

Rigging Guide

Regulatory Requirement

AS3850 and the National Code of Practice for Precast and Tiltup Construction require that rigging systems be designed to distribute loads equally between all anchors in precast components.

If loads are not equally distributed, damage or failure can occur to the precast components, the rigging components or both.

Rigging Geometry affects the loads in the rigging equipment and the precast components being lifted. Common rigging errors can result loads of twice the design loads. A common mistake is to lift a component designed with four equally loaded points with four fixed length slings attached to a ring or hook. The small variations in the lengths of the rigging result in the load in this case only being shared by two of the slings, resulting in double the load applied to the anchors and the concrete surrounding the anchor. When lifting thin precast panels this has been the cause of many failures. Rigging with multiples of three lifting points (except for the special case shown) is not recommended by codes.

Rigging Diagrams

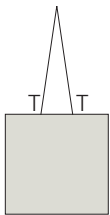
The diagrams below show the effect of different rigging geometries on the loads.

Equalised loading

Correct Rigging for equalised Anchor loading

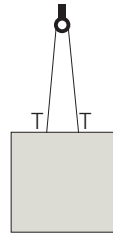
2 points

2 fixed length
Equal loads
in each



$P=2T$

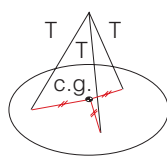
2 sheaved slings
Equal loads
in each



$P=2T$

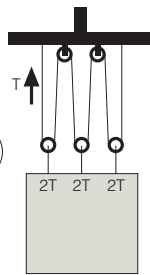
3 points

Only for special cases!



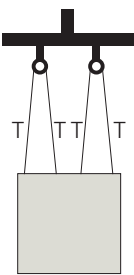
$P=3T$

Special Case! 3 fixed leg slings equally distributed around the centre of gravity

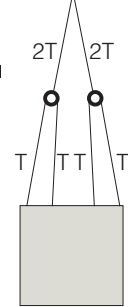


$P=6T$

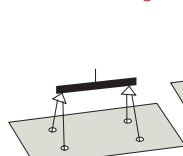
4 points



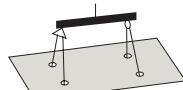
$P=4T$



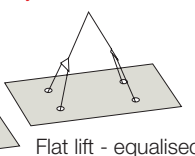
$P=4T$



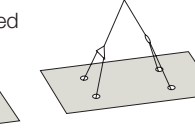
Flat lift - equalised



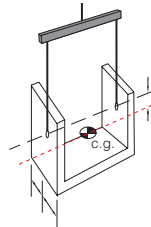
Flat lift - equalised



Flat lift - equalised



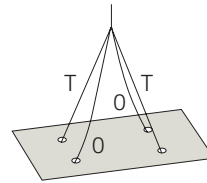
Flat lift - equalised



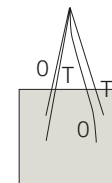
Always ensure that the centre of gravity (centroid) of the object being lifted lies below the centre of lift of the lifting anchors to avoid instability and toppling during lifting.

Unequal loading

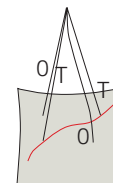
4 point rigging with fixed length slings develops unequal loads - load is shared only on two slings



Flat lift
4 x fixed slings
no equaliser

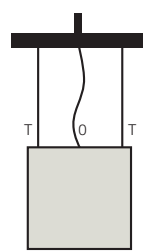


$P=2T$

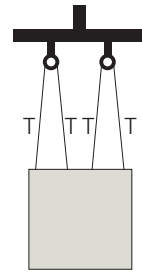
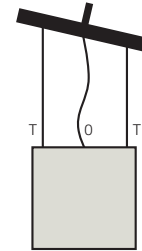
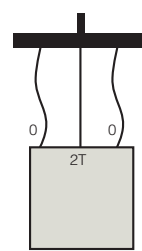


$P=2T$

4 equal length slings unequal loads. Panel tries to bend to equalise the loads. This overstresses the panel causing cracking.



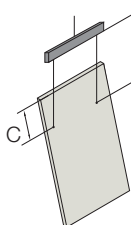
Fixed leg slings indeterminate loading!



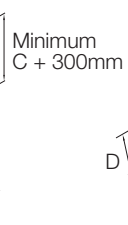
$P=4T$

Central anchor
Double Loaded

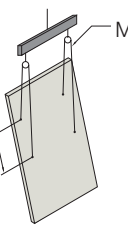
Recommended Rigging Configurations when Facelifting with Unilift QwikTilt systems



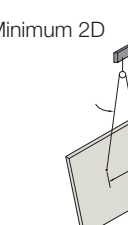
2 x 1



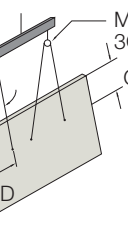
2 x 2



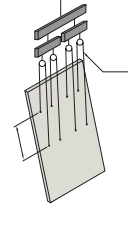
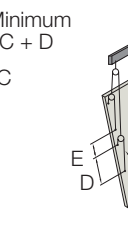
4 x 2



2 x 4



4 x 2



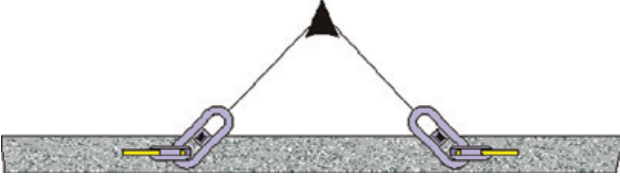
The maximum sling angle θ should be specified in the lifting design.

Rigging Guide

Recommended Rigging Configurations when Edge-lifting panels with EdjPro systems

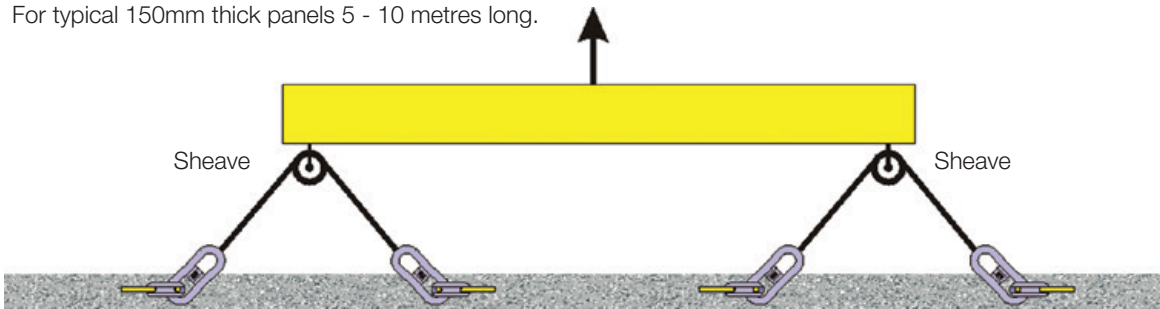
2 point edge lifting:

For tilting up panels by their long edge, e.g. from the casting bed. For typical 150mm thick panels less than 5 metres long.

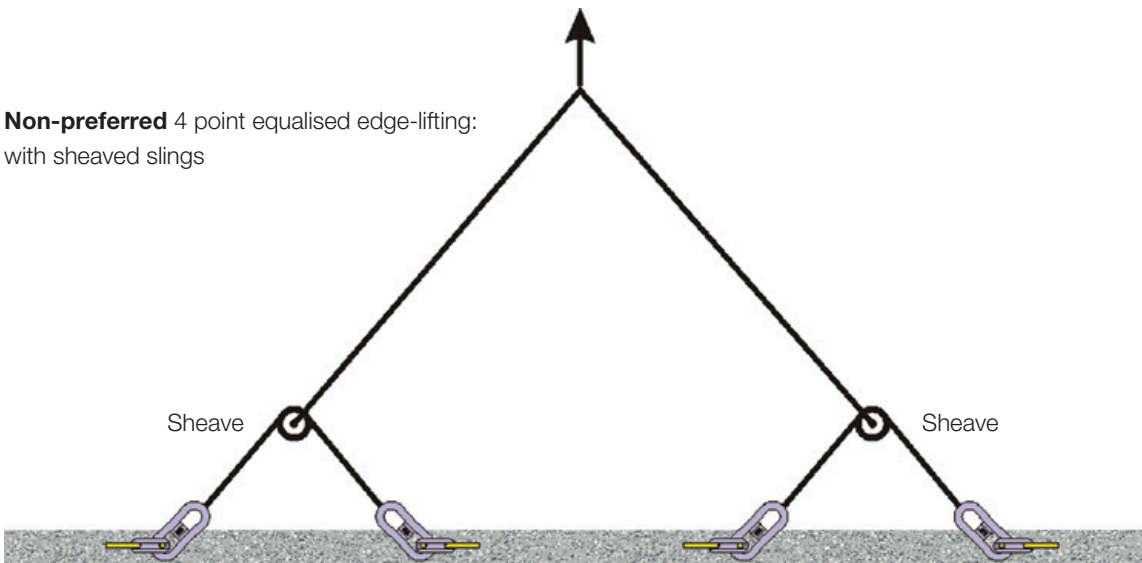


Preferred 4 point equalised edge lifting:

With load equalising beam and sheaved slings.
For typical 150mm thick panels 5 - 10 metres long.

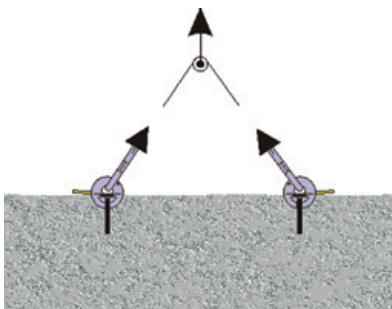


Non-preferred 4 point equalised edge-lifting:
with sheaved slings

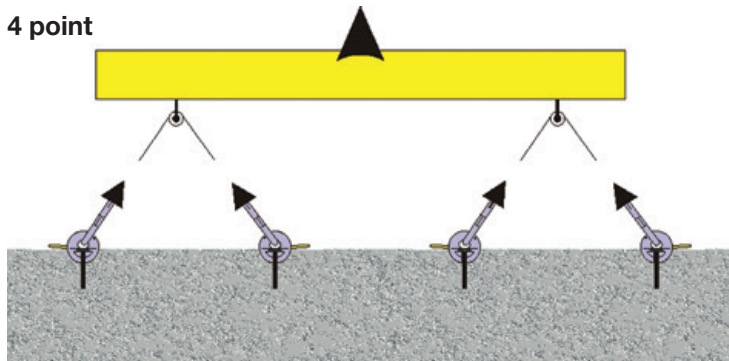


Transporting in the factory, handling and erection by top-lifting from the edge

2 point



4 point



Mid-air Panel Rotation 'Spin-up' and Erection using EdjPro anchors and clutches

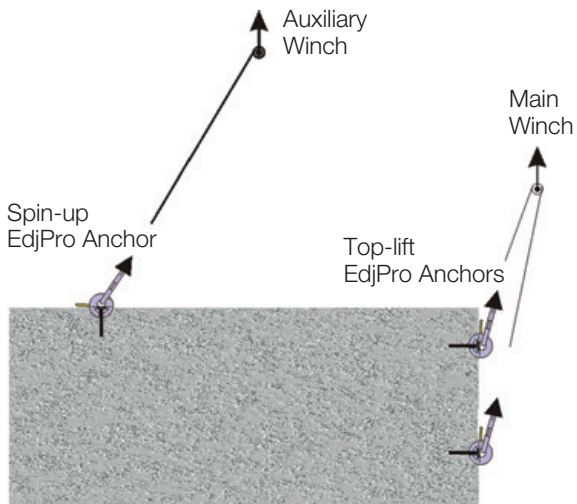
Main Winch:

Connect two either standard EdjPro Clutches or Remote Release clutches to the EdjPro top-lift erection anchors.

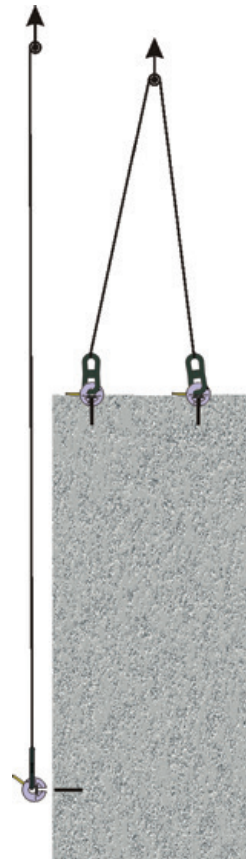
Auxilliary Winch:

Connect an EdjPro clutch with locking ring arm **away** from the point of lift to the 'spin-up', or 'tail-lift' EdjPro anchor which is located at approximately $\frac{1}{4}$ of the long edge.

Standard EdjPro clutches



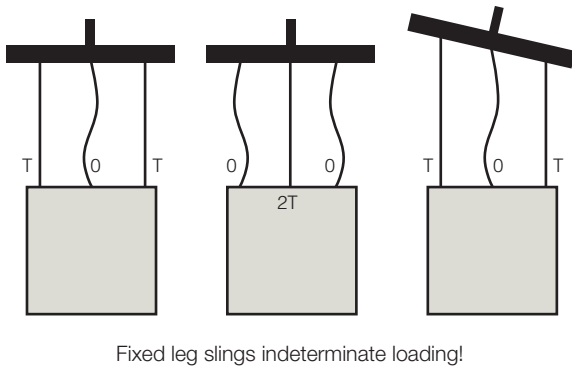
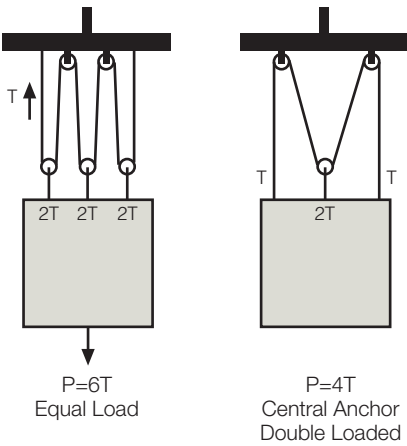
Turn the panel by transferring the load to the main hoist.



Remove the spin-up clutch. Hoist the panel into position and disconnect the top lift clutches, preferably with the aid of an elevated work platform or remote release when using the EdjPro remote release clutch.

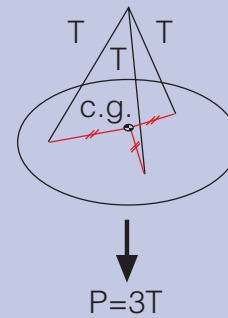
**Not recommended:
Rigging Configurations with
multiples of 3 lifting points**

Rigging with multiples of 3 slings is particularly difficult and not recommended



Many accidents and failures have occurred with these rigging configurations because of the difficulty of ensuring that the loads are evenly distributed. Flat lifting with three points is possible when they are equi-distant from the centre of gravity.

This can be OK but it is generally safer for stability to lift with 4 fixed leg slings and design for sharing the load on 2 of the 4 points.



Special Case! 3 fixed leg slings equally distributed around the centre of gravity