Timber-framing and foundation pointers

This article highlights two issues in timber-framed building work that are common in complaints about LBPs to the Building Practitioners Board and in enquiries to MBIE’s technical team – holes and notches to studs and joists, and foundation set-out.

Update: Please note that on 11 May 2018 this article was updated to provide greater clarity around size limits for holes and notches in studs and joists.

Handy reference guide to NZS 3604:2011

These issues relate to NZS 3604:2011 Timber-framed buildings.

This Standard is a core compliance document for those involved in building work. A helpful reference guide containing selected extracts from this Standard is also available: SNZ HB 3604:2011 Timber-framed buildings Handbook (the Handbook).

This Handbook provides users with a collection of figures and tables extracted from NZS 3604:2011 that are commonly used on-site or in the design office. SNZ HB 3604:2011 has been designed as an ‘on-site reference guide’ and should prove a useful resource for those who don’t have ready access to the full version of the Standard.

MBIE has sponsored the handbook SNZ HB 3604:2011 so it is now free to download from the Standards New Zealand website.

Holes and notches to studs and joists

Studs

Achieving greater levels of energy efficiency in our homes has become more important. Because of this, some common methods of construction have changed or been modified. An example of this is the move from 90x45 mm to 140x45 mm timber wall framing in order to provide enough depth for thicker wall insulation.

It is important to note that while NZS 3604:2011 (and the Handbook) provides notching and drilling limits for 90 mm deep, NZS 3604-specified wall framing, it does not give limits for 140 mm deep, NZS 3604-specified wall framing.
The limit for 90 mm NZS 3604-specified framing is that the maximum size of the hole or notch can be no more than 25 mm, or 27 per cent of the depth of the stud. This may be increased to 35 mm where no more than three consecutive studs are drilled or notched. However, there are restrictions for studs associated with brick veneer and with trimming studs. See Clause 1.5.3 of the Handbook and Clauses 8.5.2 and 8.5.1.6 of NZS 3604:2011 for more information.

NZS 3604:2011 does not provide notch or hole limits for 140 mm deep NZS 3604-specified framing. However, BRANZ Guideline January 2018 states that the maximum size of a hole or notch could be 38 mm (27 per cent of 140 mm) and that all other requirements that apply to notching and drilling (such as spacing and location) given for 90 mm spacing apply equally to 140 mm framing. The 140 mm wall depth can offer additional opportunities for the size and position of services that plumbers and electricians can run through holes in the framing.

BRANZ Guideline January 2018 [PDF 510 KB] is available on the BRANZ website.

Where 140 mm deep studs are used in place of 90 mm deep NZS 3604-specified studs for a non-structural reason (eg to accommodate insulation), the notch or hole size may be increased by the stud depth difference, i.e. to 75 mm. This is provided a notch does not reduce the net section depth below that required by NZS 3604 (ie 65 mm) and a hole is located in the centre of the stud depth. All other requirements that apply to notching and drilling (such as spacing and location) given for 90 mm spacing apply equally to 140 mm framing.

Joists

NZS 3604 notch and hole requirements for floor joists are different to the requirements for studs and are given in NZS 3604 Clause 7.1.7 and BRANZ Guideline January 2018. Larger holes or notches are also possible if floor joists deeper than specified in Table 7.1 of NZS 3604 are used for the application.

Notches and holes in studs or joists that do not meet the above requirements must be subject to specific engineering design.

Foundation set-out

A number of recent Building Practitioners Board complaints have considered issues relating to foundation set-out, siting or accuracy of layout of a house slab. The most common area of concern for foundation-related complaints is where the foundation set-out is found to be inconsistent with the consented drawings.

Modern methods of construction often involve foundation specialists laying the foundations and then the carpenter starting work after the slab is formed. This is an example of the move to greater levels of specialisation to help drive efficiency into the building process. However, it is important that clear communication is not lost in this process.

To be clear and to avoid doubt, always work to the consented set of drawings and if there are differences within the working drawings then these should be raised and resolved with the designer, project lead and the building consent authority before work progresses.

Common problems to watch out for include:

- The foundation layout plan not being consistent with the wall framing assembly or other aspects of the consented drawings.
- The layout provided by the truss and frame manufacturer not aligning with foundation design. This often leads to frames overhanging or falling short of the slab.
- The finished foundation not meeting the dimensional tolerances required by NZS 3604:2011. This means the slab and wall framing will probably not line up with each other. Refer to section 1.3 of the Handbook or section 2.2 of NZS 3604:2011.
- Complex, angular, stepped, or irregular foundation layouts, for which set-out is more difficult and problems are more common.
- Tight or infill sites, which often have additional requirements with boundary clearances, building adjacent to easements, and the like, meaning that accurate set-out is even more important.

Find the Standard and the Handbook

NZS 3604:2011 Timber-framed buildings can be purchased on the Standards New Zealand website.

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Quiz

1. What is the maximum diameter hole you can drill in a 90 mm stud, if you are complying with NZ 3604:2011?
   a. 50 mm
   b. Any size providing it is not a trimmer stud
   c. 25 mm, but may be increased to 35 mm in some cases
2. What size hole can be drilled in a 140 mm stud, according to the BRANZ Guideline January 2018?
   a. 38 mm
   b. It depends on the grade of the timber
   c. 50 mm
   d. It is up to the plumber

3. Do the consented plans take precedence over other drawings when establishing a building layout?
   a. Yes
   b. No

4. Where can tolerances for timber framing be found?
   a. In the 2018 Builders Omnibus
   b. In either section 1.3 of SNZ HB 3604: 2011 or section 2.2 of NZS3604:2011
   c. Schedule 1 of the Building Act