

WHY REVISE NZS 3604?

A standard represents the thinking on a subject at the time it was written. As soon as it is published, the world moves on. Recently, NZS 3604:2011 *Timber-framed buildings* was released, which considered the many changes since 1999.

By Roger Shelton, BRANZ Senior Structural Engineer

Stands can only ever be a snapshot in time. The knowledge on the subject grows, construction practices change, other standards are revised and occasionally a major event occurs that causes a stop and rethink. All of these happened in the case of the review of NZS 3604:1999 *Timber framed buildings*.

NZS 3604 was last revised in 1999 and then amended in 2000 and again in 2006 to incorporate the revised timber grading regime introduced by Amendment 4 to NZS 3603 *Timber structures standard*.

Many changes since 1999

Since 1999, a number of significant events have happened in the New Zealand construction environment that have impacted on NZS 3604.

AS/NZS 1170:2002 INTRODUCED

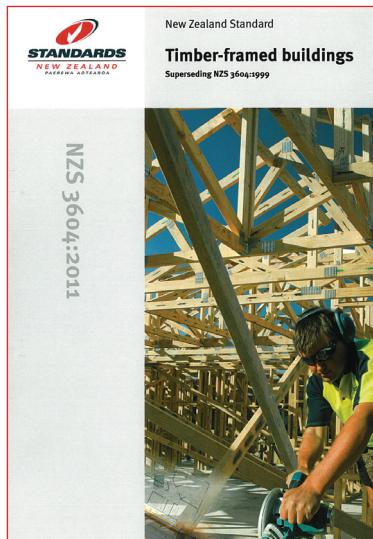
The most important was the introduction of the joint Australia/New Zealand loading standard, AS/NZS 1170:2002 *Structural design actions*, to supersede NZS 4203, the loading standard on which NZS 3604:1999 is based. The new standard was cited by the New Zealand Building Code clause B1 *Structure* in 2008.

The change of loading standards had wide-ranging implications on the technical basis and all the selection tables in NZS 3604. To avoid NZS 3604 designs getting too out of step with the equivalent specific designs done to AS/NZS 1170, it became essential to update NZS 3604.

DEVELOPMENT OF E2/AS1

When NZS 3604 was last revised in 1999, E2/AS1 was very limited and didn't include some commonly used exterior cladding systems and weathertightness detailing. To fill that gap, a small range of details was included in Section 11 *Building envelope*. The subsequent publication of E2/AS1 (Third Edition) in 2005 expanded and superseded these details, creating many contradictions.

The reviews of NZS 3604 and E2/AS1 at the same time has allowed rationalisation, by



removal of all weathertightness details from NZS 3604 Section 4 *Durability* and Section 11 *Building envelope*.

Construction practices changed

Changes in construction practice over the last 10–12 years since the last revision have rendered many aspects of the standard out of step with the industry.

Changes in limited technical review

Industry feedback and surveys by Standards New Zealand indicated that the standard wasn't broken, and only minimal changes were required. The guiding principle for the technical drafting committee therefore became a 'limited technical review' only.

The main areas of change in NZS 3604:2011 are summarised on the next page.

Darfield earthquake considered

The 4 September 2010 earthquake in Canterbury occurred during the final stages of the revision so the initial findings on building performance were considered. Generally, timber buildings performed well in terms of life safety, although the cost of damage was very high.

This is perhaps an expected result for an event that was between 60% and 80% of the design value of an ULS (ultimate limit state – a return period of one in 500 years) event in Canterbury.

LIQUEFACTION NOT ADDRESSED

Many foundations (especially concrete slabs) were badly affected by liquefaction. The resultant lateral spreading often caused irreparable damage to a superstructure that would otherwise have performed well. There was a lot of discussion about how to address this in NZS 3604:2011.

In the time available before publication, it was not possible to include soundly based solutions for foundations on sites potentially subject to liquefaction. One of the major stumbling blocks is how to reliably identify a site that needs an enhanced foundation to cope with liquefaction, because such a solution will inevitably add significantly to the cost of constructing a timber-framed building. This has not yet been resolved but solutions are starting to emerge.

Changes likely after February quake

The 22 February earthquake happened just after publication. This was a much larger event with more significant ground shaking, significantly above Code levels. It's too early to predict the effect of these events on the New Zealand Building Code and related standards such as NZS 3604, especially in view of the government's intention to hold a Royal Commission of Inquiry into building performance. It is fair to assume that there is likely to be an amendment of NZS 3604 in the not too distant future.

CHRISTCHURCH SEISMIC HAZARD LEVEL INCREASED

An early outcome of the February event has been the decision to increase the seismic hazard level for Christchurch from 0.22 to 0.3. Fortunately, this is still within the band used for zone 2 in NZS 3604 Section 5, so no adjustments will need to be made to 3604 designs in respect of bracing demand. ▶