Informal meeting on Code of Practice for Packing of Cargo Transport Units

at the request of the United Nations Economic Commission for Europe Working Party on Intermodal Transport and Logistics

Geneva and virtual, 29-30 March 2023

Comments to changes to clauses 5.3 and 5.2

Submitted by the secretariat

Background

This document contains comments received from Germany to changes proposed to clauses 5.3 and 5.2. To facilitate the understanding of comments made, boxes provide the text with the proposals made for changes on which comments were received.

Comments received

General remark to section 5.3

5.3.2.1 Dangerous goods regulations include general provisions for the use of containers for the transport of solid substances in bulk. Substances shall be transported in bulk containers to the applicable bulk container instruction identified by the letters "BK" in column 13 of the Dangerous Goods List, with the following meaning:

1. **BK1: the transport in sheeted bulk containers is permitted;**
2. **BK2: the transport in closed bulk containers is permitted;**
3. **BK3: the transport in flexible bulk containers is permitted.**

5.3.2.2 Bulk containers shall be siftproof and shall be so closed that none of the contents shall escape under normal conditions of transport, including the effect of vibration, or changes of temperature, humidity or pressure. If the design of the container or any CTU is such that it cannot be made siftproof then it should be fitted with a liner to achieve this.

5.3.2.3 Before being filled and offered for transport each bulk CTU shall be:

5.3.2.3.1 checked externally in accordance with Chapter 8 clause 8.2.2 including any damage to service or operational equipment

5.3.2.3.2 checked internally in accordance with Chapter 8 clause 8.2.3

5.3.2.3.3 cleaned in accordance with Chapter 8 clause 8.2.4

5.3.2.4 In the case of specialist bulk CTUs, service or operational equipment shall mean any equipment or fittings applied or attached to the CTU that facilitates the packing and / or unpacking of the cargo while fully containing, and preventing any escape of, the cargo.

By introducing new provisions for regulated solid bulk cargoes, it becomes unclear which provisions apply only to regulated bulk cargoes and which provisions are considered as recommendations for all. The CTU Code should not repeat text of the IMDG Code, because this would imply the danger that information may be incomplete, and users relay only on the incomplete information and do not consider the mandatory requirements of the IMDG Code.

Proposals to amend the text:

5.3.2 Substances which meet the criteria for inclusion in a hazard class of the IMDG Code are defined as dangerous goods. Such goods are permitted for transport unpacked in a bulk CTU only if this is individually permitted by the IMDG Code and when all provisions of the IMDG Code are complied with. Only substances exhibiting a very low degree of hazard are permitted in bulk. They can be identified by an entry in column 13 of the Dangerous Goods List (IMDG Code). For dangerous goods, the mandatory provisions of the IMDG Code shall be observed in addition to following recommendations of this Code, which apply to all solid bulk cargoes.

5.3.3 Use of bulkheads

5.3.3.1 Cargoes categorised as a dangerous good in the IMDG Code (or similar) are required to be carried in accordance with packing instruction BK2 which states that bulk containers are designed and tested in accordance with ISO 1496 -4:1991 "Series 1 Freight containers- Specification and testing - Part 4: Non pressurized containers for dry bulk". Unfortunately, there are a very limited supply of containers built to this standard, so the IMDG Code states "*Freight containers designed and tested in accordance with ISO 1496-1:1990 "Series 1 Freight containers - Specification and testing - Part 1: General cargo containers for general purposes" shall be equipped with operational equipment which is, including its connection to the freight container, designed to strengthen the end walls and to improve the longitudinal restraint as necessary to comply with the test requirements of ISO 1496-4:1991, as relevant.*" This can normally be fulfilled by fitting a partial height false bulkhead against the front wall (see figure 7.71).

Figure 7.71 False bulkhead

5.3.3.2 The front false bulkhead consists of two full-width panels with horizontal softwood timber cross beams extending the whole width of the CTU and resting against the strong corner posts. The panels should be birch plywood (internal grade) and have a minimum thickness of 12mm. The height of the panels should be at least 200mm above the height of the cargo when packed but at least 1,800mm high with the lower panels as high as possible (preferably 1,200mm high). Panels with a height less 600mm should have one full width 150 x 50 mm softwood timber cross beams and all other panel heights at least two full width beams.

5.3.3.1 For the transport of solid bulk cargoes, preferably non-pressurized containers for dry bulk, designed and tested in accordance with ISO 1496-4:1991, should be used. When general cargo containers for general purpose according to ISO 1496-1: 2013 are used, the IMDG Code requires that the end walls are strengthened to the same level as provided

in ISO 1496-4:1991. In case of solid bulk cargoes which are not subject to the IMDG Code, a similar reinforcement of the end walls is recommended.
5.3.3.2 Reinforcement can normally be fulfilled by fitting a partial height false bulkhead against the front wall (see figure 7.71). The front false bulkhead consists of two full-width panels with horizontal softwood timber cross beams .....
(to be continued as proposed in the document).

Remarks to 5.3.3.2:

Why only birch-plywood? This excludes a lot of other solutions and may prevent future innovations regarding sustainability such as reusable bulkheads made of plastics.

Thixotropy of granulated/powderous cargoes is barely considered. Especially in adverse (rough) weather conditions or sudden brake forces (in case of road transportation), a 200 mm height difference might not be enough.

5.3.4.1~~(5.3.2)~~ The CTU intended to carry a bulk cargo should be cleaned and prepared adequately as described ~~in subsection 5.2.5~~ **under clause 5.3.2.3,** in particular if a cargo-specific liner ~~will~~ **shall** be used for accommodating bulk cargoes like grain, coffee beans or similar sensible materials ~~(see figure 7.54)~~**.**

5.3.4.1 A CTU intended to carry a bulk cargo should be cleaned and prepared adequately as described under clause 5.3.2.3. It may be necessary to place plywood or chipboard facing not only to the front wall but also to the side walls of the CTU to protect them from bulging or scratching (see former figure 7.53). A cargo specific liner should be used for accommodating bulk cargoes like grain, coffee beans or similar sensible materials (see former figure 7.54).

Former Figure 7.53 should be kept.
It illustrates the lining in a 40-foot container with chipboard panel

Former Figure 7.54 should be kept.
It shows a CTU with liner bag for accommodating a sensitive bulk cargo

Proposal for 5.3.5

5.3.5 **Packing bulk cargoes**

5.3.5.1 Informative Material 3 – *Cargo Transport Units (CTU) types*, section 1.5 Non pressurised bulk container types – describes the various designs of bulk containers. These containers have an outward appearance of a general-purpose container but are fitted with loading and discharge hatches to the roof, front end or rear doors. Bulk containers designed just to carry solid bulk cargoes will generally have loading hatches in the roof which would allow gravity filling (see figure 7.75) or from ground level by means of an elevator (see figure 7.76). Bulk containers with a top loading hatch at the front of the container (see figure 7.77) can be packed using a gravity chute or a screw loader (see figure 7.78).

Note: 5.3.6.1 describes dry bulk containers, however, bulk CTU for other modes are available and their designs are generally similar and present the same packing and unpacking solutions.

Figure 7.75: Top loading

Figure 7.76: Elevator

Figure 7.77: Front chute

5.3.5.2 Box type CTUs can only be loaded and discharged through the rear doors so typical processes can include a screw loading elevator (see figure 7.78), a belt thrower (see figure 7.79), a retractable belt (see figure 7.80) or a pneumatic blowing system (see figures 7.81 and 7.82).

Figure 7.78: Screw loading

Figure 7.79: Belt thrower

Figure 7.80: Retractable belt

Note: When packing bulk CTUs through a front chute and or using a screw loading device, packers are reminded that inclining the CTU during the packing process may cause damage to the CTU's structure (see 5.3.1.4).

Figure 7.81: Pneumatic

Figure 7.82: Pneumatic blower

5.3.5.3 Abrasive cargoes, such as sugar and some grains, can cause damage to the liner if the flow of the material is directed directly at the liner, particularly during gravity loading through the top hatches (floor) or thrown or pneumatic loading through the rear doors (roof or front wall).

5.3.5.4 These loading methods do have restrictions, and it requires the loading operators to understand the "flowability" of the product being loaded so that it is evenly distributed across the entire container by gradually withdrawing the conveyor / blow pipe. Powders and grains which have a high angle of repose may settle unevenly and cause the eccentricity of the bulk material in the CTU which could result in handling difficulties.

5.3.5.5~~(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 designed and tested for this method of handling.

It is proposed to retain the wording of the actual version of the CTU Code. The proposed new text is not really necessary, and the illustrations are of such low quality that they cannot be used in an official document.

Proposal for 5.3.7

5.3.7 Weighing

5.3.7.1 All packed CTUs should comply with international and national regulations concerning the gross mass of the CTU and transport vehicle. However, containers carried by sea are covered by specific requirements.

5.3.7.2 The international convention for Safety Of Life At Sea (SOLAS) requires that all packed containers are weighed prior to loading on board a ship, and that a verified gross mass certificate (VGM) is presented to the carrier and the marine terminal.

5.3.7.3 Under the current terms of SOLAS, dry bulk cargoes can only have a VGM produced by method 1, therefore, on completion of packing and after the container has been sealed, the packer should weigh the packed and sealed container on a calibrated weighing device.

The proposed text contains a provision that the gross mass of a CTU containing solid bulk cargo should be verified by weighing. As this is a mandatory requirement by SOLAS chapter VI regulation 2, it is not necessary to repeat this provision as recommendation in the CTU Code. Furthermore, it might create confusion when the CTU Code contains this provision only for CTU containing solid bulk cargoes but nor for CTU containing flexitanks. *Therefore, for the sake of consistency and taking into consideration that the verification of gross mass is already required by SOLAS, section 5.3.7 should be deleted.*

Proposal for 5.3.8

The OPRC-HNS protocol addresses the preparedness and co-operation to pollution incidents by hazardous and noxious substances and has been issued as guidance for governments and other authorities. “Hazardous and noxious substances” means any substance other than oil which, if introduced into the marine environment is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea. This definition is not restricted to solid bulk cargoes. Thus, it makes no sense, to refer to this protocol only in the context of CTUs containing solid bulk cargoes. All information which shippers of such substances shall provide to the carriers, are provided in mandatory legal instruments of the IMO, for dangerous goods in packed form in the IMDG Code. *Therefore, section 5.3.8 makes no sense and should be deleted.*

Proposal for 5.3.9

5.3.9 Temporary storage

5.3.9.1 CTUs, particularly freight containers, are frequently used as temporary, or long-term storage for bulk cargoes, and care must be taken that the cargo does not deteriorate during the storage or, in the case of dangerous goods, become unstable. The Warehousing White Paper[2] provides advice on storing Dangerous Goods in Warehouses. It should be noted that multiple CTUs carrying one or more dangerous goods and stored in close proximity to each other presents similar risks to those described in the White Paper.

5.3.9.2 Where concentrations of CTUs carrying different dangerous goods are found, the following guidance should be consulted:

- **Operations, particularly relating to good housekeeping and the prevention of combustion or explosion.**
- **Dangerous Goods Storage, particularly relating to documentation, chemical inhibitors and marking.**
- **Fire and explosion prevention, particularly relating to fire alarms, water supply and hot operations being carried out in the area.**
- **Security, specifically relating to policies and procedures to allow quick response to incidents.**
- **Emergency Response plans, particularly relating the hazard, nature and extent of possible emergencies.**

The reason for referencing this "warehousing white paper" is unclear in the context of solid bulk cargoes. Mandatory requirements for the temporary stowage of dangerous goods (not only in solid bulk form, but also in liquid bulk and in packaged form) are promulgated in local regulations such as Port Regulations. Recommendations for Safe Transport of Dangerous Goods in Port Areas and Related Activities have been issued by the IMO and are much more comprehensive than the proposed text in 5.3.9. *Therefore, 5.3.9 should be deleted.*

Annex II

Remarks to 5.2.7.1.2

5.2.7.1 Commodity considerations

1 General:

- **Flexitanks shall only be offered to transport non-regulated (non-dangerous) substances when the flexitank is suitable and the materials of construction are resistant and compatible with the substance temperatures likely to be encountered at the time of filling and during transport.**
- **All parties are required to undertake an appropriate risk assessment before accepting any cargo for transport in a flexitank container system.**
- **All parties are required to exercise responsible care and ensure safe and reliable flexitank systems conforming to all relevant regulations.**

2 Dangerous Goods:

- **Cargoes regulated as Dangerous Goods shall not be transported in flexitanks, therefore cargo included in IMDG Code (International Maritime Dangerous Goods Code) Dangerous Goods List, Chapter 3.2 which provides the UN Number, Proper Shipping Name and Class of Dangerous Goods together with provisions for transport of substances classified as Dangerous Goods is not allowed to be transported in a flexitank.**
- **Regional and National Regulations may also apply when the CTU passes through the state or region. Substances (cargo) classified as Dangerous Goods by Regional or National Regulations and statutory legislation, are not permitted to be transported in flexitanks.**

The reference to the Dangerous Goods List (DGL) of the IMDG Code is misleading. A substance has to be declared as Dangerous Good when it meets the criteria for inclusion in one of the hazard classes of the IMDG Code. When such substance is not mentioned by name in the DGL, the shipper has to classify the substance under a “not otherwise specified” entry in the DGL (e.g. FLAMMABLE LIQUID N.O.S) and has to supplement the description (FLAMMABLE LIQUID in this example) with the chemical name of the substance (or substances in a mixture). The proper shipping name consists of the wording shown in capital letters in the DGL and the supplemented chemical name which cannot be taken from the DGL but only from the transport document containing the shipper’s declaration.

To avoid any confusion, following text is proposed:

“Dangerous Goods: Liquids meeting the classification requirements of the IMDG Code are defined as Dangerous Goods and are not allowed to be transported in flexitanks.”

General remarks to 5.2.8 (transport of flexitanks).

The driver should be made aware that the container is carrying a filled flexitank as the handling characteristics for the container may be different.

Caution! – Wherever possible the driver should avoid sudden alteration of direction or breaking as the contents of the flexitank are unhampered, and the flexitank material is flexible. Therefore, the load moves heavily and unpredictably.

The driver should inspect the container for signs of leakage prior to starting and periodically during the journey to the destination. If there are signs of leakage, then the driver should ensure that the vehicle is parked in a position that will not cause a hazard or undue traffic congestion and away from any drains, rivers or waterways and does not require returning to the public highways and notify the shipper / consignee.

Uneven surfaces and twisting roads can cause the cargo to move within the flexitank. Abrupt movements could cause an internal wave that could result in the end, or side walls being damaged (see figure 7.68). If the driver notices such damage, it should be reported when the load is delivered to its destination.

Figure 7.68 - Damaged side wall following road transport

The proposed text contains provisions to reflect the problem that a fully loaded flexitank may damage or even break the walls of a freight container under certain conditions. A freight container for general cargo is not designed and tested to accommodate liquids. The dynamic impact due to the movement of the liquid in a flexitank which is placed in a freight container are not considered in the design and construction of freight containers.

Due to this fact, the proposed text in 5.2.8.1 for road transport contains following wording:

“Caution! – Wherever possible the driver should avoid sudden alteration of direction or breaking as the contents of the flexitank are unhampered, and the flexitank material is flexible. Therefore, the load moves heavily and unpredictably”.

For sea transport the wording in 5.2.8.4 is:

- **Temperature sensitive cargoes[4] should not be placed on or near heated bunker tanks, the elevated temperature required to keep the fuel viscosity low may heat or otherwise damage the cargo (red slots below deck in figure 7.69).**

Note: the height up the side will depend on the ship's design and may be higher or lower than shown in the figure. CTUs (containers) carrying flexitanks should not be stowed adjacent to the engine room bulkhead.

- **Above deck, CTUs (containers) with flexitanks should not be stowed in the outer and upper most slots as or at the edges of deck covers (red slots above deck in figure 7.54 as:**
  - **CTUs (containers) in the top slot can be subjected to high temperatures from the sun's radiation.**
  - **CTUs (containers) in the outer slots can be subjected to high acceleration loads.**
  - **CTUs (containers) placed at the edge of the deck covers may have slightly wider separation and there is an increase in the risk of the side walls being bowed outwards.**

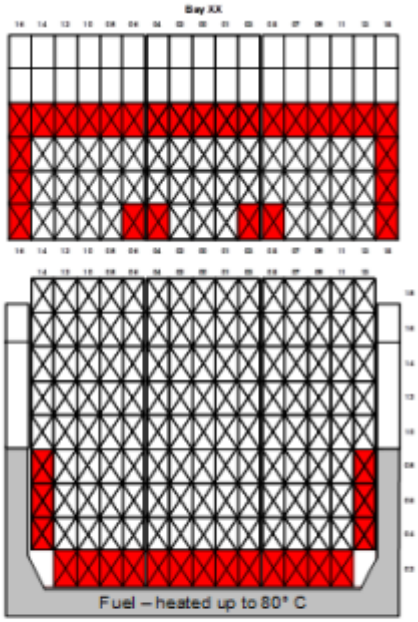

Figure 7.69 - Positioning flexitanks

"CTUs (containers) in the outer slots can be subjected to high acceleration loads. - CTUs (containers) placed at the edge of the deck covers may have slightly wider separation and there is an increase in the risk of the side walls being bowed outwards".

It is the principle of the CTU Code that the cargo should be packed in a manner to prevent the CTU and its contents from being damaged when exposed to the acceleration forces expected during transport. It would contradict this principle when specific restrictions have to be observed to limit the acceleration force, such as to avoid sudden braking and change of direction, because the cargo is not capable to withstand the forces normally encountered during transport.

A research carried out by the classification society GL (now DNV) shows the result that a limitation of the contents in a flexitank to maximum 18 tons would ensure that a freight container is not damaged when the acceleration forces which are typical for individual mode of transport are encountered. A paper, summarizing the result of this research, is attached to these comments.

Therefore, it is proposed to limit the maximum net mass of a liquid in a flexitank to 18 tons and to delete the requirement to avoid sudden alterations of direction when transported by road and to delete the requirement to select specific stowage locations providing low acceleration forces when transported by sea.

Alternatively, when such mass limitation is not acceptable to the informal working group, it is proposed not to approve the text in 5.2.8 and not to include this section.