Representation & Advocacy

November 2017

For members attending the upcoming meeting in Melbourne, please familiarise yourself with the below as it will be discussed.

For members who are unable to attend the meeting, please review and submit your comments before the 15th of November.

1. **Proposed changes to AS 3850.2**
2. **AS 3850.1 Appendix A**
3. **Discussion points from draft AS 3600**

1. Proposed changes to AS 3850.2: ferrules & bolts

We are seeking input from members regarding a proposed change that relates to the use of bolts and Threaded Inserts.

Clause 5.1.2 currently reads:

5.1.2 Brace connections

Bolts in connections at both ends of a brace shall be torqued in accordance with the insert supplier's specification and verified.

NOTES:

1. Braces and fixings should be verified at least weekly and after major weather events to ensure they are secure. A record of all checks should be maintained.
2. Two temporary braces on an element may be adjusted in alternate directions to ensure a minimal pre-load in the braces, which will reduce vibration under cyclic loading.
3. A common method used to verify bolt torque is by the use of a calibrated torque wrench

Two alternative changes (premised on two different approaches), were presented:

Option 1 – Any tool, one bolt

Assumes that a bolt would fail before a Threaded Insert and that installers will continue to use rattle guns even if specifically directed to use torque controlled tools. Therefore it would be safer to restrict the use of stronger bolts, so that the cast-in insert remains undamaged if a weaker bolt is over-torqued.

This proposes the following changes:

Insert the following paragraph at the end of clause 5.1.2:

"The tensile capacity of connecting bolts used for brace connection must be lower than the tensile capacity of the cast-in insert it is being attached to (refer Part 1 Clause 2.5.4(d))."

And alter the Notes of Clause 5.1.2 as follows:

NOTES:

1. No change
2. No change
3. It is critical that bolts used in brace connections are not over-torqued as this can lead to failure.
4. A suitable ~~common~~ method used to achieve the specified bolt torque during installation and to avoid over-torqueing, is through the use of a calibrated torque wrench.
5. Most manual torque wrenches, if set to a specific torque setting, will only indicate if the fastener is under torqued or has achieved the specified torque; not that the fastener has been over tightened.

Option 2 - Any bolt, one tool

This option is based on the premise that a standard should not be prescriptive where a problem can otherwise be overcome. It assumes that if calibrated torque wrenches are used (which is already recommended in AS 3850), every bolt would be torqued to the correct specifications, and therefore there would be no need to restrict bolts.

Therefore, the insertion of the wording at the end of clause 5.1.2, as proposed in Option 1 above, **is unnecessary.**

This option does however, agree with the above changes to the Notes.

Comment: It is suggested that suppliers of Threaded Inserts should provide documentation on their Threaded Inserts and the installation torque that has to be used and the installers should use controlled tools.
AEFAC members support this option.

Which one of these above two options do you agree with?
Or do you have another suggestion?

2. AS 3850.1 Appendix A: bracing to low strength concrete

A member has expressed concern that clause A7.3 from Appendix A dramatically disadvantages precast due to causing installation delays. Previously panels could be installed into an 8MPa insitu slab. The standard now requires this to be 12MPa.

Clause A7.3.1 currently reads:

A7.3.1 Concrete properties

The mean compressive strength of the concrete at the time of test shall be not less than 12 MPa, as applicable to the intended application. The compressive strength of the concrete shall be determined in accordance with the test procedure outlined in the AS 1012 series. Tests conducted in concrete with a lesser compressive strength shall be rejected.

The Committee's reasoning behind this change:

- Test results from concrete under 12MPa are too variable;
- On-site cylinders are not a true representative of insitu concrete at this low strength; and
- 12MPa is in line with European standards.

Has this change negatively impacted your ability to compete in the market? If so, by how much?
If you had the option to install at 8MPa would you?

3. AS 3600: panel reinforcement for 12m+ high buildings

As you would be aware, AS 3600 is currently under review. From our request for feedback and information provided by members, we submitted a response to Standards Australia. The majority of this directly related to section 17.7 Prefabricated Concrete Structures. Since then, it has been suggested that insertion of the following drafted clause 11.5.2 Limitation on used of (simplified design) method, dramatically disadvantages the precast industry:

Clause 11.5.2 currently reads:

11.5.2 limitation on use of method

Structural walls designed using Clause 11.5.2 shall—

(a) not be used in a building exceeding 12 metres in overall building height as defined in AS 1170.4;

(b) not be constructed on sites with soil classifications of either D_e or E_e and where subjected to earthquake design actions; and

(c) have a ratio of effective height to thickness that does not exceed 20 for singly reinforced walls or 30 for doubly reinforced walls.

Otherwise, the wall shall be designed as a column in accordance with Section 10.

To obtain an understanding of the reasoning behind the change we have sought feedback from engineers and Committee members and provide the following reasoning:

- These provisions apply to ALL reinforced concrete, regardless of precast or not (except in 11.7.5).
- Clause 11.5.2 states the Simplified Method is limited to a **building height** of 12m and various height/thickness ratios, and clause 11.7.3(d) states that a wall height CAN exceed 12m (between supports), in which case it must be doubly reinforced. There seems no limit on multiple levels. It just then requires analysis beyond the Simplified Method.

- There are longstanding precedents for having a designated simplified design method but with limitations. Various Australian Standards relating to housing construction all use simplified methods of other more detailed Australian Standards, and are therefore more conservative. For example: in relation to wind loads - AS4055 comes out of AS1170.2; in relation to timber structure / framing - AS1684 comes out of AS1720; in relation to masonry - AS4773 comes out of AS3700. Even within AS1684 there is a more simplified AS1684.4 which is more conservative still than AS1684.2.

- The design of standard-compliant options is possible, with justified efficiencies. This competition is what the regulatory system via the NCC seeks to actively encourage.

- The rules originate from the British standard, but the method was empirical. That was nearly 30 years ago, and we know a lot more about the design of concrete walls now than we did then. At the time it was first incorporated in the standard, it was never anticipated by the Committee of that time that the design of walls for multi-storey buildings would use this method of design. The changes to this section are the first for 30 years, and they are long overdue as they address an exploitation of a loophole in the standard, where people are using that clause to deliver a product that probably should not be in the marketplace. Also, since that time, concrete strengths have gone from 50MPa to 100 MPa.

- The earthquake standard AS. 1170.4 - the loading code for earthquakes - was introduced in 2007, and the requirements of that standard had never properly been transferred into AS 3600, and in particular the effects of seismic loads on buildings and to the design of reinforced concrete walls. Designers are using the Simple Method by assuming that the wall is never in tension with μ=2 point, in fact, it should have been using μ =1. In 2015, the SRIA published a very definitive guide on the detailing of concrete structures for seismic loads which can be downloaded for free that explain some of the issues - refer http://sria.com.au/ .

- Real-life modelling from the 2011 Christchurch earthquake has shown that singly reinforced thin walls with high tensile reinforcement such as mesh, have performed very badly, and most have failed. The reality is we could get a similar earthquake in Australia, and many senior structural engineers in Australia believe that the use of this type of wall needs to be limited. Also, many academics have been modelling such walls and have shown that they will perform very poorly.
- The Simplified Method is still acceptable for 2 or 3 story buildings and for industrial buildings, but it will not apply for multi-storey buildings greater than 12m (or about 4 stories).

Do you agree with the requirements for this change? If not, what would you propose?

Do you see this impacting the precast industry more than insitu? If so, how do you propose we work around it?

Please come ready to discuss the above issues at the meeting or submit comments before 15th November.

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