

CAMLOK LIFTING CLAMPS

Long Load Recommendations

What Constitutes A Long Load? Or when do I need to use more than one clamp?

This is a complex question to answer.

All plates and beams can be lifted at the centre of gravity provided that it is sufficiently strong and stable enough to withstand the internal forces generated by the lifting process. If the object cannot withstand these forces then a multipoint lift must be used.



These two plates are the same length and width. The 30mm thick plate on the right can easily be handled by a single clamp. However to control the flexure of the 8mm plate on the left, 2 clamps have been used with a lifting beam.

These recommendations are limited to flat plates and rolled sections. Large fabrications, hollow sections and other loads are not covered here.

Case 1 Flat plate



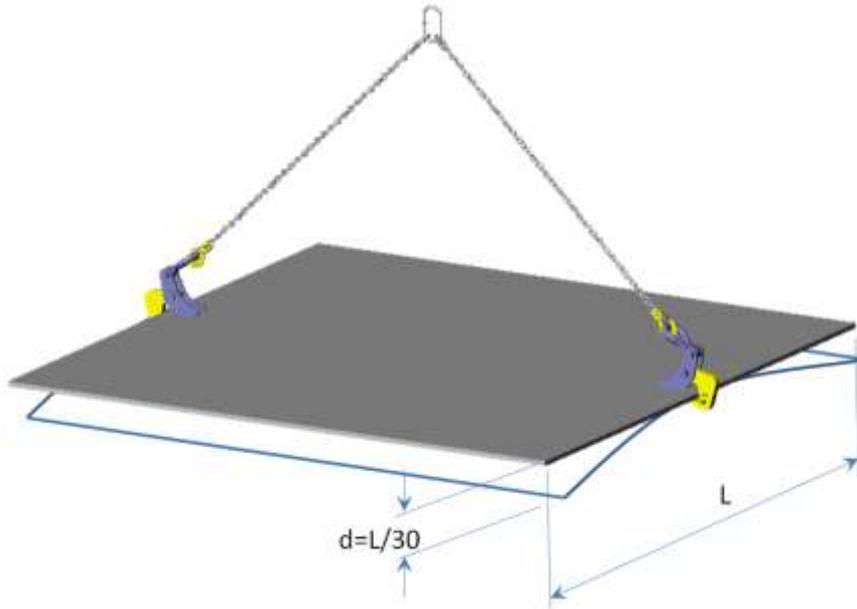
As the length of the plate increases the stress due to bending at the lifting point also increases, the limit to the length is when the bending stress equals the yield of the material and the object suffers permanent set.



The formation of the gutter section of this thin sheet has increased the lateral stiffness but not the axial. The use of protective packing should not be used. The THS clamps were replaced by special non marring versions.

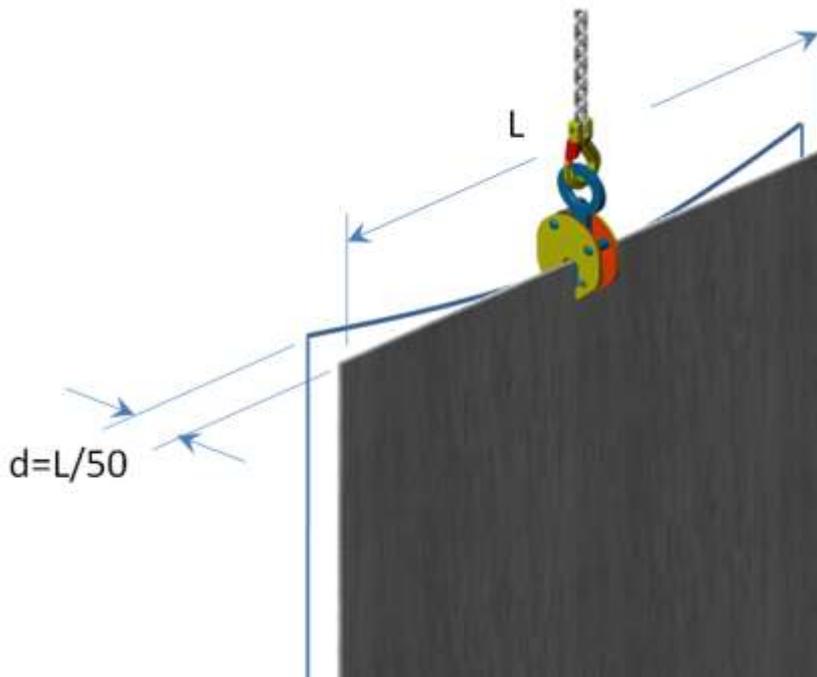
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Flat plate Horizontal

A pair of horizontal clamps positioned along the line of the C of G should not produce an end deflection of more than $1/30^{\text{th}}$ of the total length of the plate when lifted horizontally. (Example: 2m long plate lifted by 2 CH2 clamps should not deflect more than 66mm vertically at each end.)



Flat plate Vertical

A single vertical clamp positioned above the C of G should not produce a lateral movement of more than $1/50^{\text{th}}$ of the total length of the plate when lifted vertically. (Example: 3m long plate lifted by a CZ3 should not deflect more than 60mm horizontally at each end.)

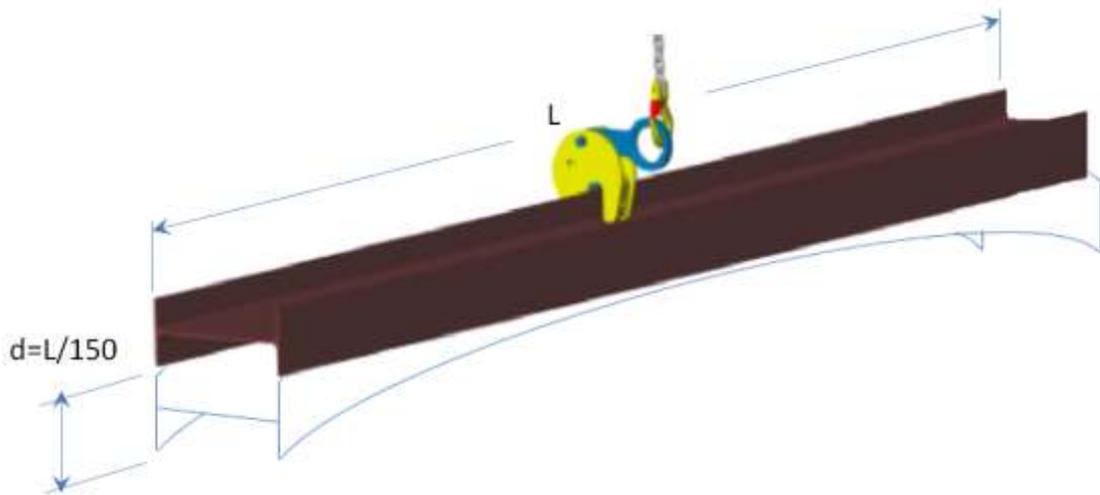
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Case 2 I beams, channels and railway lines

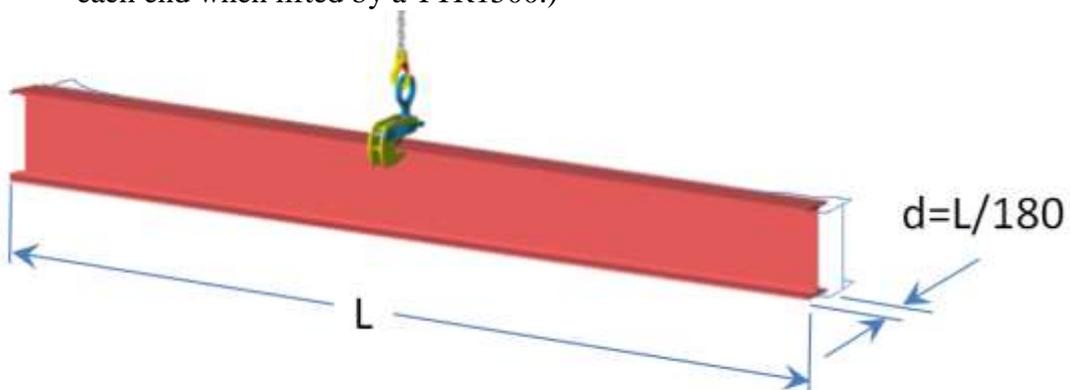


This type of object will tend to curl as the unsupported length increases. The lateral curvature moves the C of G to the side; this causes the object to tip and increases the curvature. This action can be very violent and cause personnel injury.



Rolled sections

A single clamp positioned above the C of G or a pair of clamps along the line of the C of G should not produce an end deflection of more than $1/150^{\text{th}}$ of the total length of the section when the major axis is horizontal. (H or U)
(Example: 12m long I beam should not deflect more than 80mm vertically at each end when lifted by a TTR1500.)



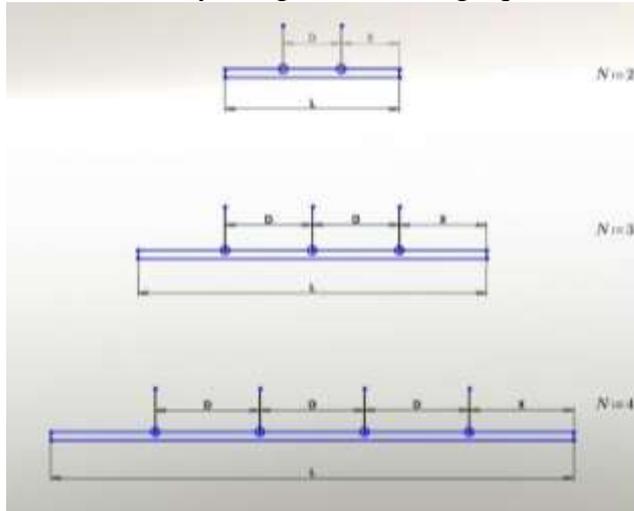
Rolled sections

A single clamp positioned above the C of G or a pair of clamps along the line of the C of G should not produce a lateral movement of more than $1/180^{\text{th}}$ of the total length of the section when the major axis is vertical. (I or [) (Example: 6m long I beam should not deflect more than 33mm horizontally at each end when lifted by a single TTG3.)

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When using multiple lifting points the placement of the clamps will effect the deflection of the object. The distance between clamps to give the minimum deflection can be found by using the following equation:



$$D = \frac{L}{\sqrt{(N^2 - 1)}}$$

Where

D = Distance between clamps

L = Length of load

N = Number of clamps used

X = Overhang

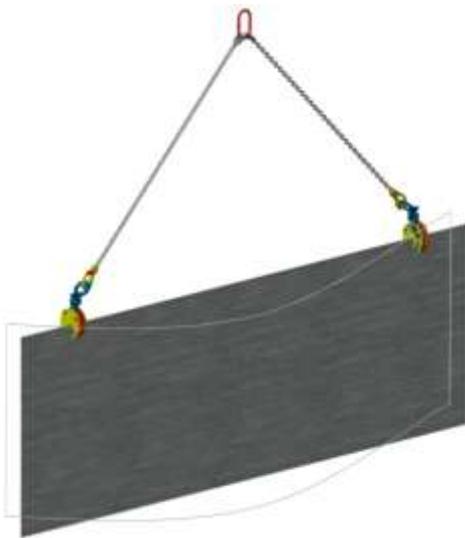
The clamps must be equally spaced around the centre of the load

Some sort of load sharing is advisable on multi clamp lifting beams if loads are stiff.

(Example: 12m long I beam lifted with 2 clamps.)

$$D = \frac{L}{\sqrt{(N^2 - 1)}} = \frac{12}{\sqrt{(4 - 1)}} = \frac{12}{\sqrt{3}} = 6.93\text{m} \sim 7\text{m}$$

Each clamp fitted 2.5 m from each end using a 7m long lifting beam



The use of 2 leg chain slings do not offer any increase in lateral support. The use of this type of sling can exaggerate stability problems when widely spaced.

Contact

If you wish to discuss your application or clarify any of the points raised in this document then please do so via:

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