the How To of Hanger Bars

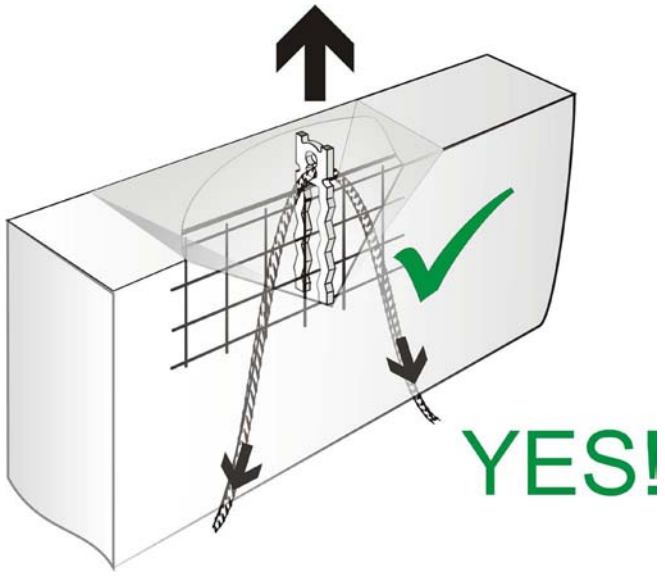
Why Use a hanger bar?

Thin concrete panels cannot support a high load when they are lifted by their edges. When the concrete cracks, a pie shaped segment including the anchor is torn from the panel.

A hanger bar is a reinforcing bar which improves the load capacity of the anchor beyond the load at which the concrete would otherwise fail.

What is a hanger bar?

A reinforcing bar bent in an inverted V shape which is passed through a hole in the anchor. The lifting load is therefore transferred by the hanger bar, deep into the concrete panel.



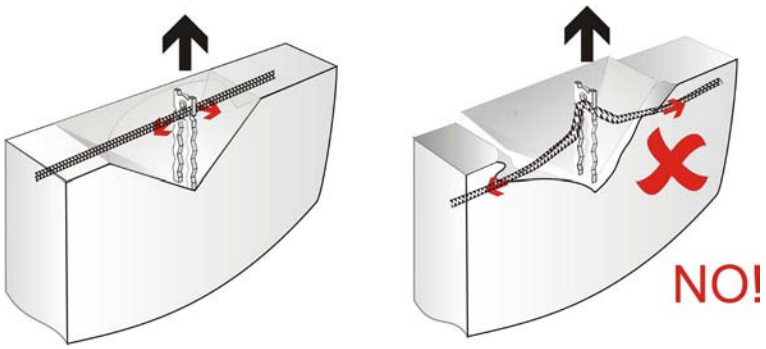
When are hanger bars required?

As a rule of thumb,

- Hanger Bars are normally required for all panels up to 500mm. Thicker panels may or may not require hangers depending upon the loads and concrete strengths.
- Hanger bars are always required for edgelift anchors *of any type* in 150mm thick panels when the Anchor Lifting Load is greater than about 2.3Tonnes. This is because most panels are lifted from the mould when the concrete is only 10-15MPa.
- At 10MPa, the cracking strength is only 5.7Tonnes which provides a 2.3Tonne Working Load Limit (including the Design Factor of 2.5 required by AS3850).

Will a horizontal bar e.g. A panel trimmer bar work as a hanger bar?

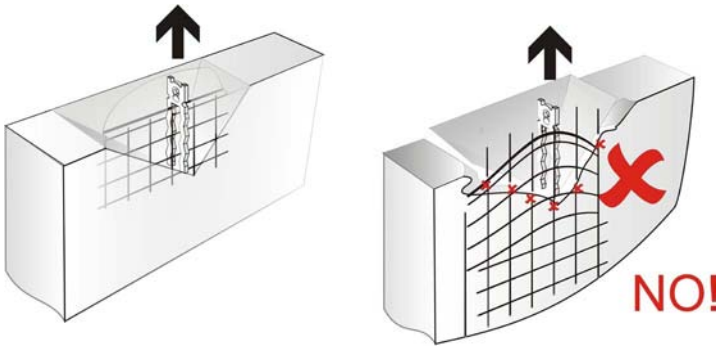
NO! Horizontal bars do not transfer load and pull out of the panel edge.



Does panel mesh improve the lifting load?

NO! Panel mesh is designed only to resist shrinkage forces in the concrete.

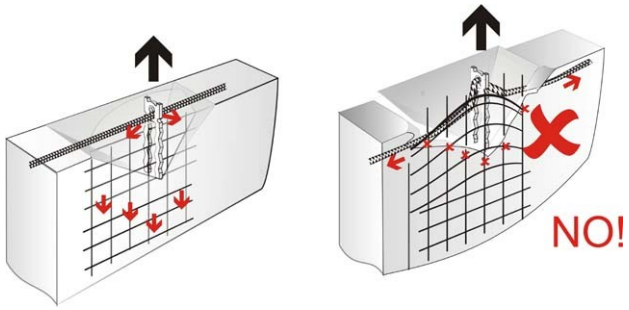
It must NEVER be relied upon to improve the lifting load capacity of anchors in panels!



Can the lifting load be improved by the other panel reinforcing e.g. bars?

Maybe, *but ONLY if that reinforcing has been especially designed to resist the lifting load!*

This is NOT normal! Normal panel reinforcing is designed ONLY for in-service structural loads.



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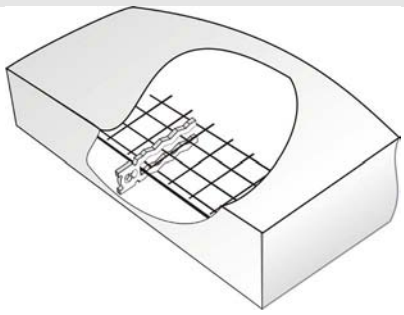
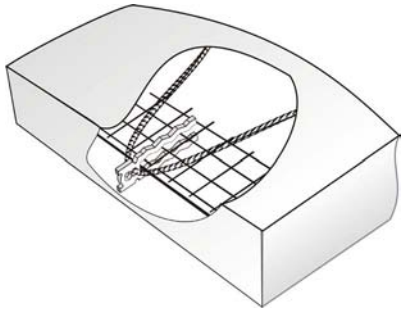
How are the various reinforcing elements placed around anchors?

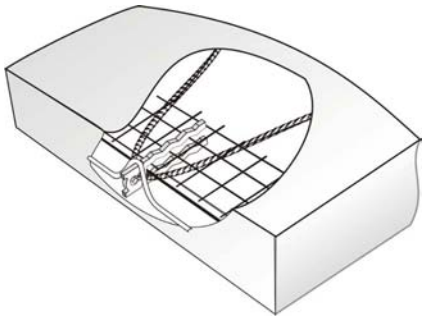
Place the shrinkage mesh through the legs



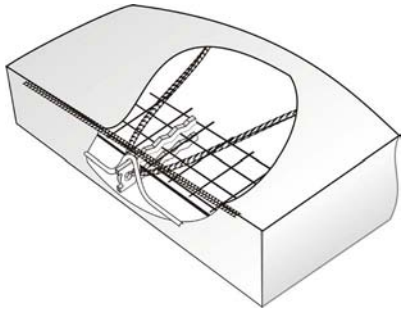
Insert the hanger bar in the anchor hole



Placed the shear bar in the notch over the top of the anchor



Place the edge trimmer bar in the second notch on the anchor and then other bars



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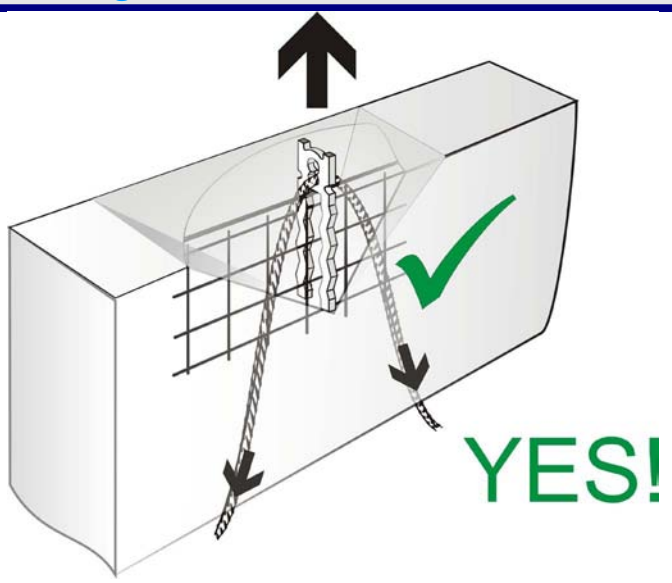
Hanger Bar Detailing

Hangers must extend downwards below the crack to shed the load deep within the panel.



The required “leg length” is calculated according to AS3600 to develop the strength of the bar.

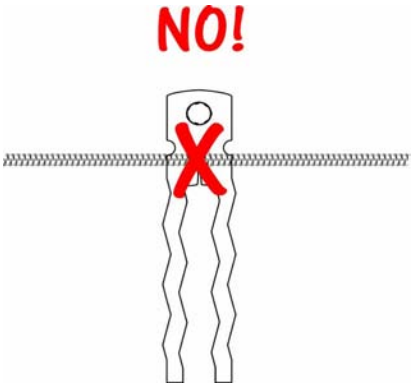
Note:
AS3850 requires that the strength of the anchor exceeds 2.5 X WLL of the anchor.

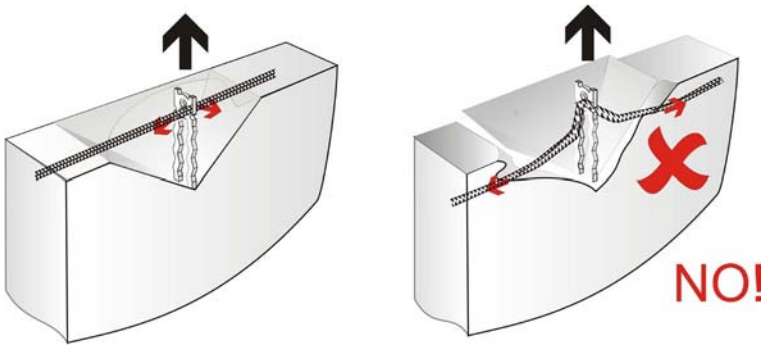
The bar forms part of the anchor itself and therefore its strength must meet this requirement for all its strength limit states.

NB: the limit state strength of the bar may not be limited by its tensile strength only!
The bar strength is normally limited by shear at its attachment point, which must be checked!

DO NOT USE HORIZONTAL e.g. Trimmer bars!

Horizontal bars do not increase the pullout strength of the anchor !





After the concrete cracks, horizontal reinforcing progressively strips out of the panel edge at little or no increased load!

What are the typical hanger bar dimensions? How are they calculated?

The development depth required for each hanger leg to share the load is calculated using AS3600 clause 13.1.2.1 to develop the full strength of the bar.

- An N16 bar is required for anchor working loads up to 7.1Tonnes
- An N20 bar is required for anchor working loads up to 9Tonnes

Note: An N20 bar is used for WLL of 8Tonnes with reduced development length (Cl 13.1.2.2)

The following diagram shows a hanger bar detail designed for lifting 150mm thick panels when demoulding at 10MPa.

This is *the recommended standard detail* for all 7, 8 and 9 tonne hanger bars, regardless of anchor type or make (applicable for both hairpin and spherical head “eye” anchors).