Behind the walls

Holes and notches

Wastepipes, smart wiring, cables, heat pump conduits - nobody wants to surface mount them, but just how much can be concealed in the wall without weakening the structure?

BY ANN GALLOWAY, FNZIA, ANN GALLOWAY ARCHITECT LTD, NAPIER

NZS 3604:2011 places some restrictions on the size and location of penetrations through timber framing.

**Match holes to framing size**
The maximum allowable size of holes and notches depends on the timber framing size (see Figures 1 and 2):
- For 90 mm studs and top plates, holes can be up to 25 mm diameter and notches up to 25 mm deep.
- For 70 mm studs and top plates, this is reduced to 19 mm in both instances, except where diagonal braces are cut into the studs, then a cut up to 22 mm is acceptable.
Notches may be no longer than 200 mm and must be at least 600 mm apart, regardless of which edge of the stud is notched.
If no more than three consecutive studs are notched or drilled in 90 mm framing, then notches and holes up to 35 mm are acceptable.
Holes and notches must be offset by at least 100 mm.
In general, holes in the face of studs or notches in the edge can be located anywhere on the stud, except for trimming studs and studs supporting brick veneer.

**No holes or notching in trimming studs**
Trimming studs must not have holes, cuts or notches in the middle third of their length, regardless of stud size.

19 mm max. diameter or 35 mm for a max. of three consecutive studs

25 mm max. diameter or 35 mm for a max. of three consecutive studs

25 mm max. depth for max. 200 mm length or 35 mm for a max. of three consecutive studs

100 mm min.

18 mm max. depth for max. 200 mm length or 22 mm cut for diagonal metal brace

70 × 45 mm stud

100 mm min.

90 × 45 mm stud

Figure 1: Notches and holes in studs. Space notches in studs at least 600 mm apart.
**Brick veneer**
Holes in studs supporting brick veneer must be at least 50 mm from the outside face of the stud to allow adequate depth for brick tie fixings. Care is also needed so fixings for claddings, linings or battens do not damage services.

Specifying 140 mm framing can alleviate many of these issues, as well as allowing for higher-value insulation products.

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**Top and bottom plates**
Large checks or holes in top plates require the plate to be strengthened with extra timber and/or steel angle (see Figure 3).

If the bottom plate is notched or has a hole for more than half its width, one extra 100 × 3.75 mm nail fixing is required each side of the penetration.

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**Figure 2:** Notches and holes in top plates. See Figure 3 if notches or holes are larger than shown.

**Figure 3:** Strengthening for large checks and holes in wall plates.