

Soleplate leveling and bolting



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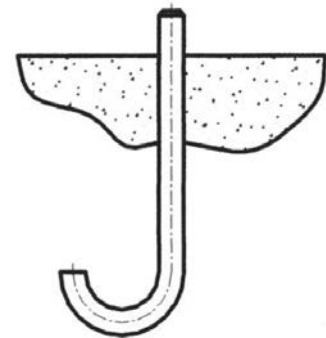
There are the several options for holding down bolt placement, soleplate levelling and grouting. The choice of the most appropriate can have a significant impact on the cost and ease of installation. Gantrail prepare proposal drawings with many quotations based on their knowledge of the application. However local conditions may make alternative solutions more appropriate. We have a large number of standard drawings that are also available on request. Alternatively, cost savings may be achieved using different procedures and details on site. This note shows some options and identifies some of the advantages 'Pros' and disadvantages 'Cons'.

HOLDING DOWN BOLT PLACEMENT OPTIONS

J Bolt or deformed bar cast into the concrete

Pros: Cheap materials.

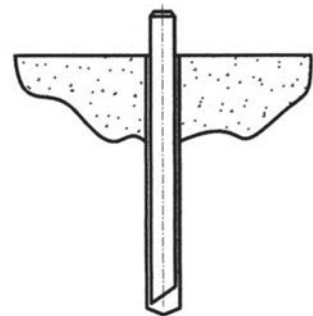
Cons: Difficult to ensure positional accuracy when casting concrete Then soleplates may not fit over the cast-in holding down bolts.



Drilled hole in concrete and threaded bar grouted in situ. Bar is angel cut at the bottom to help prevent rotation on being tightened.

Pros: Accurate as actual soleplate drilled holes can be used as template.

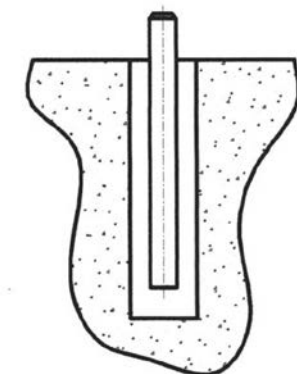
Cons: May hit reinforcement when drilling and require diamond drilling or moving of bolt hole in sole plate.



Void formed when casting slab or beam. There are a number of standard void formers. Gantrail sell sealed ended corrugated tubes to form bolt pockets.

Pros: Cheaper civil engineering operations but the tubes need to be fixed to the reinforcement.

Cons: Large hole if it is to be filled with expensive epoxy or polyester grout. Economic when using cement based grout.

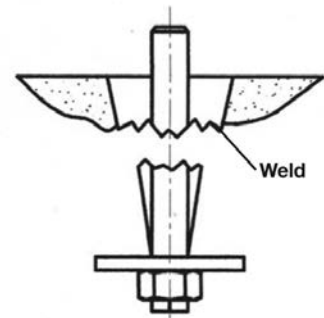


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Cast into proprietary removal bolt sleeve

Pros: Tolerant to inaccuracies, high strength with simplicity.

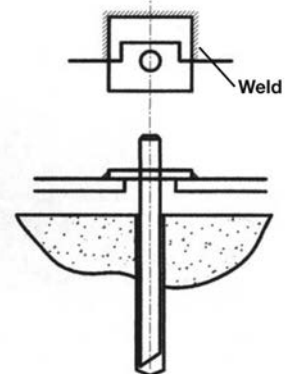
Cons: More complicated formwork to hold dummy soleplate and/or holding down bolts.



Notched soleplate, cover plate then site drill holding down bolt holes

Pros: Position of holding down bolt can be changed on site if reinforcement is struck.

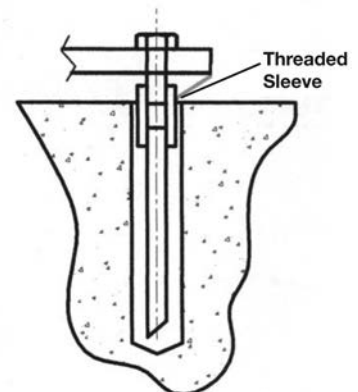
Cons: More parts, and operations. Welders may not be available when soleplates are being fitted. Cannot weld cover plates to galvanised sole plates unless the zinc is removed.



Threaded bar cast in threaded sleeve, hexagon headed bolt used as hold down bolt

Pros: Easier re-levelling and lifting of soleplate to cater for settlement

Cons: Difficult to ensure accuracy unless drilled and grouted.
More parts, expensive

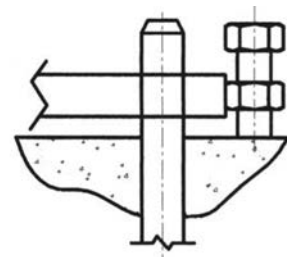


SOLEPLATE LEVELLING OPTIONS

Levelling screw through nut welded to soleplate side

Pros: Cheap and easy to use in most cases.

Cons: Nuts readily knocked off on transit to site. Set screws must be removed to prevent them becoming a load path. Sometimes they become bonded and are not re-usable because they bond to grout.



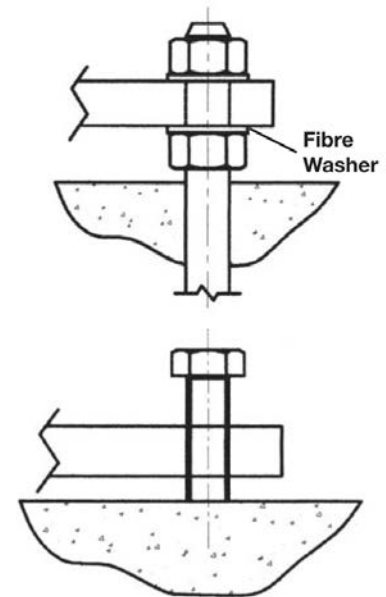
Soleplate leveling and bolting

Levelling nut under soleplate with thin nut and fibre washer or plastic nut

- Pros: Material cost low - one extra nut and washer.
No need to remove levelling screws.
- Cons: Nut sometimes thicker than grout. Cannot access nut in trench.
Fibre washer can be accidentally omitted and not checked before grouting.

Drilled and tapped soleplate

- Pros: Easy to use on site.
No increase in soleplate overall dimensions.
- Cons: Expensive to drill and tap soleplate.
If the setscrews are not removed they can act as supports for the sole plate and prevent the tightening of the holding down bolt pulling the sole plate down to the set grout.
Set screws often non re-usable because they bond into grout.



GROUT OPTIONS

Polyester bolt grout used for fixing holding down bolts but not for under sole plates

- Pros: Rapid set, high strength, with some tolerance to water.
- Cons: Hole sizes need to be accurate as grout shrinks a very small amount. Expensive - 5 times that of cement based grout.

Epoxy bolt grout

- Pros: Strong and with a relatively high tensile strength. Bonds well to the concrete and the sole plate.
Good for repairs.
- Cons: Not normally used, as polyester has become the normal choice of these two.
Not water tolerant. Expensive

Cementitious bolt grout

- Pros: Approximately a fifth of the cost of resin grouts (polyester and epoxy).
- Cons: Slow to cure, relatively lower strength. Brittle and can crack if detailing or thickness is not right. Easily mixed with too much water, which impairs properties.

Epoxy soleplate grout (polyester is not used)

- Pros: High strength, toughness, good bonding to concrete and steel only 15 mm nominal thickness, fast set.
- Cons: Cost - 5 times that of resin grouts per unit volume but used in thinner layers.

Cementitious soleplate grout

- Pros: Cheaper - about a fifth the cost of resin grout per unit volume. Larger void filling capacity.
- Cons: Nominal thickness 25 mm instead of 15 mm. Probably more difficult for quality control (this may be considered controversial by some suppliers).

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Gantry Railing Ltd

Sudmeadow Road, Hempsted, Gloucester GL2 5HG
www.gantrail.com

Tel: +44 (0) 1452 300688
Fax: +44 (0) 1452 300198

International: +44 (0) 1452 300688
E-mail: info@gantrail.com

