

Mr Colin O’Gara
37 Perry Road
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GATB/6278

22 September 2011

Dear Colin,

Re: Bolcracker

We acknowledge your verbal instructions to inspect and report on the structural adequacy of your “Bolcracker” solution to a well known issue in ensuring tolerance within holding down bolts for structural steel frames.

We confirm that we inspected your prototype on Monday 19 September 2011. For clarity we set down the principle of Bolcracker and the consequences of its use with holding down bolts:

Principles of Bolcracker

The following principles are incorporated into Bolcracker:

- Bolcracker comprises an angular (roughly square) plastic enclosure.
- The Bolcracker is fitted to the buried end of a holding down bolt, beneath the anchor plate.
- The Bolcracker enclosure has a square hole matching the square shank of the holding down bolt such that it is captured by the bolt head.
- The Bolcracker is split and incorporates a plastic hinge with a clamping action such that it can be fitted after the steel holding down bolt arrangement has been assembled.
- The Bolcracker enclosure provides a small annulus around the bolt head, with sufficient tolerance to allow free rotational movement of the bolt head after it has been placed in position and the surrounding concrete has hardened.
- Various sizes will be available to fit each different holding down bolt diameter, ensuring a close fit to the bolt head with only sufficient annulus to allow the desired free movement, which is then confined by the holding down bolt cone.

Considerations

We have considered the differences between an installation with and without Bolcracker to understand how the holding down bolt might suffer or benefit from its use. For ease of reference we have tabulated our considerations, as set out below:



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Holding Down Bolt Assembly with Bolcracker				
		Advantages	Disadvantages	Consideration
1	Annulus	Allows free rotation of bolt head	Air gap. Could this cause corrosion?	Corrosion requires both air and water to be present. The concrete encasement would limit the extent of both and therefore this potential risk can be dismissed.
2	Plastic used in Boltcracker manufacture	Cheap to manufacture, light and easy to install	Plastic sandwiched between Anchor plate and holding down bolt head	Tightening the holding down bolt will compress the plastic sufficiently to mobilise the design restraint. There would be no discernible loss of tensile force in the bolt. Boltcracker needs to be manufactured from a suitable certified plastic material
3	Bolcracker is damaged in transit		No tolerance of holding down bolt	Correct fitting of Boltcracker to be checked at time of installation in concrete foundation
4	Bolcracker falls off after fitting		No tolerance of holding down bolt	As long as holding down bolt is tightened at time of installation a correctly fitted Boltcracker should not fall away.
5	Bolcracker fills with Concrete		No tolerance of holding down bolt	Bolcracker needs a close tolerance square hole to minimise risk of grout entering annulus.
Traditional Holding Down Bolt Assembly				
		Advantages	Disadvantages	Consideration
A	No annulus	Maintain current situation	In set concrete the holding down bolt is not free to move within the cone.	Holding down bolts then need to be adjusted to the correct position at the risk of damaging bolt threads or bolt shank by excessive force required to bend.
B	No annulus		Bolts need to be released after concrete has started to set, but before fully hardened (often the morning after casting)	The timing of releasing the bolts is critical to ensure that the bolts have the full tolerance required for erection of baseplates.
C	Use of Denso Tape	Denso Tape is frequently used for the same purpose	The size of the denso tape is critical to ensuring sufficient tolerance is available, different amounts are required for different bolt diameters. There is little guarantee that the correct amount is used.	Consequences as item A above.
D	Use of Denso Tape	Denso Tape is frequently used for the same purpose	Movement of the holding down bolt after the concrete has set would create an annulus which enables the free movement.	This is similar to the situation when using the Boltcracker

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Conclusions

Boltcracker adds significant benefits to a holding down bolt assembly by maintaining the intended movement tolerance in the holding down bolt cone. We can envisage no circumstances where a correctly sized and installed Boltcracker would be a detriment to a holding down bolt assembly.

We trust this provides you with sufficient information, however should you require any clarification please contact us.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Gary Brown', with a long horizontal flourish extending to the right.

Gary Brown Bsc(Hons) MStructE MCIQB MRICS
Director for Thomasons

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