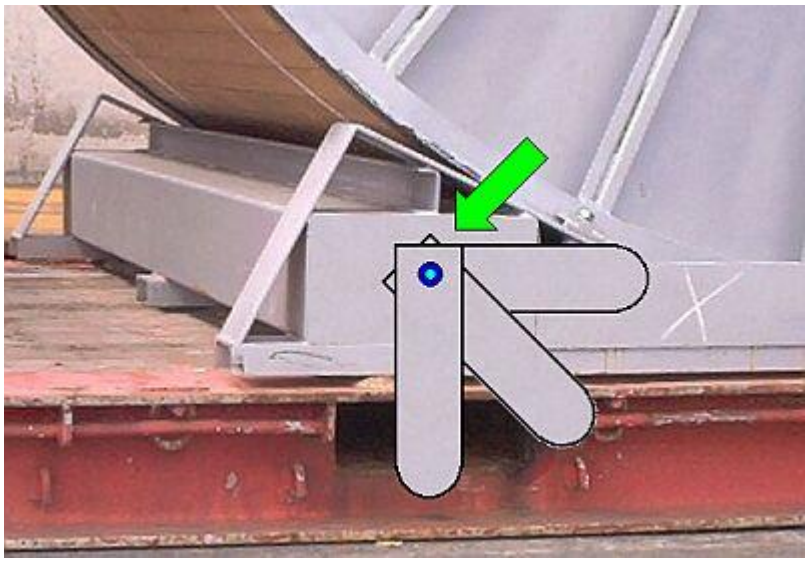
Lateral securing using steel edge provided at the design stage

The cable reel could be held absolutely securely on the flatrack if the manufacturer had given some thought to cargo securing from the outset. A steel edge which is welded on or can be bolted on ensures 100% secure lateral securing.



Lateral securing option using steel lugs

Steel lugs provided at the design stage, which may even be adjustable in the transverse direction, would be another possible way of ensuring transverse securing. A large number of other options is feasible - it is not unreasonable to expect the

manufacturer's engineers and technicians to display a little imagination.

Lengthwise securing using squared lumber

Appropriate lengthwise cargo securing can be readily achieved by using squared lumber bracing.

Lengthwise and transverse securing using chains

Lengthwise and transverse securing using chains - plan view

The use of chains allows securing to be achieved in both the transverse and lengthwise directions. Because of the package

dimensions and the lashing points provided, the transverse components turn out to be greater than the lengthwise components. To achieve adequate securing, several chains should be used or the longitudinal components should be supplemented by additional squared lumber bracing.

Vertical securing and securing against tipping using vertical and oblique lashings

Provided that the cable reel is secured adequately in the floor area against lengthwise and sideways shifting, vertically and obliquely applied lashing are sufficient to secure the cable reel against tipping and other vertical forces.

How to secure steel coils in 20'gp container

General

Following points to be observed for securing coils:

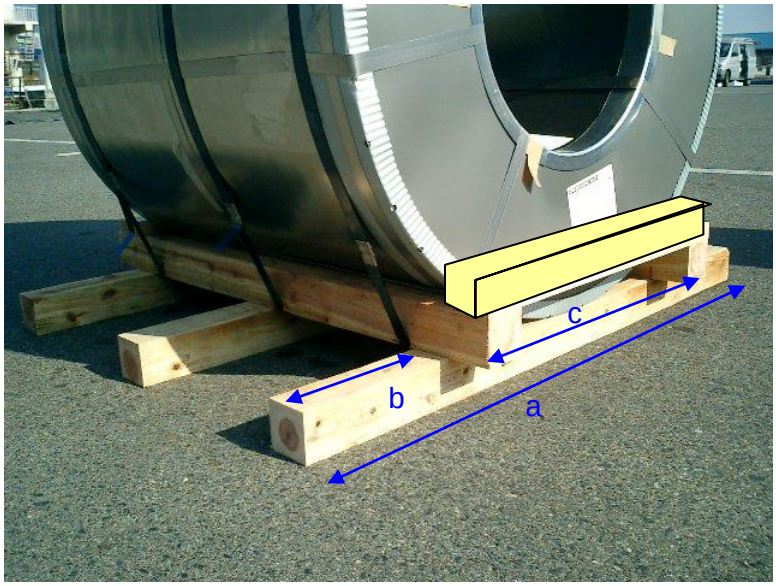
- correct length of the cradle for weight distribution
- blocking against side and length shifting in floor height above the bedding
- lashing in four direction or several coils together to one full block

The below securing guideline is valid for all types of coils. Coils can be loaded eye to the sky, eye to the door or eye to the side. Usually loading coils eye to the sky is not so problematic, as the coil weight is not so high and the weight is better distributed. Loading eye to the side is the common method and usually used for the heavy coils. Therefore the first chapter explain stuffing coils eye to the side. All guidelines like weight distribution, bedding, blocking and lashing have to be followed by all stuffing methods (eye to sky and eye to door). At the end some special chapters added for loading coils eye to the door.

Part A coil stowed with eye to the side

1. Preparation of cradle

Build a cradle which meets the following requirements: Length (a) in cm to be calculated: coil weight in kg / 48 kg/cm. (Limit: 4,8t per meter = 48kg per cm) or longer.



Maximum free end b on each side depends on the thickness of used square timber.
10x10cm: max 50cm.
15x15cm: max 75cm.
20x20cm: max 100cm
25x25cm: max 125cm.
30x30cm: max 150cm.
If hard wood is used above value can be extended by 10cm. Hapag-Lloyd do not recommend the use of timber with 25x25cm or higher and also hard wood because of environmental reasons.

If not possible to meet these requirements, coils are too heavy for loading on timber bedding. Then steel bedding or other container types like flatracks required. Pls contact first your sales office, when you intend to ship heavier coils.

In summery of above requirement, coils of more than 15t can not be shipped in 20' standard container. If somebody insists to ship heavier coils, stuffing method has to be agreed with special cargo department of Hapag-Lloyd case by case.

The coils have always to be place in the container with the bedding in length direction. The bedding needs to have minimum 2 timbers in one-piece, placed as fare as possible

to the outward position, close to the container side walls. Additional beddings below the middle of the coils are not a requirement from the container owner, but can be added.

Example1: coil weight: 7650kg, c=65cm Result: a=160cm, b= (160-65cm)/2=48cm square .timber 160x10x10cm possible.
Example2: coil weight: 9960kg, c=75cm Result: a=208cm, b= (208-75cm)/2=67cm square .timber 210x15x15cm possible.

2. Position inside the container

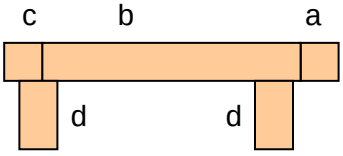
A single coil should be placed in the middle in length and athwart direction inside the container. When two coils are loaded in the container, it should be avoided to place both together in the middle. Place one as far as possible to the end wall and the other as close as possible to the door side. The space to door and end wall required for blocking and securing shall of course remain.

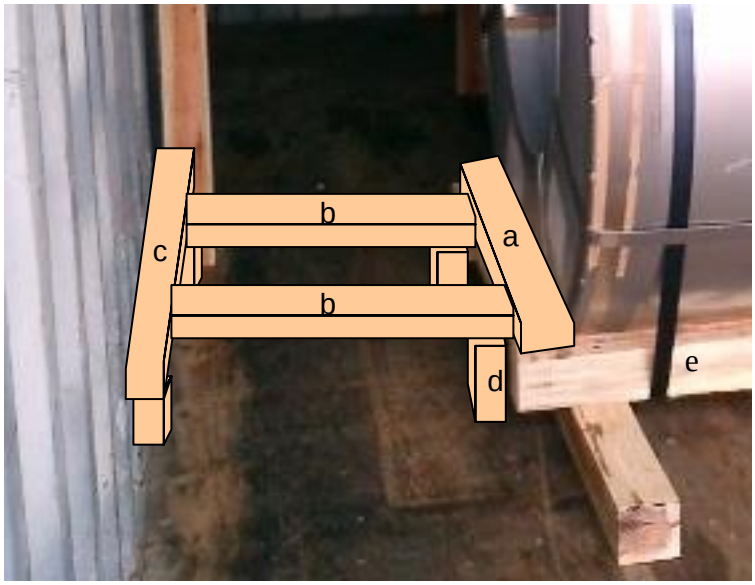
3. Blocking

Task of the blocking is to prevent sliding of coils in length and athwart direction. It needs to be taken in account, that the door can **not** take any force and the container walls are very soft. Thus the blocking is to be spread over a large surface and in the lowest possible height.

Blocking to the side: Timber (a) already there from the cradle, see chapter 2. Then two pieces (b) to be placed between (c) and (a), with a distance in between as wide as possible. To keep all pieces (b) and (c) in the same height, min. 4 pieces supports (d) to be placed below and nailed together. It is important that (b) do not touch the containers side wall.

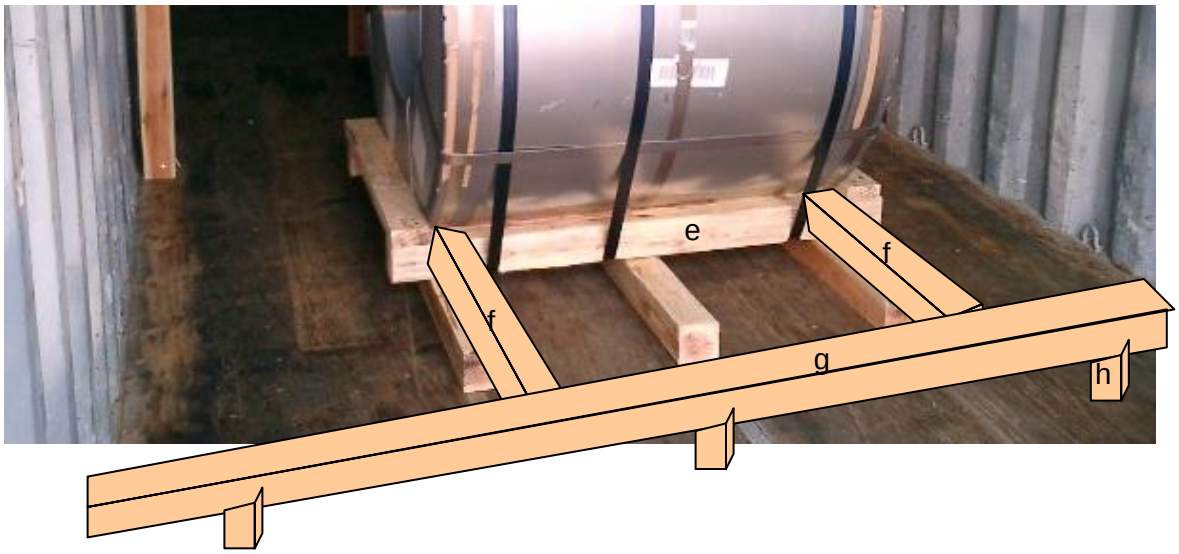
Side view:





Same patter to be done on the other side.

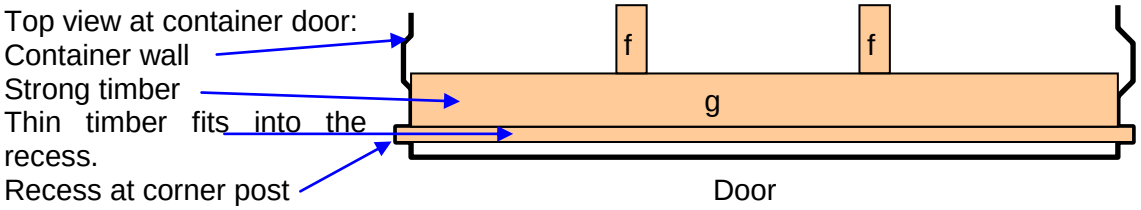
Blocking in length direction to be placed against athwart timber (e) on which the coil rest.



Both pieces (f) need to be placed between (e) and (g), all in the same height. Best to lay pieces (f) on the bedding and put the timber (g) on top of supports (h) with the same height as the bedding. Square timber (g) to be set with its ends into the corrugated side walls of the container.

Blocking between 2 coils simple to be done with two pieces (f) between (e) of each coil. Blocking to end wall of the container can be done with (g) fixed into the corrugated side walls or touching the end wall over the full width, same pattern as blocking to the side (c).

There are special requirements for rail shipment. A stronger blocking in length direction is required by the rail companies. To place a timber (g) in between the corrugated sidewalls is not accepted. Therefore the blocking is to be set against the corner posts and end wall of the container and into the recess of the corner post at the door side.

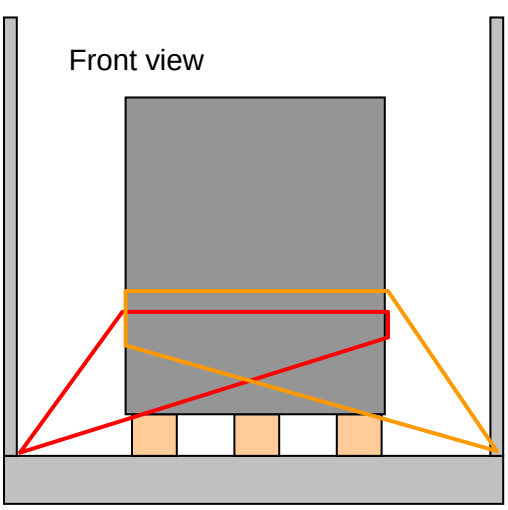


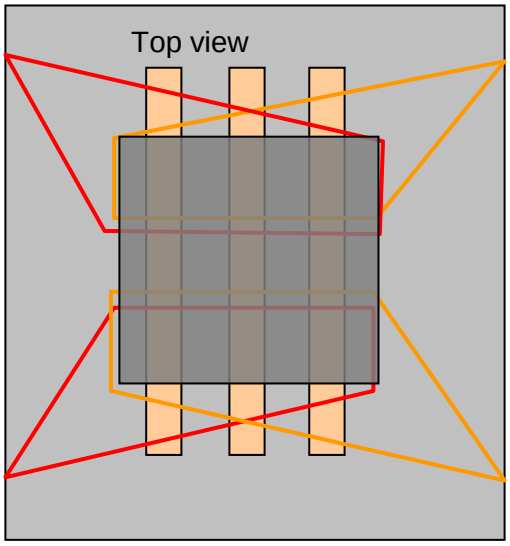
Picture left side shows example of blocking lengthwise with use of the recess in corner post at door side.

Finally we can say that blocking is possible without nailing to the container floor and any wedges. Nails can be used to keep the wood constructions together, but no forces should be brought to the nails. Also the wedges can be used as bedding of the coil, but not for blocking.

4. Lashing

Aim of the lashing is to secure against tipping. The height on which the lashing is fixed to the coil is usually below the middle. Therefore it is only workable when the coils are blocked in floor height as well. The lashing of each coil needs to be done by 4 lashings. Each starts and ends on the same point. As lashing material can be used best steel straps, but also nylon belts with edge protections or steel wires.





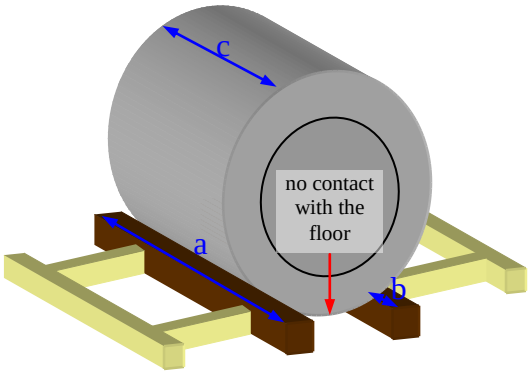
As the lashing eyes of a container can take only 1-2t, the strength of lashing material need not more than 2t.

5. Example

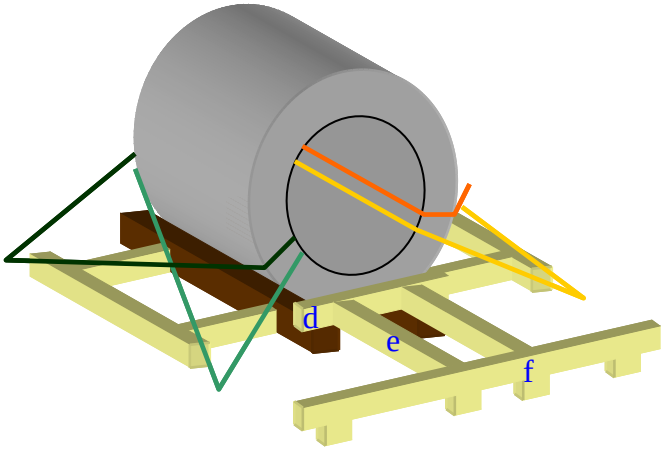
Here you can see one picture of good securing a steel coil with eye to the side.

For heavy, high and thin steel coils it is useful to add a blocking to the side wall in a higher position.

Part B coil stowed with eye to the door



Lay out the bedding (brown) and blocking to the side walls (yellow). The distance between both square timbers of the bedding should be as wide as possible, but only so far apart that the steel coil will have no contact in the middle with the floor of the container. Use stronger square timber to reach a wider distance. Length of the bedding (a) depends on the weight of the coil and will be calculated in cm: coil weight in kg / 48 kg/cm. (Limit: 4,8t per meter = 48kg per cm) or longer. At least the bedding length should be 20cm longer (10cm each side) than length of the coil to place on this bedding on each end timber for blocking in length direction. Maximum free ends (b) have the same limits as written in Part A.



The blocking in length direction is to be done same way as written in Part A. Place a timber on the bedding athwart (d), one timber (f) athwart into corrugates side walls or recess of corner posts at the door and add two timber (e) as connection in between. Below timber (f) small supports required to archive same height over the whole arrangement. Blocking in length direction is to be placed on both sides of each coil.

Finally the coil is to be secured by 4 nylon belts, each from each corner, like a closed circle.

For any further questions regarding this proposal please contact:
Ralph Schubert,
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Email: Ralph.schubert@hlag.com

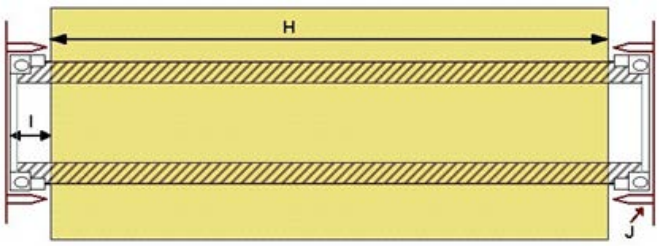
A Guide for the Loading and Lashing Cargo on Hapag-Lloyd Flatracks

This guide is for your information and guidance concerning stuffing and securing of cargo on Hapag-Lloyd flatracks. It contains basic requirements only, which may differ from cargo to cargo. In case of questions please contact the Hapag-Lloyd Special Cargo Department as follows: special.cargo@hlag.com. This guide is based on the CTU code and our experience to guide you and improve cargo securing. We do not over rule and do not raise the lashing requirements of the IMO/ILO/UNECE CTU Code of Practice and IMO Code of Safe Practice for Cargo Stowage and Securing. Both provides more detailed guidance's regarding cargo securing and calculation.

In the interest of the safety of crew, handlers and vessel Hapag-Lloyd reserves the right to inspect flatracks prior loading and to refuse loading in case of stowage and/or securing is not fulfilling CTU Code requirements or not deemed safe.

Stuffing. Cargo should be positioned on the flatrack to ensure suitable weight distribution both along length and width. The aim is to have the centre of gravity not too far "off-centre".

Due to cell guide structures, over wide cargo and respective blocking and bracing materials should not be stowed within 30cm (12“) of the front end of a flatrack as this prevents being loaded under deck. Any of such cargo would need to be loaded on deck with additional cost.



No.	Explanation	20'Flat	40'Flat
H	Max. allowed length for over wide cargo	550cm	1160cm
I	Min. distance to flatracks outer end	30cm	30cm
J	Cell guides of the vessel under deck		

It is important that out of gauge measurements are accurate and include the lashing equipment. Incorrect declaration can lead to miss rating and short shipment. The width of the floor is less than the container's outer width (244cms; 96"). Therefore cargo might overlap the flatracks floor, but still be in-gauge. Only those parts of the cargo or lashing materials which overlap a virtual horizontal line between the outer edges of the corner posts need to be counted as over-wide.

Welding. Any kind of welding, drilling holes or modifying flatracks structure is strictly forbidden.

Weight distribution. Hapag-Lloyd flatracks are constructed to carry heavier and more concentrated loads than standard equipment. The main strength of a flatrack is in the two outer bottom rails, so cargo must either rest on these rails or have weight transferred to the rails by cross timbers. Although a maximum payload is marked on each flatrack, the maximum weight which can be carried depends on the length the cargo is resting on the bottom rails. The maximum payload can be utilized only when the cargo is distributed over the complete length of the flatracks bottom rails. Shorter resting length leads to less allowed load. Half of payload can be loaded in any way independently of the cargoes length.

A specific load calculation including special bedding arrangement (e.g. point load) can be verified with Hapag-Lloyd Special Cargo Department.

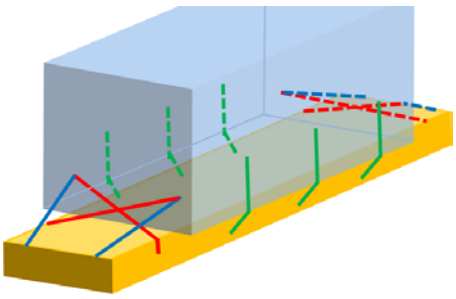
Bedding. Cargo is to be positioned on the flat with its centre of gravity in the middle of the flat, in length and cross direction. Heavy weights are not allowed to be placed exclusively on the wooden floor of the flats. The bedding is usually to be laid out across the flat and needs to reach the main girders.

Antislip material. Any contact between metal to metal must be avoided. Wood dunnage or similar anti-slip materials (rubber) have to be placed between cargoes of metal material and the flatrack bottom rails. Using anti-slip material with high friction coefficient decreases the number of lashings required. A detailed table of friction factors between a wide variety of materials can be found in the CTU code Annex 7 (Appendix 2 and 3).

Lashing eyes. Hapag-Lloyd's flatracks are fitted with numerous lashing eyes (D rings) with a capacity of 5000kgs. Hapag-Lloyd's latest flatracks with series numbers HLXU or FANU 368..., 668... and 868... have stronger lashing eyes with a diameter of about 30mm and higher lashing strength though they do require use of shackles, special hooks with wide opening or use web lashings directly. Leased equipment might have reduced strength.

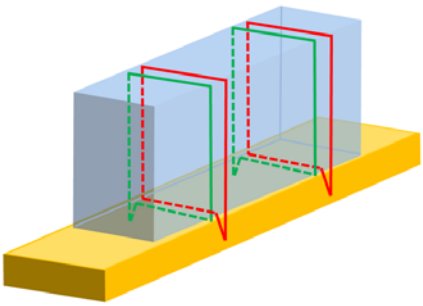
Lashing in general. All cargo must be secured by using materials, which are suitable for the size, construction and weight of the load. Web lashings require edge protection on sharp edges. Don't mix different lashing materials like wires and web lashing on the same cargo, at least for securing in the same lashing direction. Different materials have different elasticity and create unequal lashing forces. Knotting in web lashing should be avoided as breaking strength is reduced by at least 50%. Turnbuckles and shackles should be secured, so that they will not spin off. The strength of a lashing system is given by different names like breaking strength (BS), lashing capacity (LC) or maximum securing load (MSL). For chains and web lashings the MSL/LC is considered 50% of the BS. The manufacturer will provide you with linear BS / MSL for direct lashing like cross lashings and/or system BS / MSL for loop lashings. Every part in a lashing system must have the similar MSL. Otherwise the weakest can be counted only. Remember bad lashing angles, sharp edges or small radii will reduce these figures.

Lashing methods for cargo with lashing eyes. The task of the lashings is to prevent moving of the cargo against side and length direction and against tipping to side. The most lashings must be set against moving to side. For this purpose the cross lashings (red) are the most efficient method. Additionally direct lashings downwards (green) to increase friction and lengthwise (blue) to stop moving in length direction need to be installed. For calculation purposes use the linear MSL figures for each direct lashing.

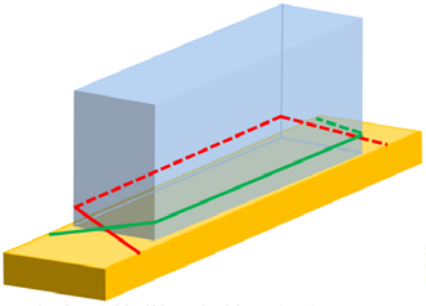


direct lashing - across, down and length

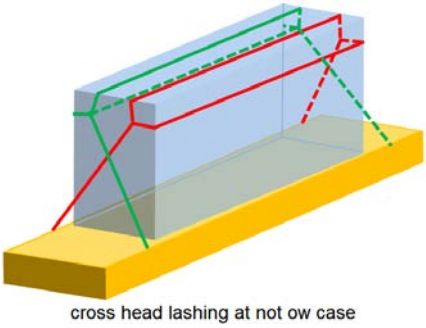
Lashing methods for not over wide cargo without lashing eyes, transverse. The recommended lashing methods for not over wide cases against moving sideward's are the vertical half-loop lashings, horizontal half loop lashings and the cross head lashings.



vertikal half-loop lashing at not ow case



horizontal half-loop lashing at not ow case



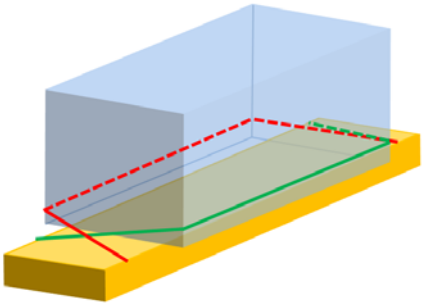
cross head lashing at not ow case

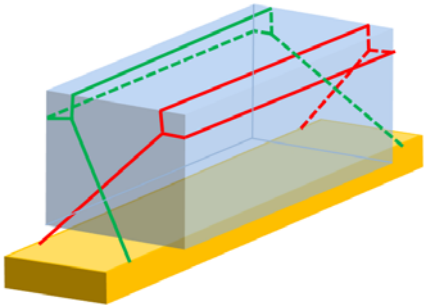
The simple top over lashings can be used as well but not solely and should be combined with one of the above methods.

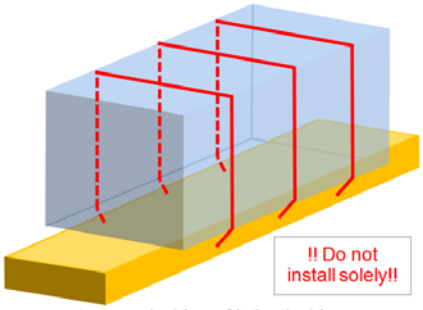
For calculation purposes use the system MSL figures provided by the lashing material manufacturer.

Additionally the cases must be secured in length direction which is explained further down.

Lashing methods for over wide cargo without lashing eyes, transverse. The recommended lashing methods for over wide cases to secure against moving sideward's are the horizontal loop lashings and the cross head lashings in combination with the top over lashings.


horizontal half loop lashing against moving to side


cross head lashing against moving to side



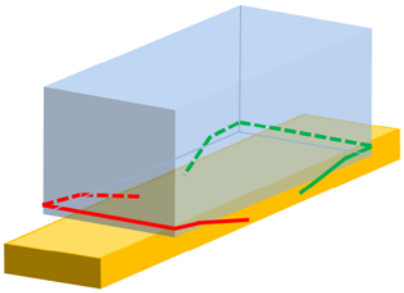
top over lashing, friction lashing

The top over lashing must not be installed solely, but can be used in combinations best with horizontal half loop lashing. Not recommended are vertical half loop lashings.

For calculation purposes use the system MSL figures provided by the lashing material manufacturer for horizontal half loop lashing and cross head lashing. And for top-over lashings, a calculation must be made using the applied tension values as supplied by the manufacturer, along with friction and acceleration factors.

Additionally the cases must be secured in length direction which is explained in next paragraph.

Lashing methods for cargo without lashing eyes, length wise. Securing cargo in length direction can be achieved by blocking and bracing with timbers or by a lashing system. Timber bracing is more common when cargo is crated. The heavier the cargo, the stronger the bracing needs to be. Blocking should be braced against corner posts.
If a lashing system like the horizontal half loop lashings can be installed, then no further bracing is necessary.


horizontal half loop lashing against moving length

Lashing calculation. As a recognised "Rule of Thumb" the number of lashings on each side of the cargo multiplied by the linear or system MSL, must be higher than the weight of the cargo. This is valid for optimum lashing system and the number of lashings must be increased when the lashings have bad angles, are bend around narrow radii (wire) or when there are other aspects of less than optimal lashing methods.

Lashing example: A wooden case of 18 tons is to be secured with web lashings, with 8500daN (8.5 tons) system BS and loop lashings system. Then the system MSL will be 4.25 tons. 18 tons dived by 4.25 tons is 4.2. Rounding-up a minimum 5 pairs of loop lashing are required each side for a total of 10 lashings.

April 2016