

Distr.: Restricted  
4 October 2012

Original: English

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**Group of Experts for the revision of the IMO/ILO/UNECE  
Guidelines for Packing of Cargo Transport Units**

**Third session**

Geneva, 15–17 October 2012

Item 3 of the provisional agenda

**Updates on the second draft of the Code of Practice for Packing of Cargo Transport Units**

**Comments on the second draft of the CTU Code**

**Transmitted by the expert of Germany**

The comments on the second draft of the CTU Code from the expert of Germany are presented below for consideration by the Group of Experts.

## I. Sequence of chapters

In 1.4.2 of the draft text it is outlined that chapter 2 will contain “dos and don’ts” in form of a short overview or introduction to the Code and that chapter 3 will contain the definitions, as was decided during the 2<sup>nd</sup> session of the GoE. In the following text of the draft however, chapters 2 and 3 have been mutually exchanged. The GoE may wish to reconsider its decision on the sequence of chapters.

## II. Chapter 2 (or chapter 3?)

The definitions of „consignor“, forwarder“ and „freight forwarder“ should be amended to read:

<b>Consignor</b>	the party who prepares a consignment for transport; normally, this is the producer or the distributor of the goods. In most cases, the consignor does not contract the transport by himself but has the transport arranged using the service of a forwarder
<b>Forwarder</b>	the party who organises shipments for consignors; in most cases, the forwarder is not active as a carrier but acts only as an agent who dispatches shipments via carriers and who books or otherwise arranges space on the means of transport for these shipments
<b>Freight forwarder</b>	see forwarder

*Justification: ensure consistency with the definition of shipper as given in this chapter*

## III. Chapter 3 (or chapter 2?)

The text of this chapter should be replaced by following text:

### “3 KEY REQUIREMENTS (DOS AND DON’TS)

#### 3.1 General

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

#### 3.2 Planning

- Do select the most suitable CTU type to accommodate the cargo.
- Do prepare a packing plan.
- Do not exceed the permitted payload limits of the unit.
- Do select the securing methods best adapted to the characteristics of the cargo.

### 3.3 Packing

- Do distribute heavy cargo over a large floor area.
- Do not concentrate heavy cargo on small areas on the floor.
- Do load with the centre of gravity in the centre of the CTU.
- Do not load with eccentric load distribution.
- Do use block stow when packing of cargo.
- Do not build up irregular layers of packages.
- Do not stow heavy goods on top of light goods.
- Do not stow goods with tainting odours together with sensitive merchandise.
- Do not pack wet and damp goods.
- Do observe all handling instructions on packages such as "this way up".
- Do not use dunnage or packaging material which is incompatible with the cargo.

### 3.4 Packing of dangerous goods

- Do not pack incompatible goods which have to be segregated.
- Do not pack damaged packages.
- Do check that all packages are properly marked and labelled.
- Do pack dangerous goods near the door where possible.
- Do affix required placards at the exterior of the CTU.

### 3.5 Securing

- Do fill void spaces whenever possible.
- Do secure the cargo in a way that forces are distributed over a large area of a unit.
- Do not secure the cargo with devices that produce heavy forces into small areas of the inside structure of the unit.
- Do use non slip surface material against sliding of packages where appropriate.
- Do secure each single loaded item independently where necessary.
- Do not overstress securing devices.
- Do not fasten lashing belts by means of knots.
- Do use hooks or shackles to fasten lashing belts.

### 3.6 On completion of packing

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

### 3.7 Unpacking

- Do check that the identification number on the CTU and the seal serial number are as shown on the transport documentation.
- Do check the exterior of the CTU for signs of leakage or infestation.
- Do use proper equipment to cut the seal.
- Do open the doors with caution as cargo might fall out.
- Do record every package as it is removed noting any markings and damages.
- Do remove all dunnage for re-use, recycle or dispose.
- Do clean the interior of the CTU to remove all traces of the cargo, especially loose powders, grains and noxious materials.
- Do remove all dangerous goods marks from the exterior of the CTU once it has been cleaned.”

*Justification: This chapter is intended to give a short introduction of “dos” and “don’ts” It should not contain explanations, as this might mislead the user of the Code to take this section as recommendation for packing, with the consequence that he will not read carefully the appropriate sections in the Code. For the same reason, no figures should be shown here. Furthermore, it would be inconsistent to have some dos or don’ts illustrated where others are not.*

## IV. Chapter 4

Section 4.4 should have following wording:

### **“4.4 Consequences of overloading of CTUs**

4.4.1 A CTU overloaded by excess weight presents a serious threat to the safety of work of the various persons along the chain of transport, who are in charge of handling, lifting or driving the CTU. This applies to all modes of transport on road, rail and sea.

4.4.2 There is an additional hazard to road and rail vehicles when an overloaded container leads to exceeding the permissible gross mass of the vehicle. This hazard may be aggravated by a road driver's usual unawareness of the overweight, so that he may not adjust his driving habits accordingly.

4.4.3 The main hazard from overloaded CTUs is related to the process of lifting when loading or unloading the CTU on or off a ship or vehicle and when handling the CTU by mobile stackers in a terminal area. Most cranes are equipped with weight limit controls. However, as these are designed to protect the crane from overstressing, they will scarcely assist in the detection of overweight CTUs.

4.4.4 When an overweight cargo transport unit is offloaded from a ship or vehicle, its condition may only be discovered upon being removed for stacking in the terminal area and the handling equipment being found to have inadequate lifting capacity. Handling equipment, in some ports, may not be available for handling such heavy units. This may cause undesirable delay of transport.

4.4.5 In view of the above, all efforts should be taken to prevent overloading of CTUs. However, if a unit is found to be overloaded, it should be removed from service until it has been repacked to its maximum gross mass.”.

*Justification: the redundant text (present paragraph 4.4.2.1) should be deleted. Present section 4.4.3 is not correct, as the hazards described here are significant for overloaded CTU only. A CTU which is not overloaded constitutes a danger only when its mass is misdeclared. This deficiency however is*

*addressed in section 4.5. The proposed section 4.4.4.1 is not acceptable, because an overloaded CTU shall never be returned to the originator, as this would imply a non-permitted transport by road or rail.*

## V. Chapter 5

Subsection 5.1.4 should be amended to read as follows:

“5.1.4 The carrier is not responsible for the condition of a CTU. He trusts that the consignor delivers a cargo which is safe and suitable for transport. Thus, the consignor will be blamed by the carrier for any deficiencies of the CTU. However, when the consignor is not the packer, the consignor had to trust that the packer did fulfil his obligations. The consignor will blame the packer for any faults which had been committed within his responsibility.”.

In subsection 5.1.7 and in paragraph 5.1.10.3 the word “shipper” should be replaced by “forwarder”. In figure 5.1 the word “forwarding agent” should be replaced by “forwarder”, the word “stevedoring company” should be replaced by “port terminal operator”

*Justification: to be consistent with the definitions in chapter 2*

In paragraph 5.1.10.3 the text under the last three bullet points should be deleted.

*Justification: the shipper’s declaration is covered in 5.1.10.1. The last two points have no relevance for safety, as safety is not compromised when shipping instructions are submitted late or when the CTU does not arrive in time and, therefore, the CTU is not loaded on the intended ship.*

In section 5.1.10.7, the text under the second bullet point and under the last three bullet points should be deleted.

*Justification: A carrier who is not a haulier cannot be responsible to secure the cargo in a CTU. The last three points are already covered by bullet point 5.*

Section 5.2.2 should be amended to read as follows:

### “5.2.2 Consignor and Forwarder

5.2.2.1 In most transport contracts the principle contacts are between the forwarder, acting on behalf of the consignor, and the carrier. Other parties such as the consolidator or packer, though actively involved, are responsible to either of these parties.

5.2.2.2 Figure 5.1 shows the relationship between these parties. A forwarder may act as the receiver of information about the cargo and the packing details from the consignor and packer / consolidator respectively and as processor of this information to the carrier.

5.2.2.3 The forwarder may also be the packer or the consolidator receiving goods from the consignor and packing them into the CTU before despatching it to the carrier.

5.2.2.4 Alternatively, the consignor may contract the shipment directly with the carrier, so that no forwarder is involved.”.

*Justification: ensure consistency with the definitions of consignors, shippers and forwarders as already introduced in other sections.*

## VI. Chapter 8

In subsection 8.3.7, the second sentence should read:

“To determine the required number and strength of securing points, the ferry operator should be contacted.”

*Justification: The table in IMO resolution A.581(14) applies to road vehicles only. The securing of railcars on railway ferries is dealt with in the cargo securing manual of the individual rail ferry.*

## VII. Chapter 10

In paragraph 10.2.2.2 the following wording should be added at the end of the paragraph:

“With an inclination test the friction is obtained as tangents for the sliding angle and with a dragging or pulling test the friction is the relation between the horizontal force at sliding and the vertical force. A number of tests should be performed to establish the friction for a material contact (see Annex 6).”

*Justification: the additional text explains the purpose and application of the inclination test and of the dragging test.*

In paragraph 10.4.4.6 in the last sentence, the expression “b/d” should be replaced by the wording:

“between the height and the width/length of the cargo”

*Justification: clarification for easier understanding*

## VIII. Chapter 14

It is proposed to use option 2.

*Justification: option 2 contains all necessary requirements related to a safe unpacking operation. Option 1 does not specify clearly that any CTU may contain goods evolving harmful fumes so that, for safety reasons, any CTU needs to be ventilated before persons are allowed to enter. Furthermore, option 1 deals with the hazards of fumes evolved from non-hazardous goods under the subsection “dangerous goods”, which is not consistent. The reference to interchange inspection criteria is not clear in this context, as it is not in the responsibility of the receiver to apply these criteria and to carry out respective repairs.*

## IX. Chapter 15

It is proposed to amend chapter 15 to the following wording:

### **15 TRAINING IN PACKING OF CARGO IN CTUs**

#### **15.1 Qualification of planners and packers**

15.1.1 Persons responsible for planning and supervision of packing should be fully knowledgeable about all technical, legal and commercial requirements of this task and on all risks and

dangers involved. They should know the customary terminology in order to communicate effectively with consignors, forwarders and the persons who do the actual packing.

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

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

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

## **15.2 Regulatory authorities**

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

15.2.2 Regulatory authorities involved in the development or enforcement of legal requirements relating to the supervision of the safety of the transport by road, rail and sea should ensure that their personnel are adequately trained, commensurate with their responsibilities.

## **15.3 Training**

15.3.1 All persons should receive training on the safe transport and packing of cargo, commensurate with their duties. The training should be designed to provide an appreciation of the consequences of badly packed and secured cargo in CTUs, the legal requirements, the magnitude of forces which may act on cargo during road, rail and sea transport, as well as basic principles of packing and securing of cargoes in CTUs.

15.3.2 All persons should receive detailed training concerning specific requirements for the transport and packing of cargo in CTUs which are applicable to the functions that they perform. Such training should be followed by a sufficient period of practical assistance to experienced planners and packers.

15.3.3 The adequacy of the knowledge of any person to be employed in work involving the packing of cargo in CTUs should be verified or appropriate training provided. This should be supplemented by periodic training, as deemed appropriate by the regulatory authority.

15.3.4 Topics for consideration, to be included in the training as appropriate, are specified in the table below.

<b>Topics to be included in a training programme</b>	
1	<p>Consequences of badly packed and secured cargo</p> <ul style="list-style-type: none"> <li>- Injuries to persons and damage to the environment</li> <li>- Damage to chips and CTUs</li> <li>- Damage to cargo</li> <li>- Economic consequences</li> </ul>
2	<p>Liabilities</p> <ul style="list-style-type: none"> <li>- Different parties involved in cargo transport</li> <li>- Legal responsibility</li> <li>- Goodwill responsibility</li> <li>- Quality assurance</li> </ul>
3	<p>Forces acting on the cargo during transport</p> <ul style="list-style-type: none"> <li>- Road transport</li> <li>- Rail transport</li> <li>- Sea transport</li> </ul>
4	<p>Basic principles for cargo packing and securing</p> <ul style="list-style-type: none"> <li>- Prevention from sliding</li> <li>- Prevention from tipping</li> <li>- Influence of friction</li> <li>- Basic principles for cargo securing</li> <li>- Dimensions of securing arrangements for combined transportation</li> </ul>
5	<p>CTUs – types</p> <ul style="list-style-type: none"> <li>- Containers</li> <li>- Flats</li> <li>- Swap-bodies</li> <li>- Road vehicles</li> <li>- Rail-cars/wagons</li> </ul>
6	<p>Cargo care consciousness and cargo planning</p> <ul style="list-style-type: none"> <li>- Choice of transport means</li> <li>- Choice of CTU type</li> <li>- Check of CTU prior to packing</li> <li>- Cargo distribution in CTUs</li> <li>- Requirements from the receiver of cargo regarding cargo packing</li> <li>- Condensation risks in CTUs</li> <li>- Symbols for cargo handling</li> </ul>
7	<p>Different methods for cargo packing and securing</p> <ul style="list-style-type: none"> <li>- Lashing</li> <li>- Blocking and bracing</li> <li>- Increasing friction</li> </ul>
8	<p>Equipment for securing and protection of cargo</p> <ul style="list-style-type: none"> <li>- Fixed equipment on CTUs</li> <li>- Reusable cargo-securing equipment</li> <li>- One-way equipment</li> <li>- Inspection and rejection of securing equipment</li> </ul>



<b>Topics to be included in a training programme</b>	
9	Packing and securing unitized cargo <ul style="list-style-type: none"> <li>- Cases</li> <li>- Palletized cargoes</li> <li>- Bales and bundles</li> <li>- Bags on pallets</li> <li>- Big bags</li> <li>- Slabs and panels</li> <li>- Barrels</li> <li>- Pipes</li> <li>- Cartons</li> </ul>
10	Packing and securing of non-unitized cargo <ul style="list-style-type: none"> <li>- Different types of packaged cargoes loaded together</li> <li>- Packing of heavy and light cargoes together</li> <li>- Packing of rigid and non-rigid cargoes together</li> <li>- Packing of long and short cargoes together</li> <li>- Packing of high and low cargoes together</li> <li>- Packing of liquid and dry cargoes together</li> </ul>
11	Packing and securing of paper products <ul style="list-style-type: none"> <li>- General guidelines for the packing and securing of paper products</li> <li>- Vertical rolls</li> <li>- Horizontal rolls</li> <li>- Sheet paper on pallets</li> </ul>
12	Packing and securing of cargo requiring special techniques <ul style="list-style-type: none"> <li>- Steel coils</li> <li>- Cable drums</li> <li>- Wire rolls</li> <li>- Steel slabs</li> <li>- Steel plates</li> <li>- Big pipes</li> <li>- Stone blocks</li> <li>- Machines</li> </ul>
13	Packing and securing of dangerous cargoes <ul style="list-style-type: none"> <li>- Regulations for the transport of dangerous goods</li> <li>- Definitions</li> <li>- Packing regulations</li> <li>- Packing, separation and securing</li> <li>- Labelling and placarding</li> <li>- Information transfer when transporting dangerous cargoes</li> <li>- Liabilities</li> </ul>

*Justification: There should be a clear distinction between those persons who plan and supervise the packing operations and other personnel carrying out the actual packing work under the supervisions of those persons mentioned before. Furthermore, in order to emphasize the significance of training, it is suggested to include the topics of a training programme into the body of the Code itself and not into an annex.*

## X. Annex 6

This annex should have the following wording:

### “Annex 6 Practical methods for the determination of the friction factor $\mu$ ”

To determine the friction factor  $\mu$  two alternative methods are given. A practical approach to make an assumption on the applicable friction factor is the *inclination test* which can be carried out by any party involved in the packing of a CTU. The accurate method to determine the exact friction factor is the *pulling test* which however needs laboratory equipment.

#### 1 Inclination test

The factor  $\mu$  states, how lightly a cargo will slide if the cargo platform is tilted. A method to find  $\mu$  is to incline a cargo platform carrying the cargo in question, and measure the angle ( $\alpha$ ) at which the cargo starts to slide. This gives the friction factor  $\mu = 0.925 \cdot \tan \alpha$ . Five tests have to be done under practical and realistic conditions, the largest and the lowest result shall be cancelled. The medium of the three counting results is the friction to be used.

#### 2 Pulling test

The test rig consists of the following components:

- horizontal floor with a surface representing the cargo platform
- test device for tensile tests
- connecting device between the test equipment and the bottom of the cargo unit
- PC based evaluation system.

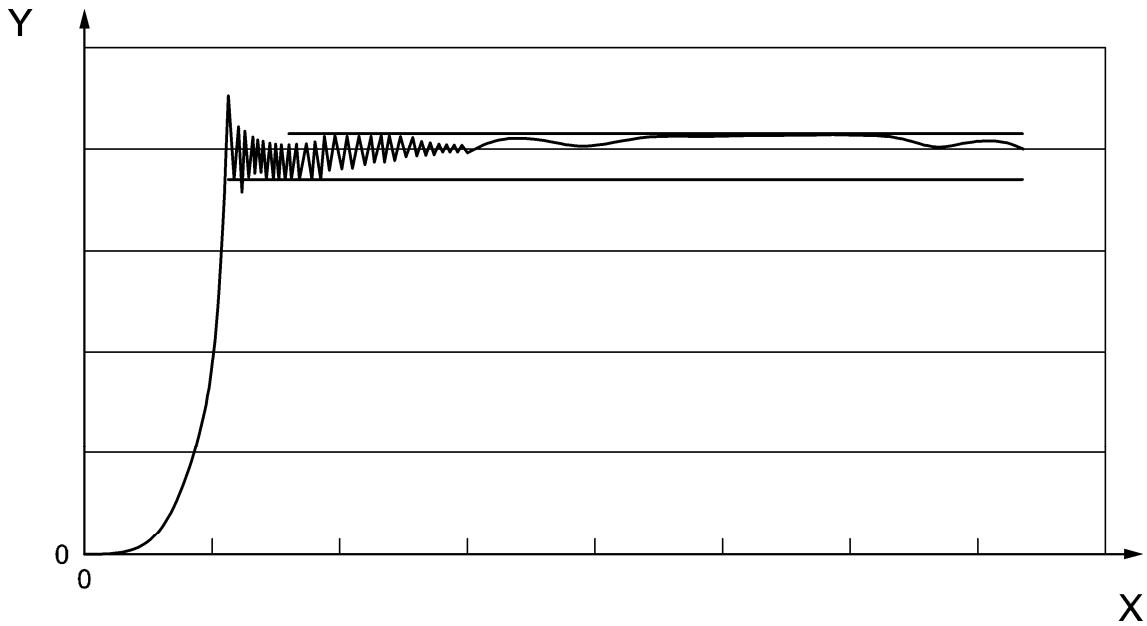
The tensile device shall meet ISO 7500-1.

The test conditions have to correspond with real ones; the contact surfaces have to be “swept clean” and free from impurities. Tests should be executed in an atmospheric condition 5 in accordance with ISO 2233:2001 at a temperature of + 20°C and 65% relative humidity.

The pulling speed should be 100mm/min, the sampling rate shall be at least 50 Hz.

A measurement of pulling force and way of displacement is made with the same test object in one arrangement with a respective glide path of 50 mm to 85 mm for each stroke. At least three individual strokes have to be carried out with an intermediate unloading of at least 30% of the pulling force per measurement.

A measurement series consists of three measurements for each of three strokes. The test piece and/or anti slip material has to be replaced for each measurement, so that any influence of material wear on the result of the measurement can be excluded.



Key:

X way of displacement  
Y pulling force

(note: copyright and permission to reproduce above figure in the CoP is still under evaluation)

The friction factor  $\mu$  has to be determined according to the equation mentioned below, taking into account the three medium values of each of the three measurements:

$$\mu = (\text{pulling force} \cdot 0.95) / (\text{weight} \cdot 0.925)$$

For a most realistic determination of frictional forces and coefficients of friction, multiple measurements series should be executed, each with different test samples for cargo area, anti-slip mat and load bearer or load.”.

*Justification: Annex 6 as proposed introduces the inclination test only, does not mention the pulling test and is not consistent with standard EN 12195-1:2010. It is proposed to describe the pulling test as well and to describe all test conditions as outlined in the agreed standard.*