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

DSC 18/8/1
14 June 2013
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REVISION OF THE GUIDELINES FOR PACKING OF CARGO TRANSPORT UNITS

Comments on the draft Code of Practice for Packing of Cargo Transport Units (CTU Code)

Submitted by Slovakia and Sweden

SUMMARY

Executive summary:	This document comments on the draft Code of Practice for Packing of Cargo Transport Units
Strategic direction:	5.2
High-level action:	5.2.3
Planned output:	5.2.3.9
Action to be taken:	Paragraph 7
Related documents:	MSC 89/7/6; DSC 16/15, section 7; DSC 18/8 and DSC 18/INF.4

Background

1 MSC 89 endorsed the proposal from ILO to elevate the status of the IMO/ILO/UNECE Guidelines for Packing of Cargo Transport Units to a non-mandatory code of practice.

2 DSC 16, having considered document DSC 16/7, agreed to the terms of reference for a Group of Experts (DSC 16/15, annex 4) for the revision of the IMO/ILO/UNECE Guidelines for Packing of Cargo Transport Units, with a view to developing it to the non-mandatory Code of Practice for Packing of Cargo Transport Units (CTU Code) under the coordination of a consultant.

Draft Code of Practice for packing of Cargo Transport Units (CTU Code)

3 The Group of Experts has, through a correspondence group and three sessions hosted by the UNECE, revised the IMO/ILO/UNECE Guidelines for Packing of Cargo Transport Units and developed it to the draft the CTU Code. Slovakia and Sweden are members of the Group of Experts.

4 The last session of the Group of Experts was held at the UNECE in Geneva from 15 to 17 October 2012. For three days the Group of Experts worked through the draft CTU Code with a view to finalize it. The group agreed on extensive changes throughout the draft CTU Code, except for the requirements for bedding arrangements of concentrated loads in containers where no consensus could be reached.

Comments on the draft CTU Code

5 Slovakia and Sweden have noted that the draft CTU Code attached in DSC 18/8 in some parts deviates from what was agreed to at the third session of the Group of Experts. Comments on the draft CTU Code due to the deviating parts as well as proposals on other improvements of the text are attached in the annex to this document.

6 With reference to annex 14, appendix 5 of the draft CTU Code (DSC 18/8) regarding bedding arrangements of concentrated loads in containers, Slovakia and Sweden have conducted full scale tests in order to investigate the actual strength of containers and to validate the different proposals that have been made to the Group of Experts on how to facilitate concentrated loads. A proposal on how to design bedding arrangements based on the full scale test results and FEM calculations is included in the annex to this document, while a complete comprehensive report from the full scale tests is submitted in information document DSC 18/INF.4.

Action requested by the Sub-Committee

7 The Sub-Committee is invited to consider the comments on the draft CTU Code and take action, as appropriate.

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ANNEX

COMMENTS ON THE DRAFT VERSION APRIL 2013 OF THE CODE OF PRACTICE FOR PACKING OF CARGO TRANSPORT UNITS (CTU CODE)

Underlined text proposed to be included
~~Strikethrough text~~ proposed to be deleted

1. Main body of the code

Chapter 1
§ 1.3.1; All annexes should be referred to in the text.

Chapter 3
§ 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.

§ 3.5; Change bullet point 7 to read:

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

Chapter 4
§ 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 typical ~~the~~ functional responsibilities of the parties involved.

§ 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.

Chapter 5
§ 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 ~~to~~ be used for static design of cargo securing arrangements.

§ 5.4; Change the second sentence to read:

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

Chapter 8
Figure 8.1 and 8.2. The figures should be made larger or replaced to make the information readable.

Chapter 11
§ 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.

Chapter 12
§ 12.3.1; The text should be in line with § 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.

2. Annexes and appendic~~x~~es

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

Annex 1
Figure 1.15, § 5.4 and 5.5 should be deleted and replaced by the following text:

Inadequately packed containers or improper weight declaration my 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.

Annex 3
This annex should be deleted

Annex 4
In the friction table on page 5, the wet friction for sawn timber/wooden pallet - shrink film should be 0.30.

Table for conversion factors on page 8; 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.

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
§ 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.

§ 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 should be deleted.

Annex 10
This annex should be deleted.

Annex 11
The instructions for container inspection in section 5 is unclear regarding what defects that can be accepted and what cannot be accepted and should thus either be deleted or completed.

Annex 14
To make it possible to find the referenced appendi~~x~~ces, the text ""to this a~~A~~nnex"" should be included in the text. Thus the note in **§ 1.5** should read:

Note: See a~~A~~ppendix 1 to this a~~A~~nnex for further details on packing marks.

All Appendi~~x~~ces should be number with a~~A~~nnex number plus appendix number. Thus a~~A~~ppendix 1 to a~~A~~nnex 14 should be numbered a~~A~~ppendix 14-1.

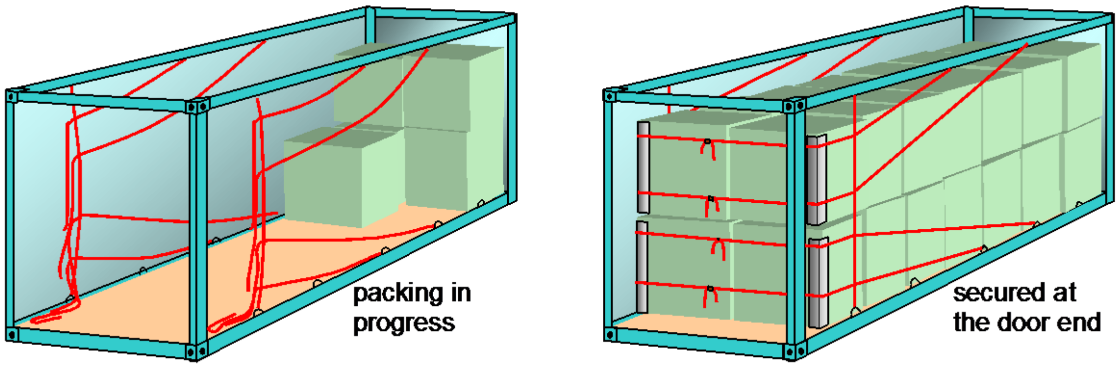
§ 1.11; The reference at the end of the paragraph should be § 3.1.4 in this a~~A~~nnex.

§ 2.3.4; In the last sentence the reference should be amended to ""aAppendix 5 to this aAnnex"".

§ 2.3.8; The reference should be aAppendix 5, section 5 to this aAnnex.
Section 2.4; The headline should read ""lashing materials and arrangements"".

§ 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 forth row.

Figure 14.20; Change the figure to the following:



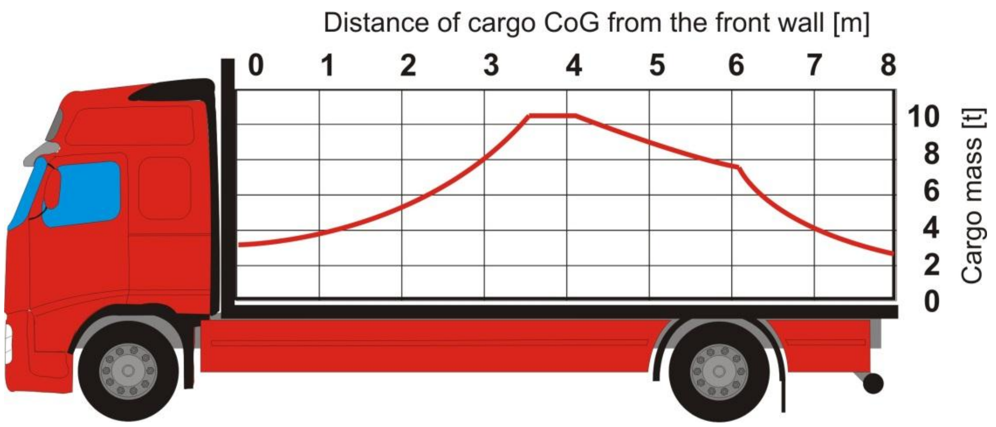
§ 3.1.4; The second and third sentences should read:

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.

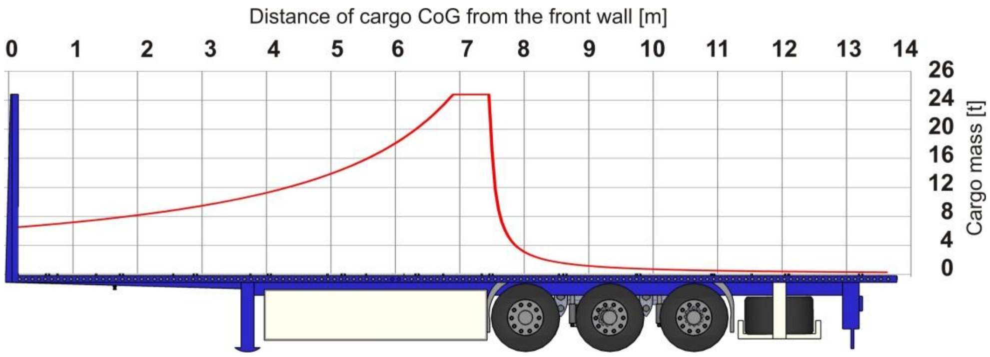
The reference in this paragraph should be aAppendix 5 to this aAnnex, section 4.

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

new Figure 14-22



and new Figure 14-23



§ 4.1.4; The first sentence should read: ""Lashings used for direct securing will inevitable elongate ~~over time~~ under external load, thus permitting the package a degree of movement"".

§ 4.2.3; In the list of abbreviations ""friction coefficient"" should be replaced by ""friction factor"".

§ 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.

§ 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.

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

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

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

§ 4.3.3.2: The information in this paragraph should be moved to § 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:

""Sawn timber/wooden pallet – shink film"" should read: ""0.30"" and ""0.30""

""Planed wood against smooth steel"" should be amended to ""planed wood – stainless steel sheet"". The values for this combination should read ""0.20"" and ""0.20"".

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 aAppendix- 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]

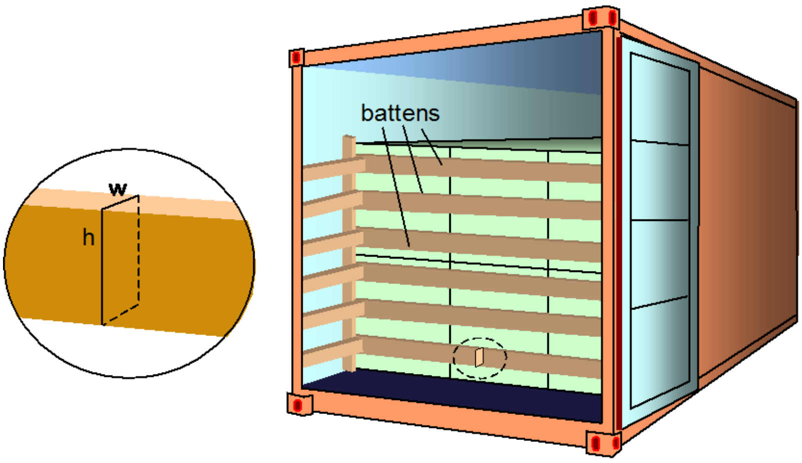


Figure 14.69 – Transverse battens in an ISO container

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:

$$F = n \cdot \frac{w^2 \cdot h}{28 \cdot L} = 6 \cdot \frac{5^2 \cdot 10}{28 \cdot 2.2} = 24 \text{ kN}$$

This force of 24 kN would be sufficient to restrain a cargo mass (m) of 7.5 t, subjected to accelerations in sea area C with 0.4 g longitudinally (c_x) and 0.8 g vertically (c_z). The container is stowed longitudinally. With a friction coefficient between cargo and container floor of μ = 0.4 the following balance calculation shows:

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

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

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

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

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.

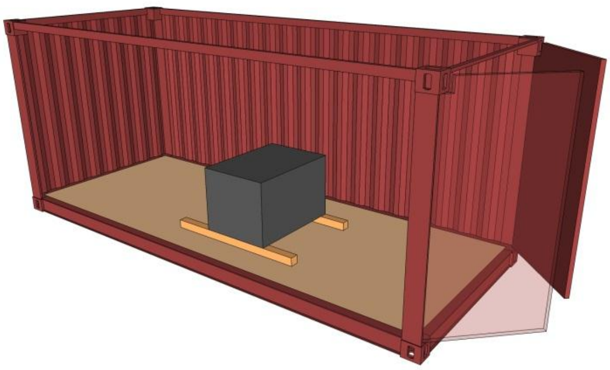


Figure 14.70 – Narrow cargo placed on longitudinal support beams.

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.

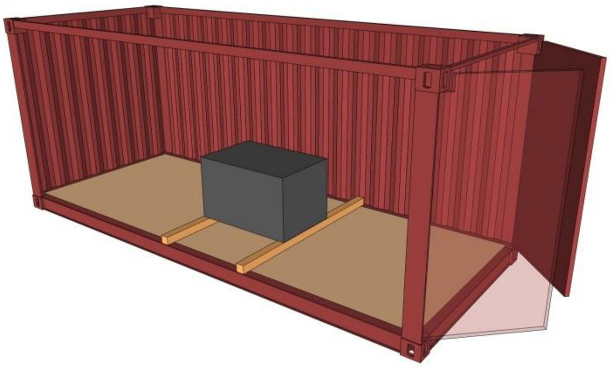


Figure 14.71 – Narrow cargo placed on transverse support beams.

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:

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

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]

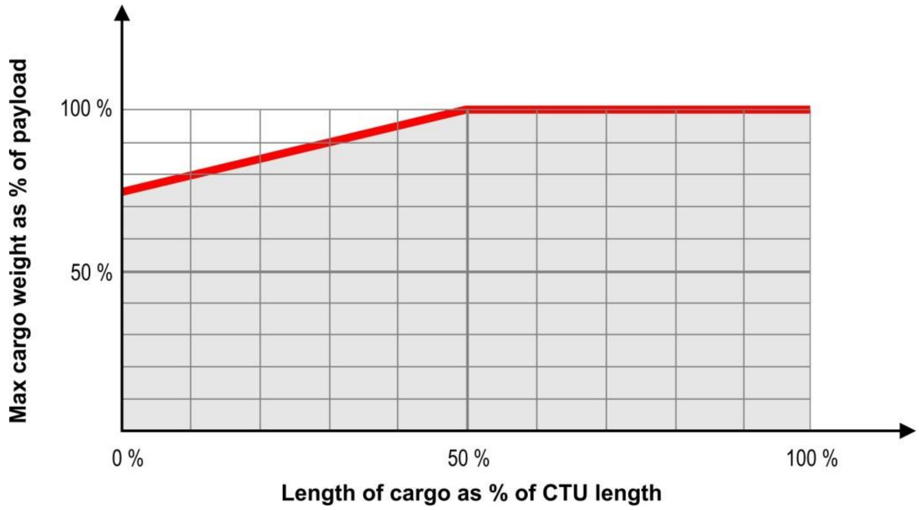


Figure 14.72 – Load distribution for general purpose ISO containers.

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:

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

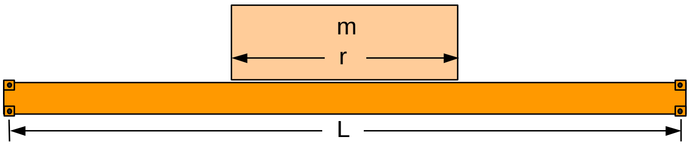


Figure 14.73 – Concentrated load on an ISO platform

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:

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

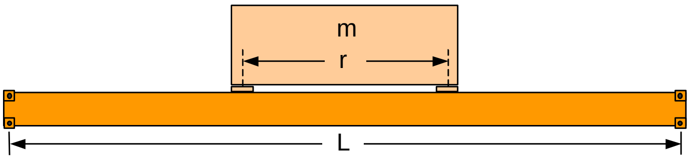


Figure 14.74 – Concentrated load bridging the distance r

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/cm^2 for timber beams and 22 kN/cm^2 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:

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

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:

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

t = length of the beam [m]

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

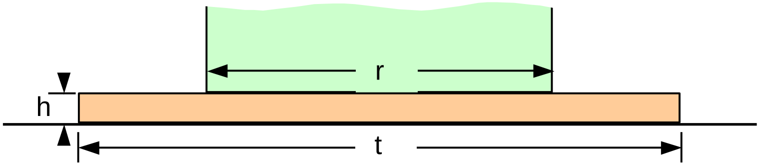


Figure 14.75 – Beam for load spreading under a flexible package

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:

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

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

t = length of the beam [m]

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

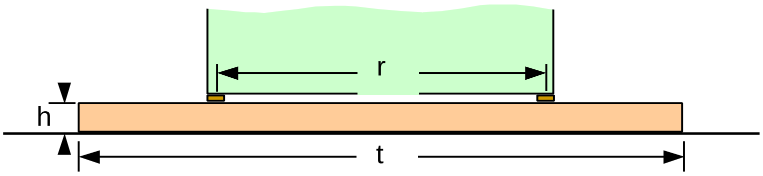


Figure 14.76 – Beam for load spreading under rigid package

Transverse support beams

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

Rigid cargo: $n \cdot W = \frac{590 \cdot m \cdot (2.3 - s) - 3270 \cdot l_e}{\sigma}$

Flexible cargo: $n \cdot W = \frac{220 \cdot m \cdot (4.6 - s) - 2450 \cdot l_e}{\sigma}$

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

n = *Number of support beams*

m = *Cargo weight, [ton]*

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

σ = *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:* $l_e = 3 \cdot n \cdot 0.28$

*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]

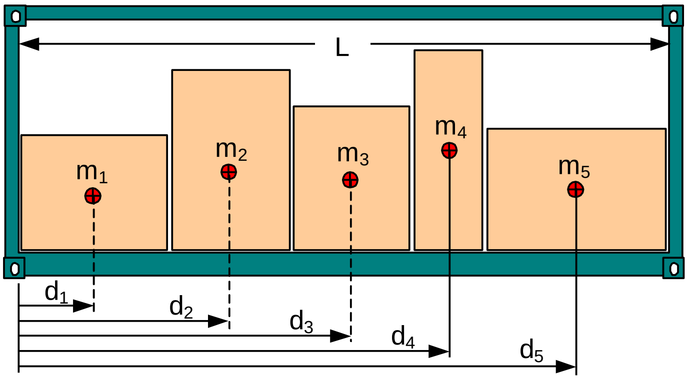


Figure 14.77 – Determination of longitudinal centre of gravity

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
	Σm_i = 18.5	$\Sigma(m_i \cdot d_i)$ = 52.78	

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

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:

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

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:

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

Tipping:

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

F_{CARGO} = force on the dunnage bag caused by the cargo [t]

m = mass of cargo [t]

$c_{x,y}$ = Horizontal acceleration, expressed in g, that acts on the 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.

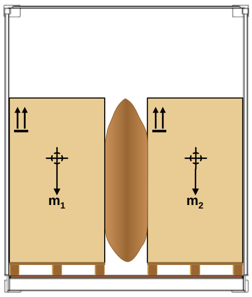


Figure 14.78 – Equal height packages

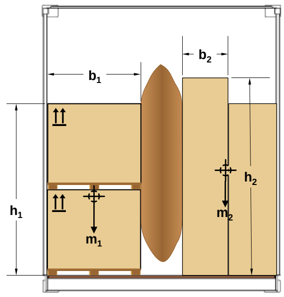


Figure 14.79 – Unequal height packages

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 should be deleted.

Annex 17
This annex should be reduced or deleted.

Annex 18
This annex should be deleted as it repeats mandatory requirements of other legal instruments.

Annex 19
This annex should be deleted as the information is available in aAnnex 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 aAnnex 21 or in chapter 2 of the main body of the code.