

### 1. This guideline applies to:

- All grouser bar sections produced at Tata Steel, Special Profiles, Skinningrove.
- Road transport and sea transport to mainland Europe by North Sea or English Channel ferry crossings.

The lowest friction factor for grouser bar on timber, as per EN 12195-1:2010 Annex B.1.2, is  $\mu = 0.6$ .

### 2. Essential requirements

- Headboard height must cover height of load and have a minimum load bearing capacity of 5 tonnes.
- All transport chains must be compliant with EN 12195-3, minimum lashing capacity LC 40 kN (Grade 8, 8 mm).
- All web lashings must be compliant with EN 12195-2, minimum lashing capacity LC 2000 daN.
- Web lashings must be protected from all abrasive surfaces and sharp edges, including side raves.
- Timber dunnage must consist of 5 square section timbers, per layer, 100 x 100 mm minimum.
- Anti-slip matting must be positioned between base timbers and trailer deck.
- Bundles to be banded with minimum of 4 bands per bundle.

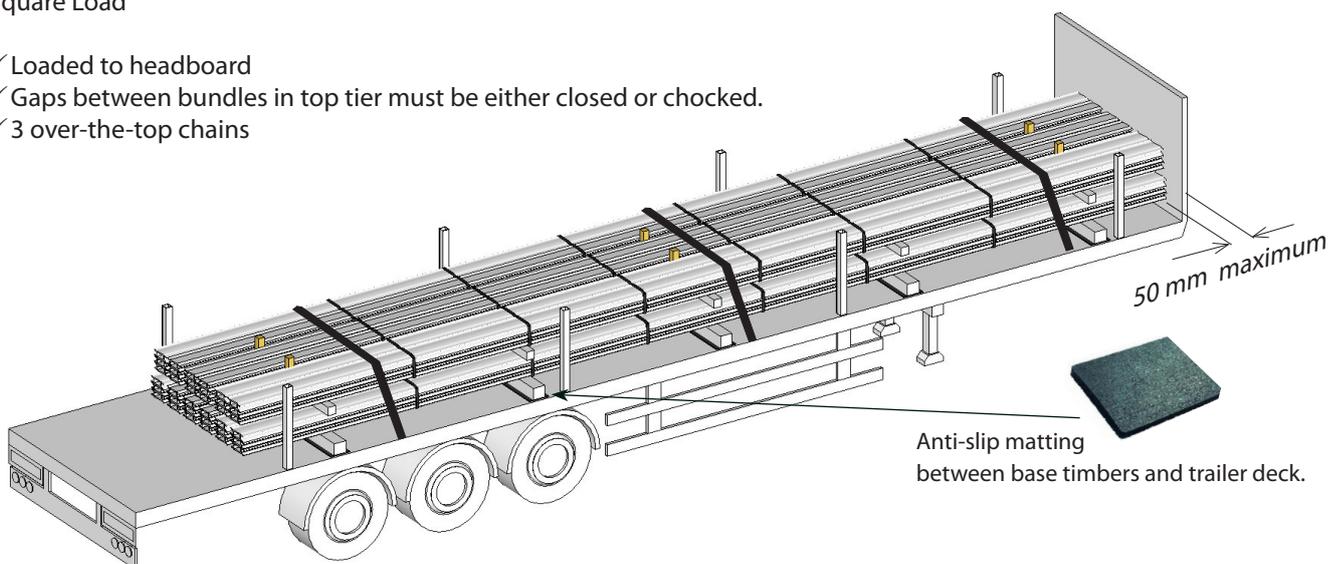
### 3. Loading to headboard

- ✓ Load product to the headboard (maximum gap of 50 mm) when axle loads allow otherwise refer to Section 4.
- ✓ Square load is allowed for UK loads only when loaded to headboard otherwise pyramid load build see Section 4.1.
- ✓ All loads: No uncontrolled gaps in top tier of load.

#### 3.1 UK loads - Transport chains (LC 40 kN) minimum.

##### Square Load

- ✓ Loaded to headboard
- ✓ Gaps between bundles in top tier must be either closed or chocked.
- ✓ 3 over-the-top chains



Shown for a 28 t load of grouser bars loaded to trailer headboard, restrained with 8 mm chains.

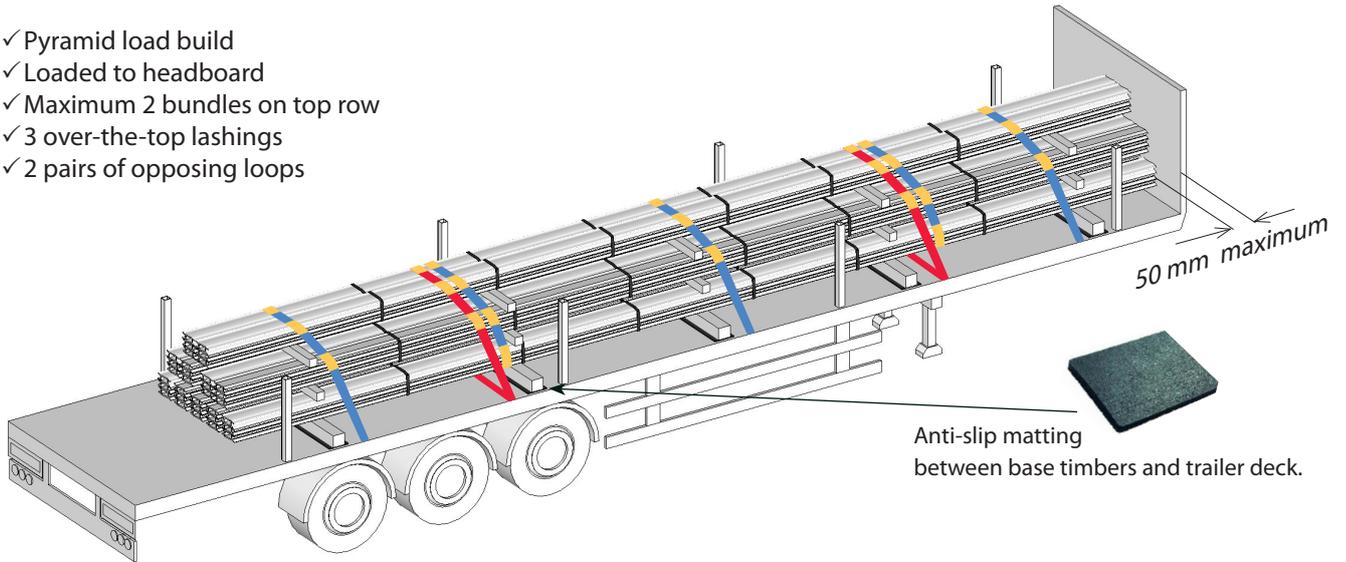


Square load build is suitable only for UK road transport when blocked in a forward direction.

This Load Restraint Guideline has been designed and tested to meet the forces for road and sea transport as stated in EN 12195-1:2010 and VDI 2700.

### 3.2 Export loads - Web lashings (LC 2000 daN) minimum.

- ✓ Pyramid load build
- ✓ Loaded to headboard
- ✓ Maximum 2 bundles on top row
- ✓ 3 over-the-top lashings
- ✓ 2 pairs of opposing loops



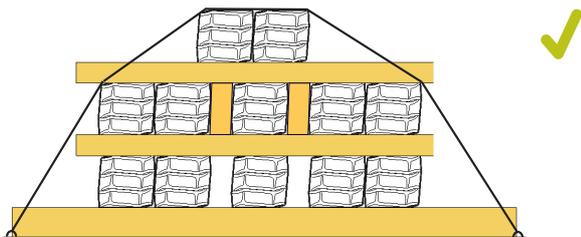
Valid for all load weights.

## 4. Loading away from headboard

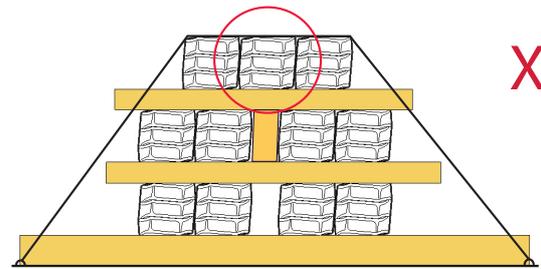
In order to optimise payload whilst complying with axle weight limits it may be necessary to load away from the headboard, see TIS-0012 on axle weights and load distribution. When loading away from the headboard the load must be built in a pyramid form.

### 4.1 Pyramid load build

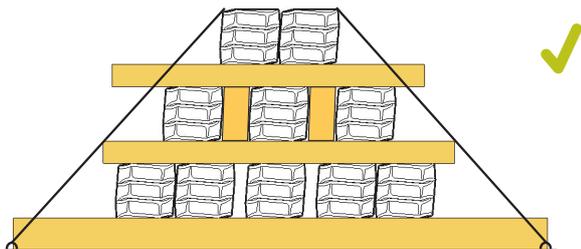
- All product in each tier must be the same section size.
- Bundles must be aligned at the front.
- Maximum of 2 bundles on top tier with gaps between bundles either closed or chocked.



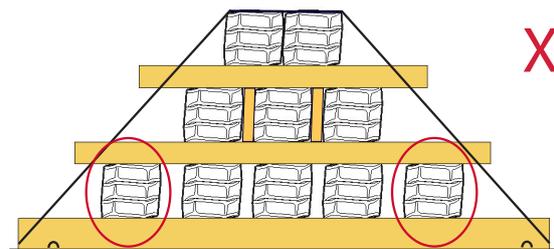
Load is built in such a way that all bundles receive clamping either through timber dunnage or directly from the restraints.



Incorrect load build with 3 bundles in the top tier - the middle bundle in the top tier is receiving no clamping.



Pyramid load build allowing good clamping throughout.



Outer bundles in bottom tier are receiving very little clamping force, most of the force is being transferred through centre bundles.

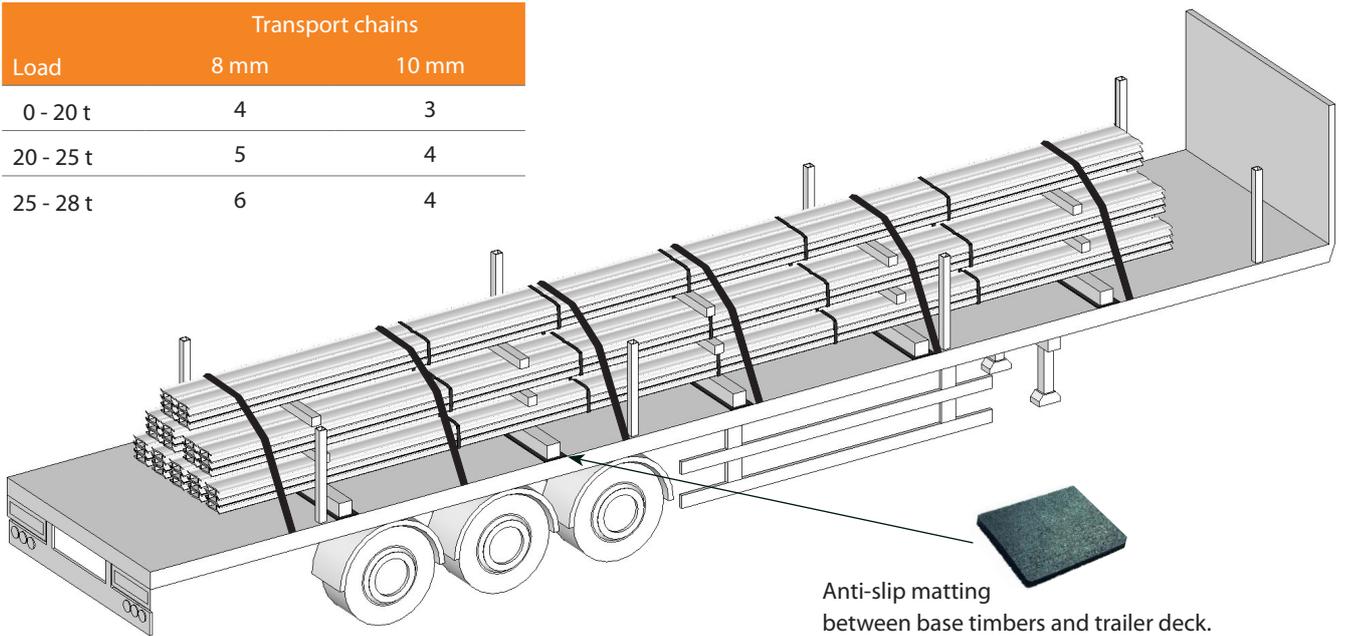
Note: Gaps are permitted between bundles of grouser bars in the lower tiers to achieve effective pyramid load build. It is good practice to block the gaps with vertical timbers especially in the middle tier as shown above..



## 4.2 UK loads - Over-the-top restraint system

Table 1: Minimum number of over-the-top chains

Load	Transport chains	
	8 mm	10 mm
0 - 20 t	4	3
20 - 25 t	5	4
25 - 28 t	6	4



Anti-slip matting between base timbers and trailer deck.

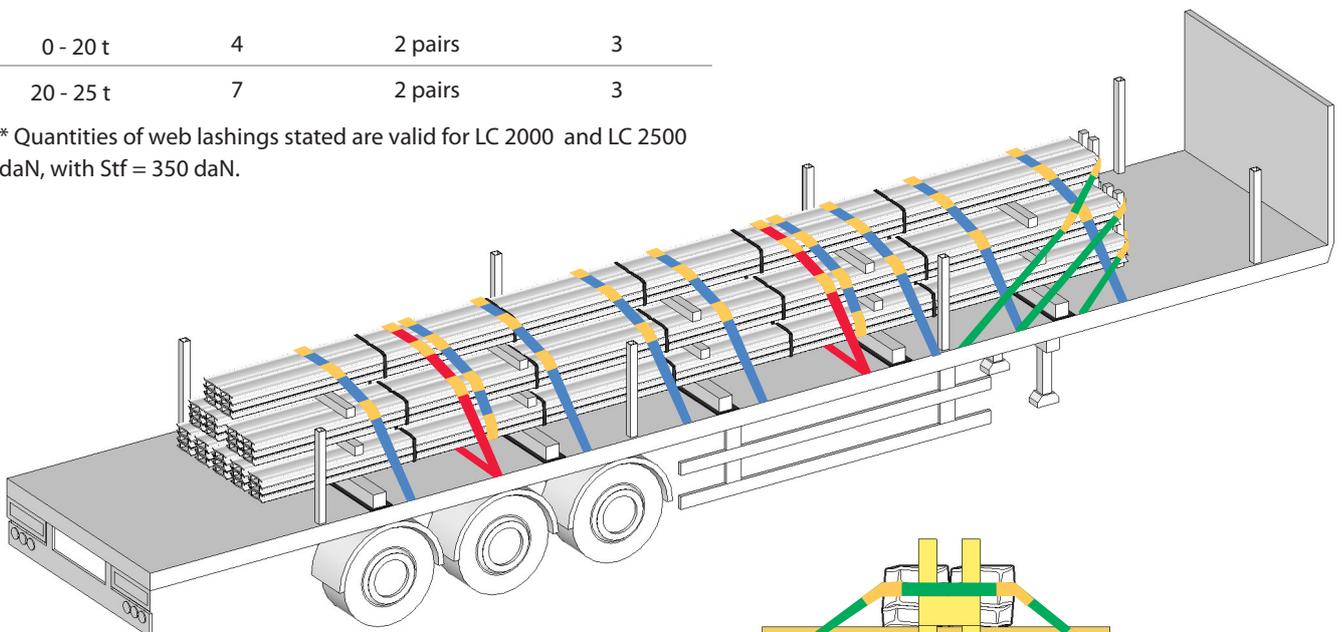
28 tonne load, loaded away from the headboard, restrained with 8 mm chains.

## 4.3 Export loads - Timber 'H' frame system

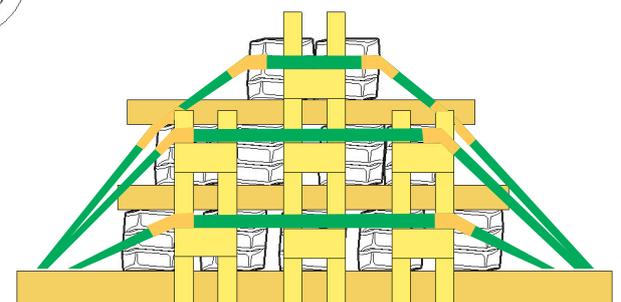
Table 2: Minimum number of lashings required

Load	Web lashing *		
	Over-the-top	Opposing loops	Timber 'H'Frame
0 - 20 t	4	2 pairs	3
20 - 25 t	7	2 pairs	3

\* Quantities of web lashings stated are valid for LC 2000 and LC 2500 daN, with Stf = 350 daN.



25 tonne load restrained with timber 'H' frames, plus 2 pairs of opposing loops and 7 over-the-top restraints.

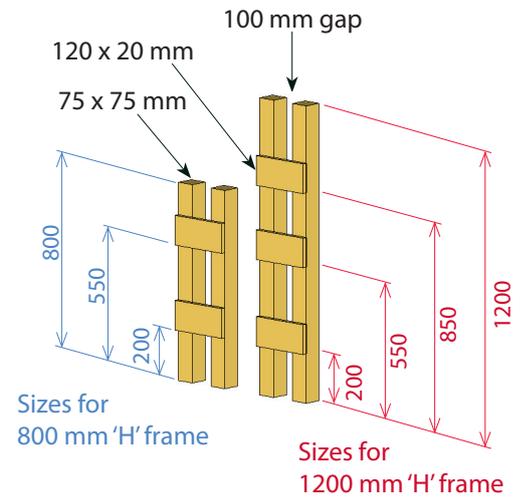


View from the front showing position of timber 'H' frames ensuring all packs are blocked, also shows position of web lashings.

## 5. Equipment

### 5.1 Timber 'H' Frame

- Frame height must cover the height of the stack being restrained.
- 2 sample sizes are shown opposite - when fitted the straps should support the centres of the bundles.
- Note that the 'H' frames can be used either way up to provide the best strap positions depending on stack heights.



### 5.2 Sideways restraint (opposing loops)



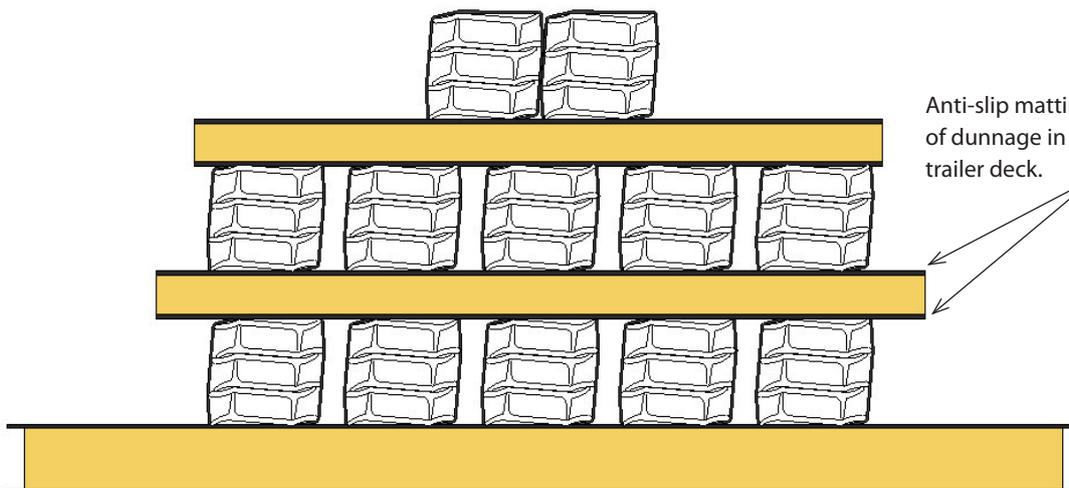
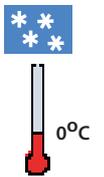
Edge protection must be used to protect all webbing straps in contact with steel.

Opposing loops must be used to restrain against sideways forces present during sea crossings.

## 6. Severe winter weather advisory periods

### 6.1 Overview of winter weather restraint

During severe winter weather advisory periods (when there is a risk of ice / frost forming in the load) additional anti-slip matting must be applied to all faces of timber dunnage in contact with product or trailer deck.



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