

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 September 2021 (second meeting)

Item 4 of the provisional agenda

Updates to the CTU Code

Bedding arrangements

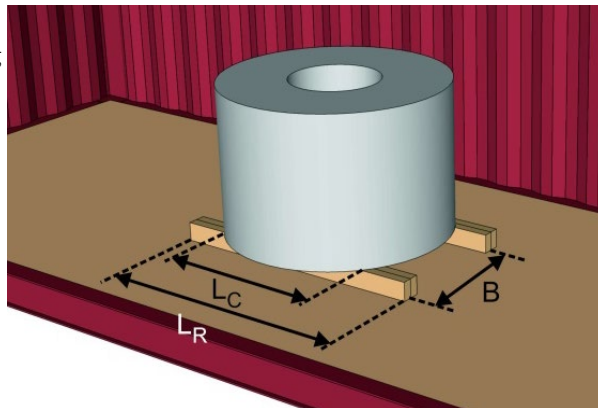
Submitted by IUMI

The weight of dense, heavy cargoes should be spread over a greater area of the container floor by suitable bedding arrangements. By putting longitudinal beams underneath the cargo, its weight can be spread over more crossbeams of the container floor.

Minimum length

The table below gives the minimum required length of longitudinal bedding beams, L_R , based on the following factors:

- The cargo weight (in ton)
- The spacing of the beams, B (in meters)



Minimum required length of longitudinal bedding beams, L_R , [m]							
Spacing between beams, B [m]	Cargo weight [ton]						
	4	8	12	16	20	24	28
0.50	1.2	2.4	3.6	4.8	6.0	-	-
0.75	1.0	2.1	3.1	4.1	5.1	6.2	-
1.00	0.9	1.7	2.6	3.4	4.3	5.2	6.0
1.25	0.7	1.4	2.1	2.8	3.5	4.2	4.9
1.50	-	1.1	1.6	2.1	2.6	3.2	3.7
1.75	-	0.7	1.1	1.5	1.8	2.2	3.0
2.00	-	-	0.6	0.8	1.3	2.1	3.0

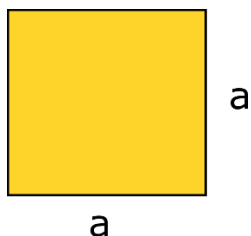
Minimum dimensions

When the minimum length of the bedding beams has been determined, the minimum cross section dimensions of the beams may be taken from the tables below, which is based on the following factors:

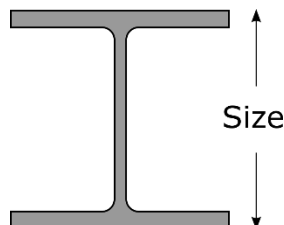
- The cargo weight (in ton)
- The minimum length of the beams, L_R (in meters)
- The length of the footprint of the cargo on the beams, L_C (in meters)

Minimum edge length, $a \times a$, of a pair of square wooden beams with $\sigma_p = 1.5 \text{ kN/cm}^2$ [mm]							
Free length $L_R - L_C$ [m]	Cargo weight [ton]						
	4	8	12	16	20	24	28
0.5	79	99	114	125	135	143	151
1.0	99	125	143	158	170	181	190
1.5	114	143	164	181	194	207	218
2.0	125	158	181	199	214	227	239
2.5	135	170	194	214	231	245	258
3.0	143	181	207	227	245	260	274
3.5	151	190	218	239	258	274	289
4.0	158	199	227	250	270	287	302

Minimum size of a pair of HEB steel beams with $\sigma_p = 15 \text{ kN/cm}^2$ [mm]							
Free length $L_R - L_C$ [m]	Cargo weight [ton]						
	4	8	12	16	20	24	28
0.5	100	100	100	100	100	100	100
1.0	100	100	100	100	100	120	120
1.5	100	100	100	120	120	140	140
2.0	100	100	120	120	140	140	160
2.5	100	100	120	140	140	160	160
3.0	100	120	140	140	160	160	180
3.5	100	120	140	160	160	180	180
4.0	100	120	140	160	180	180	200



Definition of edge length, $a \times a$, for wooden beams cross sections



Definition of size for HEB steel profiles

If multiple pairs of beams or beams with a different cross section are used, they shall have the same combined section modulus as the beams represented in the tables above. Furthermore, the required section modulus is proportional to the bending strengths, σ_p , given in each of the tables.