARGO

Introduction

1 To ensure the safety of the ship, the safety of workers both aboard ships and ashore, the safety of cargo and overall safety at sea, the International Convention for the Safety of Life at Sea (SOLAS), as amended, requires in chapter VI, part A, regulation 2 that packed containers' gross mass are verified prior to stowage aboard ship. The shipper is responsible for the verification of the gross mass of a container carrying cargo (hereinafter "a packed container"). The shipper is also responsible for ensuring that the verified gross mass is communicated in the shipping documents sufficiently in advance to be used by the ship's master or his representative and the terminal representative in the preparation of the ship stowage plan. In the absence of the shipper providing the verified gross mass of the packed container, the container should not be loaded on to the ship unless the master or his representative and the terminal representative have obtained the verified gross mass through other means.

2 The purpose of these Guidelines is to establish a common approach for the implementation and enforcement of the SOLAS requirements regarding the verification of the gross mass of packed containers. The Guidelines provide recommendations on how to interpret and apply the provisions of the SOLAS requirements. They also identify issues that may arise from the application of these requirements and provide guidance for how such issues should be resolved. Adherence to these Guidelines will facilitate compliance with the SOLAS requirements by shippers of containerized shipments, and they will assist other parties in international containerized supply chains, including shipping companies and port terminal facilities and their employees, in understanding their respective roles in accomplishing the enhancement of the safe handling, stowage and transport of containers.

Definitions

3 For the purpose of these Guidelines:

Administration means the Government of the State whose flag the ship is entitled to fly.

Calibrated and certified equipment means a scale, weighbridge, lifting equipment or any other device, capable of determining the actual gross mass of a packed container or of packages and cargo items, pallets, dunnage and other packing and securing material, that meets the accuracy standards and requirements of the State in which the equipment is being used.

Cargo items has the same general meaning as the term "cargo" in the International Convention for Safe Containers, 1972, as amended (hereinafter referred to as "the CSC"), and means any goods, wares, merchandise, liquids, gases, solids and articles of every kind whatsoever carried in containers pursuant to a contract of carriage. However, ship's equipment and ship's supplies¹, including ship's spare parts and stores, carried in containers are not regarded as cargo.

¹ Refer to the revised Recommendations on the safe transport of dangerous cargoes and related activities in port areas (MSC.1/Circ.1216).

Container has the same meaning as the term "container" in the CSC and means an article of transport equipment:

- (a) of a permanent character and accordingly strong enough to be suitable for repeated use;
- (b) specially designed to facilitate the transport of goods, by one or more modes of transport, without intermediate reloading;
- (c) designed to be secured and/or readily handled, having corner fittings for these purposes; and
- (d) of a size such that the area enclosed by the four outer bottom corners is either:
 - (i) at least 14 m² (150 sq. ft.); or
 - (ii) at least 7 m² (75 sq. ft.) if it is fitted with top corner fittings.

The term container includes tank-containers, flat-racks, bulk containers etc. Also included are containers carried on a chassis or a trailer except when such containers are driven on or off a ro-ro ship engaged in short international voyages (see definition of ship). Excluded from the definition is any type of vehicle². Also excluded from the definition are "offshore containers" to which the CSC, according to the Guidelines for the approval of offshore containers handled in open seas (MSC/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), does not apply.

Contract of carriage means a contract in which a shipping company, against the payment of freight, undertakes to carry goods from one place to another. The contract may take the form of, or be evidenced by a document such as sea waybill, a bill of lading, or multi-modal transport document.

Gross mass means the combined mass of a container's tare mass and the masses of all packages and cargo items, including pallets, dunnage and other packing material and securing materials packed into the container (See also "*Verified gross mass*").

Package means one or more cargo items that are tied together, packed, wrapped, boxed or parcelled for transportation. Examples of packages include, but are not limited to, parcels, boxes, packets and cartons.

Packed container means a container, as previously defined, loaded ("stuffed" or "filled") with liquids, gases, solids, packages and cargo items, including pallets, dunnage, and other packing material and securing materials.

Packing material means any material used or for use with packages and cargo items to prevent damage, including, but not limited to, crates, packing blocks, drums, cases, boxes, barrels, and skids. Excluded from the definition is any material within individual sealed packages to protect the cargo item(s) inside the package.

² Refer to the Revised Recommendations on harmonized interpretation and implementation of the International Convention for Safe Containers 1972, as amended (CSC.1/Circ.138/Rev.1).

Securing material means all dunnage, lashing and other equipment used to block, brace, and secure packed cargo items in a container.

Ship means any vessel to which SOLAS chapter VI applies. Excluded from this definition are roll-on/roll-off (ro-ro) ships engaged on short international voyages³ where the containers are carried on a chassis or trailer and are loaded and unloaded by being driven on and off such a ship.

Shipper means a legal entity or person named on the bill of lading or sea waybill or equivalent multimodal transport document (e.g. "through" bill of lading) as shipper and/or who (or in whose name or on whose behalf) a contract of carriage has been concluded with a shipping company.

Shipping document means a document used by the shipper to communicate the verified gross mass of the packed container. This document can be part of the shipping instructions to the shipping company or a separate communication (e.g. a declaration including a weight certificate produced by a weigh station).

Tare mass means the mass of an empty container that does not contain any packages, cargo items, pallets, dunnage, or any other packing material or securing material.

Terminal representative means a person acting on behalf of a legal entity or person engaged in the business of providing wharfage, dock, stowage, warehouse, or other cargo handling services in connection with a ship.

Verified gross mass means the total gross mass of a packed container as obtained by one of the methods described in paragraph 7 of these Guidelines. (See also "gross mass").

Scope of applicability

4 The SOLAS requirements to verify the gross mass of a packed container apply to all containers to which the CSC applies, and which are to be stowed onto a ship determined by the Administration to be subject to SOLAS chapter VI.

For example (but not limited to), a packed container on a chassis or trailer to be driven on a ro-ro ship is subject to the SOLAS requirements, if the ship has been determined by the Administration to be subject to SOLAS chapter VI and is not engaged on short international voyages. However, cargo items tendered by a shipper to the master for packing into a container already on board the ship are not subject to these SOLAS requirements.

Main principles

5 The responsibility for obtaining and documenting the verified gross mass of a packed container lies with the shipper.

6 A container packed with packages and cargo items should not be loaded onto a ship to which the SOLAS regulations apply unless the master or his representative and the terminal representative have obtained, in advance of vessel loading, the verified actual gross mass of the container.

³ SOLAS regulation III/2 defines "short international voyage" as an international voyage in the course of which a ship is not more than 200 miles from a port or place in which the passengers and crew could be placed in safety, and which does not exceed 600 miles in length between the last port of call in the country in which the voyage begins and the final port of destination.

Methods for obtaining the verified gross mass of a packed container

7 The SOLAS regulations prescribe two methods by which the shipper may obtain the verified gross mass of a packed container:

7.1 Method No.1: Upon the conclusion of packing and sealing a container, the shipper may weigh, or have arranged that a third party weighs, the packed container.

7.2 Method No.2: The shipper (*or, by arrangement of the shipper, a third party*), may weigh all packages and cargo items, including the mass of pallets, dunnage and other packing and securing material to be packed in the container, and add the tare mass of the container to the sum of the single masses using a certified method as described in paragraphs 7.2.3 and 7.2.3.1. Any third party that has performed some or all of the packing of the container should inform the shipper of the mass of the cargo items and packing and securing material that the party has packed into the container in order to facilitate the shipper's verification of the gross mass of the packed container under Method No.2. As required by SOLAS VI/2, paragraph 5, the shipper should ensure that the verified gross mass of the container is provided sufficiently in advance of vessel loading. How such information is to be communicated between the shipper and any third party should be agreed between the commercial parties involved.

7.2.1 Individual, original sealed packages that have the accurate mass of the packages and cargo items (including any other material such as packing material and refrigerants inside the packages) clearly and permanently marked on their surfaces, do not need to be weighed again when they are packed into the container.

7.2.2 Certain types of cargo items (e.g. scrap metal, unbagged grain and other cargo in bulk) do not easily lend themselves to individual weighing of the items to be packed in the container. In such cases, usage of Method No.2 would be inappropriate and impractical, and Method No.1 should be used instead.

7.2.3 The method used for weighing the container's contents under Method No.2 is subject to certification and approval as determined by the competent authority of the State in which the packing and sealing of the container was completed.⁴

7.2.3.1 How the certification is to be done will be up to the State concerned, and could pertain to either the procedure for the weighing or to the party performing the weighing or both.

7.3 If a container is packed by multiple parties or contains cargo from multiple parties, the shipper as defined in paragraph 3 is responsible for obtaining and documenting the verified gross mass of the packed container. If the shipper chooses Method No.2 to obtain the verified gross mass, the shipper is then subject to all the conditions given in paragraphs 7.2, 7.2.1, 7.2.2, and 7.2.3.

Documentation

8 The SOLAS regulations require the shipper to verify the gross mass of the packed container using Method No.1 or Method No.2 and to communicate the verified gross mass in a shipping document. This document can be part of the shipping instructions to the shipping company or a separate communication (e.g. a declaration including a weight certificate produced by a weigh station utilizing calibrated and certified equipment on the route between the shipper's origin and the port terminal). In either case, the document should clearly highlight that the gross mass provided is the "verified gross mass" as defined in paragraph 3.

⁴ Reference to the relevant MSC Circular regarding contact information for the competent authority.

9 Irrespective of its form, the document declaring the verified gross mass of the packed container should be signed by a person duly authorized by the shipper. The signature may be an electronic signature or may be replaced by the name in capitals of the person authorized to sign it.

10 It is a condition for loading onto a ship to which the SOLAS regulations apply that the verified gross mass of a packed container be provided, preferably by electronic means such as Electronic Data Interchange (EDI) or Electronic Data Processing (EDP), to the ship's master or his representative and to the terminal representative sufficiently in advance of ship loading to be used in the preparation and implementation of the ship stowage plan.

10.1 Because the contract of carriage is between the shipper and the shipping company, not between the shipper and the port terminal facility, the shipper may meet its obligation under the SOLAS regulations by submitting the verified gross mass to the shipping company. It is then the responsibility of the shipping company to provide information regarding the verified gross mass of the packed container to the terminal representative in advance of ship loading. Similarly, the shipper may also submit the verified gross mass to the port terminal facility representative upon delivery of the container to the port facility in advance of loading.

10.1.1 The master or his representative and the terminal representative should enter into arrangements to ensure the prompt sharing of verified container gross mass information provided by shippers. Existing communication systems may be used for the transmission and sharing of such verified container gross mass information.

10.1.2 At the time a packed container is delivered to a port terminal facility, the terminal representative should have been informed by the shipping company whether the shipper has provided the verified gross mass of the packed container and what that gross mass is.

10.2 There is no SOLAS prescribed time deadline for the shipper's submission of the verified gross mass other than such information is to be received in time to be used by the master and the terminal representative in the ship stowage plan. The finalization of the ship stowage plan will depend on ship type and size, local port loading procedures, trade lane and other operational factors. It is the responsibility of the shipping company with whom the shipper enters into a contract of carriage to inform the shipper, following prior discussions with the port terminal, of any specific time deadline for submitting the information.

Equipment

11 The scale, weighbridge, lifting equipment or other devices used to verify the gross mass of the container, in accordance with either Method No.1 or Method No.2 discussed above, should meet the applicable accuracy standards and requirements of the State in which the equipment is being used.

Intermodal container movements and transshipments

12 The verified gross mass of a packed container should be provided to the next party taking custody of the container.

12.1 If a packed container is transported by road, rail or a vessel to which the SOLAS regulations do not apply and delivered to a port terminal facility without its verified gross mass, it may not be loaded onto a ship to which the SOLAS regulations apply unless the master or his representative and the terminal representative have obtained the verified gross mass of the container on behalf of the shipper (see also paragraph 19).

12.2 If a packed container is delivered to a port terminal facility by a ship to which the SOLAS regulations apply for transshipment onto a ship to which the SOLAS regulations also apply, each container being delivered is required by the SOLAS regulations to have had a verified gross mass before loading onto the delivering ship. All packed containers discharged in the transshipment port should therefore already have a verified gross mass and further weighing in the transshipment port facility is not required. The delivering ship should inform the port terminal facility in the transshipment port of the verified gross mass of each delivered packed container. The master of the ship onto which the transhipped, packed containers are to be loaded and the port terminal facility in the transshipment port may rely on the information provided by the delivering vessel. Existing ship-port communication systems may be used for the provision of such information in agreement between the commercial parties involved.

Discrepancies in gross mass

13 Any discrepancy between a packed container's gross mass declared prior to the verification of its gross mass and its verified gross mass should be resolved by use of the verified gross mass.

14 Any discrepancy between a verified gross mass of a packed container obtained prior to the container's delivery to the port terminal facility and a verified gross mass of that container obtained by that port facility's weighing of the container should be resolved by use of the latter verified gross mass obtained by the port terminal facility.

Containers exceeding their maximum gross mass

15 SOLAS regulation VI/5 requires that a container not be packed to more than the maximum gross mass indicated on the Safety Approval Plate under the International Convention for Safe Containers (CSC), as amended. A container with a gross mass exceeding its maximum permitted gross mass may not be loaded onto a ship.

Containers on road vehicles

16 If the verified gross mass of a packed container is obtained by weighing the container while it is on a road vehicle, (e.g. chassis or trailer), the tare mass of the road vehicle (and, where applicable, the tractor) should be subtracted to obtain the verified gross mass of the packed container. The subtraction should reflect the tare mass of the road vehicle (and, where applicable, the tractor) as indicated in their registration documents as issued by the competent authority of the State where these assets are registered. The mass of any fuel in the tank of the tractor should also be subtracted.

17 If two packed containers on a road vehicle are to be weighed, their gross mass should be determined by weighing each container separately. Simply dividing the total gross mass of the two containers by two after subtracting the mass of the road vehicle and the tractor, where applicable, would not produce an accurate verified gross mass for each container, and should not be allowed.

Empty containers

18 Shippers of empty containers and operators of empty containers are encouraged to have practices and arrangements in place to ensure that they are empty. The tare weight will visually appear on the container in accordance with the International Organization for Standardization (ISO) standard for container marking and identification⁵) and should be used.

⁵ Refer to standard ISO 6346 – Freight containers – Coding, identification and marking.

Contingencies for containers received without a verified gross mass

19 Notwithstanding that the shipper is responsible for obtaining and documenting the verified gross mass of a packed container, situations may occur where a packed container is delivered to a port terminal facility without the shipper having provided the required verified gross mass of the container. Such a container should not be loaded onto the ship until its verified gross mass has been obtained. In order to allow the continued efficient onward movement of such containers, the master or his representative and the terminal representative may obtain the verified gross mass of the packed container on behalf of the shipper. This may be done by weighing the packed container in the terminal or elsewhere. The verified gross mass so obtained should be used in the preparation of the ship loading plan. Whether and how to do this should be agreed between the commercial parties, including the apportionment of the costs involved.

Master's ultimate decision whether to stow a packed container

20 Ultimately, and in conformance with the Code of Safe Practice for Cargo Stowage and Securing⁶, the ship's master should accept the cargo on board his ship only if he is satisfied that it can be safely transported. Nothing in the SOLAS regulations limit the principle that the master retains ultimate discretion in deciding whether to accept a packed container for loading onto his ship. Availability to both the terminal representative and to the master or his representative of the verified gross mass of a packed container sufficiently in advance to be used in the ship stowage plan is a prerequisite for the container to be loaded onto a ship to which the SOLAS regulations apply. It does, however, not constitute an entitlement for loading.

Enforcement

21 Like other SOLAS provisions, the enforcement of the SOLAS requirements regarding the verified gross mass of packed containers falls within the competence and is the responsibility of the SOLAS Contracting Governments. Contracting Governments acting as either port States or flag States should verify compliance with the SOLAS requirements. Any incidence of non-compliance with the SOLAS requirements is enforceable according to national legislation.

22 The ultimate effectiveness and enforcement of the SOLAS container gross mass verification requirement is that a packed container, for which the verified gross mass has not been obtained sufficiently in advance to be used in the ship stowage plan, will be denied loading onto a ship to which the SOLAS regulations apply. Any costs associated with the non-loading, storage, demurrage or eventual return of the container to the tendering shipper of the container should be subject to contractual arrangements between the commercial parties.

Effective date of the SOLAS requirements regarding verified gross mass of a container carrying cargo

23 The SOLAS requirements regarding verified gross mass of a container carrying cargo (SOLAS regulation VI/2) are expected to enter into force in [July 2016].

⁶ Refer to the *Code of Safe Practice for Cargo Stowage and Securing* (resolution A.714(17)) and subsequent amendments.

ANNEX 3

DRAFT AMENDMENTS TO CHAPTER 7 OF THE IMDG CODE

(Underlined text proposed inclusion
Strikethrough text proposed deletion)

- 1 Paragraph 7.3.2.2 is replaced by the following:

"7.3.2.2 The container owner* is responsible for maintaining it in safe condition. Unless otherwise specified, the provisions of the International Convention for the Safe Containers (CSC), 1972, as amended, shall be followed for the use of any cargo transport unit which meets the definition of "a container" within the terms of that Convention.

7.3.2.2.1 A container shall have the Safety Approval Plate and a valid Approved Continuous Examination Program (ACEP) or Periodic Examination Scheme (PES) decal in accordance with the International Convention for Safe Containers, 1972, as amended, when applicable.

7.3.2.2.2 When there is neither a next (first) examination date nor an ACEP marking on or near the Safety Approval Plate, or a examination date that is in the past, the container shall not be used.

* *Owner* means owner as provided for under the national law of the contracting party or the lessee or bailee, if an agreement between parties provides for the exercise of the owner's responsibility for maintenance and examination of the container by such lessee or bailee."

- 2 Paragraph 7.3.7.2.4 is replaced by the following:

"7.3.7.2.4 ~~Prior to the use of cargo transport unit, The the refrigeration system shall be subjected to a thorough inspection and a test prior to the use of cargo transport unit being packed to ensure that all parts are functioning properly. Refrigerant gas shall only be replaced in accordance with the manufacturer's operating instructions for the refrigeration system.~~

7.3.7.2.5 Refrigerant gas shall only be replaced in accordance with the manufacturer's operating instructions for the refrigeration system. Prior to filling replacement refrigerant gas, a certificate of analysis from the supplier shall be obtained and checked to confirm that the gas meets refrigeration system specifications. In addition, if concerns about the integrity of the supplier and/or the refrigerant gas supply chain give rise to suspicion to contamination of the gas where contamination is suspected, the replacement refrigerant gas shall be checked for possible contamination prior to use. If the refrigerant gas is found to be contaminated it shall not be used, the cylinder shall be plainly marked "CONTAMINATED", the cylinder shall be sealed and sent for recycling or disposal and notification shall be given to the refrigerant gas supplier and authorized distributor and competent authority(ies) of the countries to which the supplier and distributor reside, as appropriate. The date of last refrigerant replacement shall be included in the maintenance record of the refrigeration system.

Note: Contamination can be checked by using flame halide lamp tests, gas sniffer tube tests or gas chromatography. Replacement refrigerant gas cylinders may be marked with the test result and the date of testing."

ANNEX 4

RECOMMENDATIONS FOR THE GROUP OF EXPERTS FOR THE REVISION OF THE IMO/ILO/UNECE GUIDELINES FOR PACKING OF CARGO TRANSPORT UNITS

(Underlined text proposed inclusion
~~Strikethrough text~~ proposed deletion)

1 MAIN BODY OF THE DRAFT CTU CODE

1.1 The table of contents should also contain the annexes.

1.2 Throughout the text abbreviations are used. Abbreviations can only be used after they are explained. This is not always the case (e.g. table of contents CTU, 1.3.6 CTU, 2.5.2 OOG). Perhaps annex 21 should come first.

Chapter 1

Paragraph 1.1.1 states "Code of Practice for Packing of Cargo Transport units (CTU code)" instead of this Code of Practice (CTU code)". In the rest of the text replace "this Code of Practice" by "this code"

Paragraph 1.3.1: All annexes should be referred to in the text.

Chapter 3

Paragraph 3.2: Change bullet point 3 to read:

- **Do** select the securing methods best adapted to the characteristics of the cargo, the mode of transport and the properties of the CTU.

Paragraph 3.5: Change bullet point 7 to read:

- **Do not** secure the cargo with devices overstressing the structure of the CTU or the cargo.

Paragraph 3.7: Add a warning that the atmosphere within the CTU can be dangerous. This can be done by adding a new fourth bullet with the following text:

"Do pay attention that the atmosphere in the CTU may be dangerous – ventilate before entering".

Chapter 4

Paragraph 4.1.1: Change the last sentence to read:

Notwithstanding any national legislation or contracts between the involved parties the chain of responsibility discussed below identifies ~~the~~ functional responsibilities of the parties involved.

Paragraph 4.1.2: Delete the first sentence; "~~During transport, the carrier is not responsible for the cargo in a CTU.~~" as this statement is not correct. The carrier is responsible for theft, damages due to improper handling, drop of a CTU etc.

Paragraph 4.2.3: Sums up the items for which the packer of the CTU is responsible. The packer is also responsible for the segregation requirements of dangerous goods and that no incompatible dangerous goods are loaded. This item is not in the list. As it is an important issue for safe sea transport of dangerous goods, a new bullet point, at least before the last one, should be added which could read as follows:

"ensuring that no incompatible dangerous goods are loaded. Account should be taken of all dangerous goods legislations during the complete transport chain."

In paragraph 4.2.3 last bullet: the container/vehicle packing certificate is asked for. This can be done by the completion of the statement in the Dangerous goods documentation or by a separate document. It is suggested that the last bullet should be replaced by:

"provide 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."

Paragraph 4.2.4: amend the last bullet point as follows:

"4.2.4 The shipper is responsible that:

(...)

the information concerning the consignment, and description of packages and , in the case of containers, the verified gross mass is transmitted to the consignee."

Chapter 5

Paragraph 5.3: Change the footnote in the acceleration table for combined rail transport to read:

† The values in brackets apply to shock loads with short impacts of 150 milliseconds or shorter, and ~~only~~ need **not** be used for static design of cargo securing arrangements.

Paragraph 5.4: Change the second sentence to read:

Therefore, whenever the cargo cannot be secured by [locking in or] blocking, lashing is always required to prevent the cargo from being significantly displaced.

NOTE: The term "locking" should be defined in the Definitions section.

Chapter 6

[Paragraph 6.2.1: The definition of a container as in the United Nations Model Regulations on the Transport of Dangerous Goods is preferred. It reads as follows:

"A container means 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 "container" includes neither vehicle nor packaging. However a container that is carried on a chassis is included.".]

Chapter 8

Figure 8.1 and 8.2: The figures should be made larger or replaced to make the information readable.

Chapter 10

Paragraph 10.1.5: It is stated that national rules can differ from the UN Recommendations, but international rules also differ from the United Nations Recommendations. The last sentence shall be replaced by:

"However, international (ADR, IMDG, ...) and national rules (CFR49, ...) may differ from the United Nations Recommendations on the Transport of Dangerous Goods".

For each figure (label or mark) it should be made clear that the figure is an example. If used for the transport of dangerous goods, the figures in the relevant regulations should be used (e.g. 10.3.8, 12.1.6, Annex 12: 4.1.1.1,...).

Delete paragraph 10.3.10 completely. The amount is the prerogative of the Dangerous Goods regulations and can be changed easily.

Chapter 11

[Paragraph 11.1.2: It is not in all international transports that seals are required and thus the first sentence should read:

When applicable, CTUs in international transport should be sealed with a seal bearing a unique identification number.]

Paragraph 11.3.2: amend as follows:

"11.3.2 The packer of the CTU should inform the shipper on the identification number of the CTU (container number or vehicle number as appropriate), on the gross mass of the packed cargo and where applicable the verified gross mass of the unit and on the identification number of the seal (if applicable), thus to ensure that the verified gross masses and the identification numbers of each container 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.".

Chapter 12

Paragraph 12.1.5: It deals with a dangerous atmosphere in the container. As the atmosphere of the container can be a danger already during the opening of the doors, a new third sentence should be inserted. It could read as follows:

"Care should be taken not to come into contact with the internal atmosphere when opening the doors.".

Paragraph 12.3.1: The text should be in line with **paragraph** 4.2.9, bullet point 5:

The consignee or the receiver of the CTU should ~~consider his obligation to~~ **unless otherwise agreed** return the CTU, after unloading, clean and suitable for the transport of any kind of cargo.

Paragraphs 12.15 and 12.16: The sequence of these paragraphs should be changed.

In the light of the proposed deletion of paragraph 10.3.10, the second sentence of paragraph 12.16 should read as follows:

"Before opening the doors and entering such unit,"

2 ANNEXES AND APPENDICES

The numbering of the paragraphs in the annexes should contain the annex number to make it easier to navigate in the code.

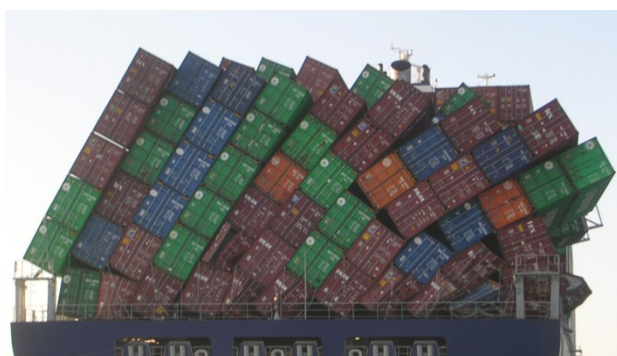
There are a considerable number of annexes which are partly very voluminous. Due to lack of time, only some of these annexes had been discussed and agreed upon by the Group of Experts. The majority of these annexes had not been substantially considered or even not been discussed at all by the group.

Annex 1

Figure 1.15, paragraphs 5.4 and 5.5 should be deleted and replaced by the following text:

Inadequately packed containers or misdeclared container weights declaration may cause container stacks to collapse.

Figure 1.16; Replace the figure by a more illustrative as the following:



Annex 2

Figure 2.1 should be updated.

Paragraph 1.8: the meaning of the first sentence is not clear. The wording should be improved. (The first sentence can be amended to read: "The shipper will arrange the transport of the goods and may arrange the cargo insurance cover. .").

[Annex 3

As mentioned in the introduction of annex 3, the content is outside of the scope of the CTU Code. Therefore, this should be deleted.]

Annex 4

Table for conversion factors: Vertical lines between the different columns should be inserted.

The instruction for cargo stowed in more than one layer for method 2 (advanced) on **page 9** should read:

1. Determine the number of lashings to prevent sliding using the mass of the entire section and the friction for the bottom layer.
2. Determine the number of lashings to prevent sliding using the mass of the section's upper layer and the friction between the layers.
3. Determine the number of lashings for the entire section which is required to prevent tipping.

The largest number of lashings in steps 1 to 3 is to be used.

Table for friction factors: there are some values which are not consistent with the respective values in table B.1 of standard EN 12195-1:2010. The Group of Experts agreed on the values as provided in the standard. Thus, most probably this discrepancy is a typing error which requires correction as follows:

| Material combination in contact surface | Friction factor μ | |
|--|-----------------------|-------------|
| | Dry | Wet |
| Sawn timber /wooden pallet – shrink film | 0.30 | <u>0.30</u> |

Text below the table for friction factors: the text should be aligned with paragraph 2.2.2.3 of annex 14. Therefore the third sentence should read: "If the surfaces are not swept clean the maximum friction factor to be used is 0.30 or the value in the table, when this is lower ~~if it is lower shall be used~~."

Annex 5

1 Introduction: condensation can also caused by high humidity at high temperatures. This should be part of the summing up. In the summation in the third sentence the end should be as follows:

"... during rain or snow or loading in an atmospheric condition of high humidity and high temperature."

Annex 6

Although this annex provides some useful information, it is very voluminous. It has to be questioned whether such in-deep information is really necessary for the packer of a CTU.

Annex 7

[This annex was discussed by the Group of Experts but was found very difficult to be understood. All required information on load distribution, at least in that extent as needed by a CTU packer, is already provided in annex 14, section 3. Therefore, annex 7 should be deleted.]

In case of the decision to keep this annex, then the following is proposed:

Paragraph 2.1.1: Container load distribution diagram (LDD(C)) specifies boundaries of ~~5-% eccentricity of CoG of cargo and boundaries for cargo CoG~~ when eccentricity of container CoG is 5 per cent and 10 per cent.

Paragraph 3.3.4: The figure above shows all LDD's and we can clearly decide that maximum cargo mass in this case is ~~22~~ 26,2 tonnes limited by container chassis and gross combination mass of 40 tonnes. Maximum eccentricity of the cargo centre of gravity shall be maximum 3.6 per cent which is limited by maximum axle load of railway wagon for route category C.

[Annex 9

This annex is outside of the scope of the CTU Code. The information on condensation damage provided in annex 5 is considered sufficient. This annex should be deleted.

Annex 10

This annex should be deleted.]

[Annex 11

The instructions for container inspection in section 5 (Containers) is unclear regarding what defects that can be accepted and what cannot be accepted and should thus either be deleted or completed. The list contained in circular CSC.1/Circ.138/Rev1 should be included.

Figures in section 5 should be numbered.]

Annex 14

To make it possible to find the referenced appendices, the text ""to this annex"" should be included in the text. Thus the note in **paragraph 1.5** should read:

Note: See appendix 1 [to this annex](#) for further details on packing marks.

All Appendices should be numbered with annex number plus appendix number. Thus appendix 1 to annex 14 should be numbered appendix 14-1.

Paragraph 2.2.2.3: in order to use the unique term "friction factor", amend as follows:

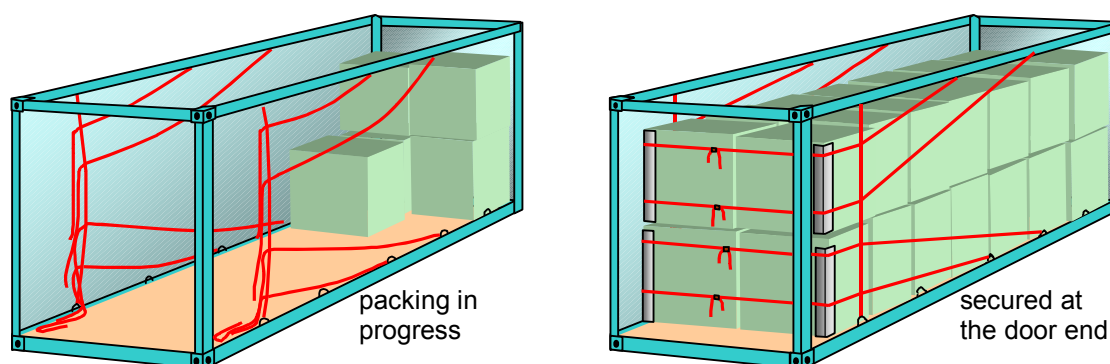
"2.2.2.3 The friction values given in appendix 3 are valid for swept clean dry or wet surfaces free from frost, ice, snow, oil and grease. When a combination of contact surfaces is missing in the table in appendix 3 or if its friction factor ~~coefficient of friction~~ can't be verified in another way, 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 ~~static friction coefficient~~ $\mu = 0.2$ shall be used unless the table shows a lower value. For oily and greasy surfaces or when slip sheets have been used a ~~static~~ friction factor $\mu = 0.1$ shall 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 4).".

Paragraph 2.3.4: in the last sentence, replace "appendix 14.1" by "appendix 5".

Section 2.4: amend the heading as follows: "Lashing materials and arrangements".

Figure 14.20: it shows a modular system of a certain provider of lashing material which has obviously been copied from advertising material. The CTU Code should not show products of certain providers but illustrate the principle of cargo securing. Therefore, it should be replaced by the following illustration:



Paragraph 3.1.1: amend the last sentence as follows: "It may be necessary to transfer the weight mass to the corner posts by supporting and ~~to support~~ the cargo on strong timber or steel beams as appropriate.".

Reason: It is the weight (the force originating from the mass) which has to be transferred into the corner posts by appropriate support.

Paragraph 3.3.3: this paragraph requires more consideration. It could be so understood that in any case where such products are handled, intrinsically safe forklifts have to be used, as there is always a danger that a receptacle is damaged, the content is leaked and an explosive atmosphere is generated.

(The paragraph reads: "Wherever there is a risk of explosion due to the vapours, fumes or dust given off by the cargo, all electrical equipment mounted on the trucks must be sealed to ensure that they are intrinsically safe for flammable and explosives atmospheres.")

Paragraph 3.3.7: amend the second sentence as follows: "The move of the unit ...".

[Paragraph 4.1.4: amend the first sentence as follows: "Lashings used for direct securing will inevitably elongate under external load ~~over time~~, thus permitting the package a degree of movement.".]

[Paragraph 5.2.3 the last sentence reads: "When a flexitank is loaded into a general purpose ISO box container, the mass of the liquid in the flexitank should not exceed 24 tonnes or the volume should not exceed 24,000 litres whichever is the larger.".

The maximum value of 24 tonnes was not agreed by the Group of Experts. Calculations carried out by classification societies provide certain evidence that the side walls of a box

container may suffer serious damage or may even fail when the liquid mass in the flexitank exceeds 50 per cent of the rated payload of the container, unless the side walls are sufficiently enforced for that purpose.

Therefore, the Group of Experts agreed on the following wording: "When a flexitank is loaded into a general purpose ISO box container, the mass of the liquid in the flexitank should not exceed a value agreed with the operator of the CTU, to prevent the container from suffering bulging damages.".]

Section 5.3 (page 266): this section shows two alternatives. The Group of Experts agreed on the first option. The second option was not presented to the group and not discussed. Therefore, it is proposed to keep the first option.

Appendix 1

Packing marks, before section 1 (Introduction), include an note in order that the users of the CTU Code are directed to the legislation for the labels and marks for dangerous goods. The note could read as follows:

"Note: The labels and marks required for the transport of dangerous goods can be found in the applicable dangerous goods regulation."

Packing marks: what is the difference between 8 and 9?

Appendix 2

Carton performance. This appendix serves no purpose in the CTU Code and can be deleted.

Paragraph 1.11: The reference at the end of the paragraph should be § 3.1.4 in this annex.

Paragraph 2.3.4: In the last sentence the reference should be amended to ""appendix 5 to this annex"".

Paragraph 2.3.8: The reference should be appendix 5, section 5 to this annex.

Section 2.4; The headline should read ""lashing materials and arrangements"".

Paragraph 2.4.2: In the table (reusable) should be included after web lashings on the third row. Web lashings (single use) should be moved to the fourth row.

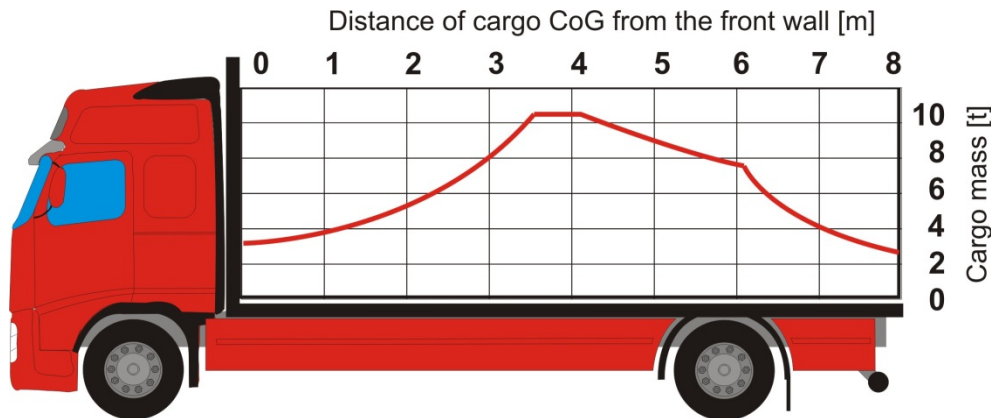
Paragraph 3.1.4: The second and third sentences should read:

In order to comply with restrictions like the observation of axle loads of road vehicles (see 3.1.7) and/or the avoidance of overloading lifting equipment ~~the transverse bottom structure of the CTU~~, the eccentricity of the CTU centre of gravity should not exceed ± 5 per cent in general. As a rule of thumb this can be taken as maximum 60 per cent of the cargo's total mass in not less than 50 per cent of the CTU's length.

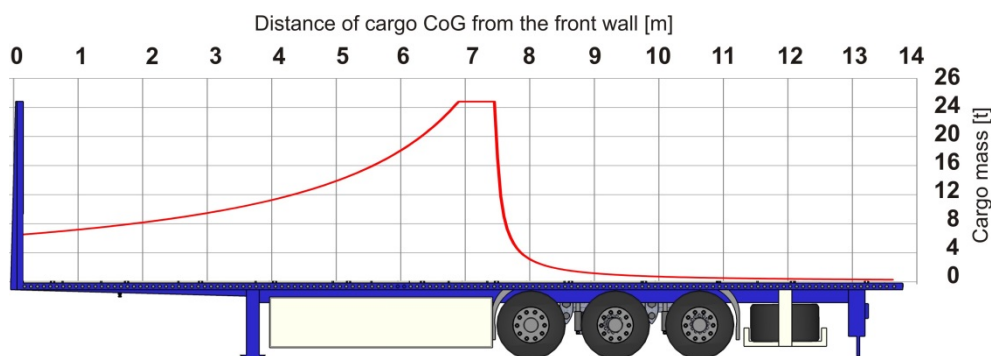
The reference in this paragraph should be appendix 5 to this annex, section 4.

Paragraph 3.1.7: Figure 14-22, and Figure 14-23: replace figures with following figures:

new Figure 14-22



and new Figure 14-23



[Paragraph 4.1.4: The first sentence should read: ""Lashings used for direct securing will inevitably elongate over time under external load, thus permitting the package a degree of movement"".]

Paragraph 4.2.3: In the list of abbreviations ""friction coefficient"" should be replaced by ""friction factor"".

Paragraph 4.2.6: The text should be changed and read:

~~Where there is a risk that the forces on the door may exceed the designed limits of the CTU~~ or Where there is the need to stack packages in a broken second layer at the centre of the CTU additional longitudinal blocking can be adopted as shown in the figures 14.33 – 14.36.

Paragraph 4.2.7: ""Friction coefficient"" should be changed to ""friction factor"". At the end of this paragraph the following sentence should be included: For direct lashing arrangements μ should be set to 75 per cent of the friction factor.

Paragraph 4.2.8: ""Friction coefficient"" should be changed to ""friction factor"".

Paragraph 4.3.1: ""kN"" should be deleted in the formula.

Paragraph 4.3.3: ""Loop"" should be replaced by ""half-loop"".

Paragraph 4.3.3.2: The information in this paragraph should be moved to paragraph 4.3.2.1 as a corner fitting has the same effect as a lashing point on the cargo. Reference should be made to figure 14.39.

Appendix 3: (friction table) the following values in the table should be changed:

"Friction factors", table: there are some values which are not consistent with the respective values in table B.1 of standard EN 12195-1:2010. The Group of Experts agreed on the values as provided in the standard. Thus, most probably this discrepancy is a typing error which requires correction as follows:

| Material combination in contact surface | Dry | Wet |
|--|-----------------|-----------------|
| Sawn timber /wooden pallet against - shrink film | 0.30 | <u>0.30</u> |
| Planed wood against smooth steel - <u>stainless steel sheet</u> | <u>0.200-30</u> | <u>0.200-30</u> |

Appendix 4: Insert the following paragraph:

2.8 If the measurement condition differs from what is specified above, the test conditions should be documented in the test report.

[Appendix 5: Based on the tests and calculations the following text is proposed for appendix 5 based on **option 2** for this section. [When the formulas in this appendix have been agreed upon, user-friendly tables are proposed to be developed.]

1 Resistivity of transverse battens

1.1 The attainable resistance forces F of an arrangement of battens may be determined by the formula:

$$F = n \cdot \frac{w^2 \cdot h}{28 \cdot L} \text{ [kN]}$$

| | |
|-----|----------------------------|
| n = | number of battens |
| w = | thickness of battens [cm] |
| h = | height of battens [cm] |
| L = | free length of battens [m] |

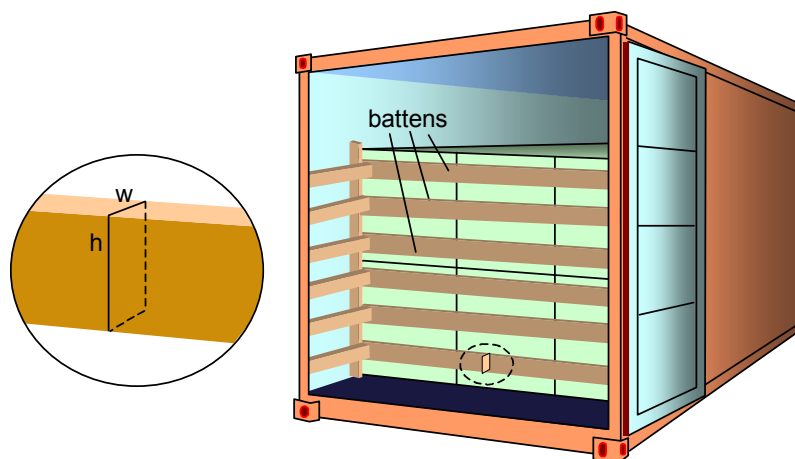


Figure 14.69 – Transverse battens in an ISO container

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:

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 [(see paragraph 5.3 of the Code)] with 0.4 g longitudinally (c_x) and 0.8 g vertically (c_z). The container is stowed longitudinally. With a friction coefficient between cargo and container floor of $\mu = 0.4$ the following balance calculation shows:

$$c_x \cdot m \cdot g < \mu \cdot m \cdot (1 - c_z) \cdot g + F \text{ [kN]}$$

$$0.4 \cdot 7.5 \cdot 9.81 < 0.4 \cdot 7.5 \cdot 0.2 \cdot 9.81 + 24 \text{ [kN]}$$

$$29 < 6 + 24 \text{ [kN]}$$

$$29 < 30 \text{ [kN]}$$

2 Beams for bedding of concentrated loads in an ISO box container

2.1 Bedding arrangements for concentrated loads in general purpose ISO [series 1 freight containers](#), [flatracks](#) or [platforms](#) should be designed in consultation with the supplier or operator of the [cargo transport unit](#). If no specific advice is available the provisions described in this section should be applied.

2.2 The centre of gravity of a concentrated load should be placed [close to half the length of the container cargo transport unit](#). If more than one concentrated load shall be packed into a container [or onto a cargo transport unit](#), the centres of gravity of the units should [as far as possible](#) be placed at distances in terms of container [unit length](#) as shown in the table below:

| Number of concentrated loads | Suitable longitudinal stowage position |
|------------------------------|--|
| 2 | 1/4 3/4 |
| 3 | 1/7 1/2 6/7 |
| 4 | 1/8 3/8 5/8 7/8 |

2.3 Short or narrow cargoes may overload the floor structure. This may be prevented either by using longitudinal support beams underneath the cargo to distribute the load over more transverse flooring beams, or by the use of transverse beams, to distribute the load towards the strong side structures of the cargo transport unit.

2.5 When longitudinal support beams are used, their minimum length should be calculated in accordance with sections 2.8 through 2.15 below and the material and the cross section dimensions of the beams should be chosen in accordance with sections 3.1 through 3.5 below. The beams should be placed as far apart as possible, near the edge of the cargo.

2.6 When four longitudinal support beams instead of two beams are used, these should be arranged as straddled twin-beams.

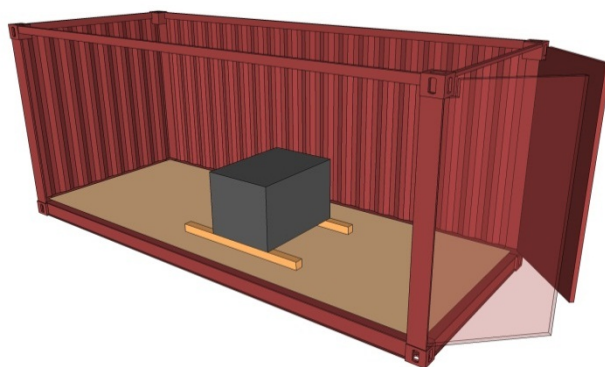


Figure 14.70 – Narrow cargo placed on longitudinal support beams

2.7 When transverse support beams are used, their length should equal the inner width of the container or the width of the platform in case of a flatrack. The material and the cross section dimensions of the beams should be chosen in accordance with sections 3.1 and 3.6 below.

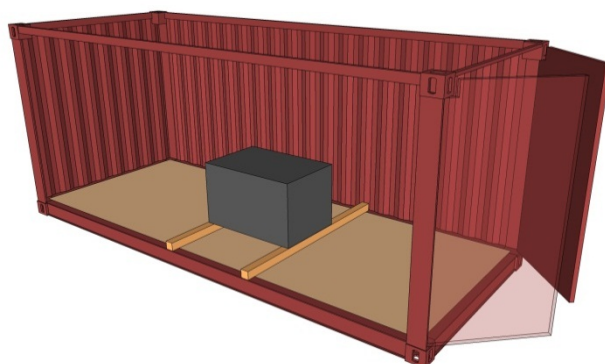


Figure 14.71 – Narrow cargo placed on transverse support beams

Longitudinal strength of containers

2.8 The minimum length of a cargo which is resting on supports near the side beams of a general purpose ISO container is:

$$r = 2 \cdot L \cdot \left(\frac{m}{P} - 0.75 \right) \text{ [m]} \quad \text{(Need only be calculated if } m \text{ is greater than 75\% of } P \text{)}$$

P = declared payload [t]
m = concentrated load [t]
L = full length of loading floor [m]
r = length of cargo foot print or bridging distance [m]

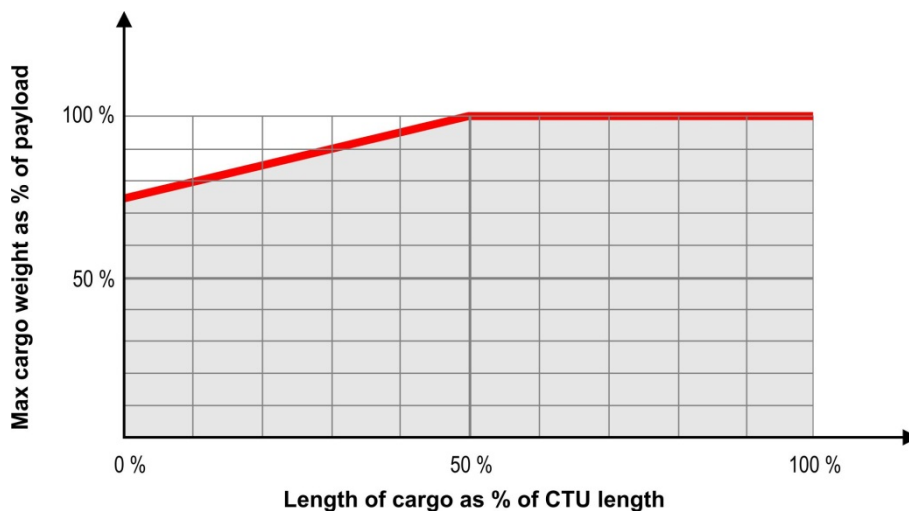


Figure 14.72 – Load distribution for general purpose ISO containers

2.9 If the length of the cargo is less than the required length according to the formula above, the cargo should be bedded with longitudinal beams designed in accordance with sections 3.1 through 3.5 below.

Longitudinal strength of flatracks

2.10 If a cargo unit is placed with its entire foot print over the length *r* on a flatrack or platform, the minimum length of the cargo is:

$$r = L \cdot \left(2 - \frac{2 \cdot P + T}{2 \cdot m} \right) \text{ [m]}$$

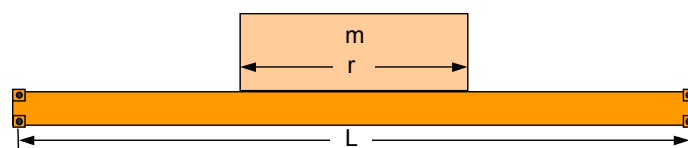


Figure 14.73 – Concentrated load on an ISO platform

2.11 If the cargo unit is rigid and stowed on transverse beddings that bridge the distance *r* on the flatrack or platform, the minimum length of the cargo is:

$$r = L \cdot \left(1 - \frac{2 \cdot P + T}{4 \cdot m} \right) \text{ [m]}$$

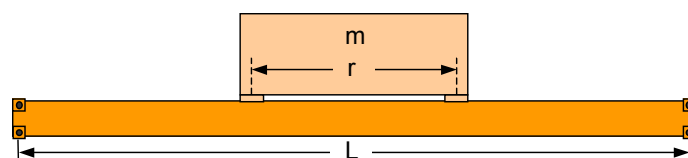


Figure 14.74 – Concentrated load bridging the distance r

P = declared payload [t]

T = declared tare weight [t]

m = concentrated load [t]

L = full length of loading floor [m]

r = length of cargo foot print or bridging distance [m]

2.12 If the length of the cargo is less than the required length according to the formulas above, the cargo should be bedded with longitudinal beams designed in accordance with sections 3.1 through 3.5 below.

Transverse strength of container and flatrack flooring

2.13 In order not to overload the transverse structure of the floor, it should be checked that cargo in containers and flatracks which are approved in accordance with C.S.C. have at least the following length:

$$r = 0.2 \cdot m \cdot (2.3 - s) \text{ [m]}$$

2.14 For containers and flatracks which are built and tested in accordance with ISO 1496, the the minimum length of cargo can be calculated as:

$$r = 0.15 \cdot m \cdot (2.3 - s) \text{ [m]}$$

r = bottom length of the cargo unit in the container (footprint) [m]

s = width of cargo foot print [m]

m = mass of cargo unit [t]

2.15 If the length of the cargo is less than the required length according to the formulas above, the cargo should be placed on bedding arrangements in accordance with sections 3.1 through 3.6 below.

3 Bending strength of beams

3.1 The permissible bending stress σ should be taken as 2.4 kN/cm² for timber beams and 22 kN/cm² for steel beams. The section modulus for a single beam should be obtained from supplier's documents. The following tables may serve as a quick reference:

| | | | | | |
|------------------------------------|---------|---------|---------|---------|---------|
| timber: dimensions [cm] | 10 x 10 | 12 x 12 | 15 x 15 | 20 x 20 | 25 x 25 |
| section modulus [cm ³] | 152 | 260 | 508 | 1236 | 2450 |

| | | | | | |
|------------------------------------|---------|---------|---------|---------|---------|
| steel: dimensions [cm] | 12 x 12 | 14 x 14 | 16 x 16 | 18 x 18 | 20 x 20 |
| section modulus [cm ³] | 144 | 216 | 311 | 426 | 570 |

Longitudinal support beams

3.2 The minimum length of longitudinal bedding beams t should be taken as the minimum required cargo length according to sections 2.8 through 2.15 above.

3.3 The required bending strength of beams should be determined by the formula:

$$n \cdot W = \frac{246 \cdot m \cdot K}{\sigma} \quad [\text{cm}^3]$$

W = section modulus of one beam [cm^3]
 n = number of parallel beams
 m = mass of package [t]
 K = Form factor of bedding beam as defined in section 3.4 and 3.5 below
 σ = permissible bending stress in beam [kN/cm^2]

1. If the cargo unit is **flexible**, so that it will rest over its entire length on the bedding beams, the form factor K should be calculated according to below:

$$K = t - r \quad [\text{cm}^3]$$

t = length of the beam [m]
 r = loaded length of beam (footprint) or bridging distance [m]

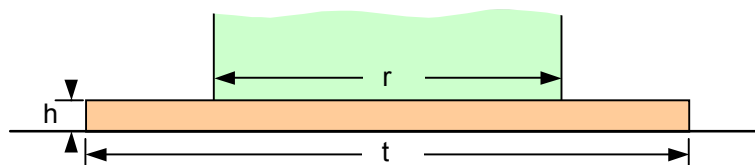


Figure 14.75 – Beam for load spreading under a flexible package

2. If the package is **rigid** so that it will bridge a distance on the bedding beams, the form factor K should be calculated according to below:

$$K = \frac{(t - r)^2}{t} \quad [\text{cm}^3] \quad \text{if } t > 1.7 \cdot r$$

$$K = 2 \cdot r - t \quad [\text{cm}^3] \quad \text{if } t \leq 1.7 \cdot r$$

t = length of the beam [m]
 r = loaded length of beam (footprint) or bridging distance [m]

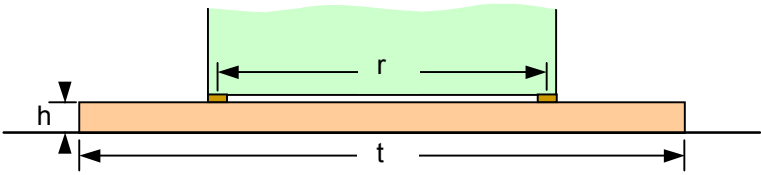


Figure 14.76 – Beam for load spreading under rigid package

Transverse support beams

3. The required bending strength of transverse bedding beams should be determined by the following formulas:

Rigid cargo: $n \cdot W = \frac{570 \cdot m \cdot (2.3 - s) - 8270 \cdot t_g}{\sigma}$

Flexible cargo: $n \cdot W = \frac{220 \cdot m \cdot (4.6 - s) - 2430 \cdot t_g}{\sigma}$

$W =$ Section modulus of support beams [cm³]

$n =$ Number of support beams

$m =$ Cargo weight, [ton]

$s =$ Width of cargo foot print [m]

$\sigma =$ Permissible stress in support beams, [kN/cm²]

$l_e =$ Contributing length of container floor [m], taken as the minimum of

Beams spaced **more** than 0.84 m apart: $l_e = 3 - n \cdot 0.28$

Beams spaced **less** than 0.84 m apart: $l_e = r + 0.56$

4 Longitudinal position of the centre of gravity in a CTU

- 4.1 The longitudinal position of the centre of gravity within the inner length of a loaded container is at the distance d from the front, obtained by the formula:

$$d = \frac{T \cdot 0.5 \cdot L + \sum (m_i \cdot d_i)}{T + \sum m_i}$$

$d =$ distance of common centre of gravity from the front of stowage area [m]
 $T =$ tare mass of the CTU. [t]
 $L =$ length of stowage area (inner length) [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]

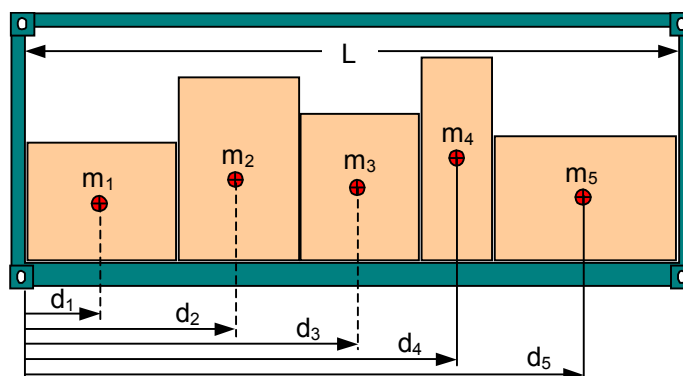


Figure 14.77 – Determination of longitudinal centre of gravity

Example:

A 20' container with inner length $L = 5.9$ m and tare mass $T = 2.3$ t is loaded with five groups of cargo parcels as follows:

| | m_i [t] | d_i [m] | $m_i \cdot d_i$ [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 |
| | $\Sigma m_i = 18.5$ | $\Sigma(m_i \cdot d_i) = 52.78$ | |

$$d = \frac{T \cdot 0.5 \cdot L + \Sigma(m_i \cdot d_i)}{T + \Sigma m_i} = \frac{2.3 \cdot 0.5 \cdot 5.9 + 52.78}{2.3 + 18.5} = \frac{59.565}{20.8} = 2.86 \text{ m}$$

5 Cargo securing with dunnage bags

5.1 Introduction

5.1.1 Accelerations in different directions during transport may cause movements of cargo, either sliding or tipping. Dunnage bags, or air bags, used as blocking device may be able to prevent these movements.

Footnote: Dunnage bags may not be used to secure dangerous goods on US railways

5.1.2 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:

$$F_{\text{DUNNAGE BAG}} \geq F_{\text{CARGO}}$$

5.2 Force on dunnage bag from cargo (F_{CARGO})

5.2.1 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:

$$F_{\text{CARGO}} = m \cdot g \cdot (C_{x,y} - \mu \cdot 0.75 \cdot C_z) \text{ [kN]}$$

Tipping:

$$F_{\text{CARGO}} = m \cdot g \cdot (C_{x,y} - b_p/h_p \cdot C_z) \text{ [kN]}$$

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 cargo sideways 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 [m]

h_p = package height [m]

5.2.2 The load on the dunnage bag is determined of the movement (sliding or tipping) and the mode of transport that gives the largest force on the dunnage bag from the cargo.

5.2.3 It is only the cargo mass that actually impacts the dunnage bag that shall to be used in the above formulas. The movement forward, when breaking for example, the mass of the cargo behind the dunnage bag is to be used in the formulas.

5.2.4 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 is to be used, that is, either the mass m_1 or m_2 , see figure 4.6.

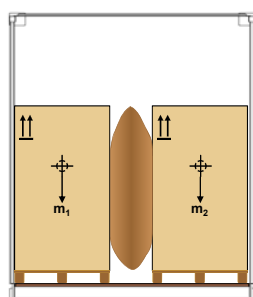


Figure 14.78 – Equal height packages

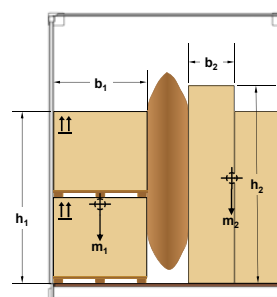


Figure 14.79 – Unequal height packages

5.2.5 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.

5.2.6 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 have the smallest value of b_p / h_p is chosen.

5.2.7 However, in both cases the total mass of the cargo that is on the same side of the dunnage bag is to be used, that is, either the mass m_1 or m_2 in Figure 4.7.

5.3 Permissible load on the dunnage bag (F_{DB})

5.3.1 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 |

5.4 Contact area (A)

5.4.1 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 |

5.5 Pressure in the dunnage bag

5.5.1 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 come loose if the ambient pressure is rising or if the air temperature drops. Inversely, if the filling pressure is too high there is a risk of the dunnage bag to burst or to damage the cargo if the ambient pressure decreases, or if the air temperature rises.

5.5.2 The bursting pressure (P_B) of a dunnage bag depends on the quality, size and the gap that the bag is filling. The pressure that the dunnage bag is experiencing as a result of forces acting from the cargo may never come close to bursting pressure as the bag is in danger of bursting and thus a safety factor according to above shall be used.]

[Annex 14

Appendix 6 should be deleted.]

[Annex 15

This annex was not discussed by the Group of Experts. Its goes beyond the scope of the CTU Code as it addresses general issues of occupational safety. This annex should be deleted.

Annex 17

This annex contains very extensive information on seals. It is not considered necessary to have such excessive information in the CTU Code. It could be appropriate to delete this annex.

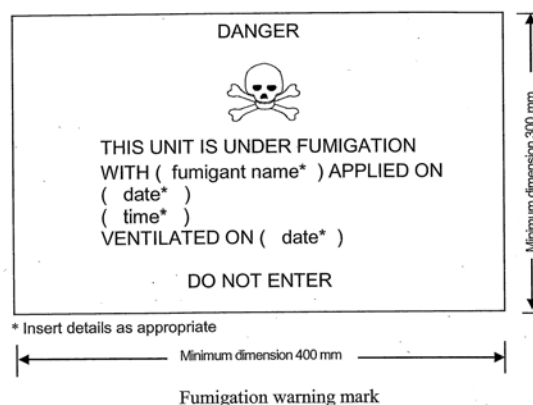
Annex 18

This annex repeats information which is already provided in the IMDG Code. Furthermore, the information provided is not fully consistent with chapter 5.5 of the IMDG Code. It was agreed by the Group of Experts that the CTU Code should not repeat mandatory requirements of other legal instruments. The reasons are first to avoid redundancy and second, more important, to avoid discrepancies, as mandatory legal instruments such as the IMDG Code are more often revised than the CTU Code. With respect to the CTU Code, all necessary information on fumigation is already provided in annex 12, section 4. Therefore, this annex should be deleted.]

In case of the decision to keep this annex, then the following is proposed:

Fumigation: the fumigation mark is regulated in the regulations for the transport of dangerous goods. It would be best not to have detailed description of the fumigation mark in the CTU. Delete 3.2 and 3.3 and replace it with the following:

"3.2 The fumigation mark shall comply with the relevant dangerous goods regulations. Hereafter is the fumigation mark as in the 18th revised edition of the United Nations Model Regulation."



[Annex 19

This annex should be deleted as the information is available in annex 12, section 5.]

Annex 21

In the text acronyms such as LC, MSL, FLT, etc. are used. These acronyms have to be explained either in annex 21 or in chapter 2 of the main body of the code.

The following acronyms have double meanings which could lead to misinterpretations by the reader: BB, CAF, CIA, COD, COP, DG, ETA, FAS, FIFO/FIO, IBC, ICC, IT, ITF, NOS, OCP, POD, POL, S/D, T&E.
