

Effect of fixings on the performance of timber weatherboards

1 THE MATTERS TO BE DETERMINED

- 1.1 The matter submitted for determination by the Authority is the method of fixing timber weatherboards that was used on a light timber frame house.
- 1.2 The Authority takes the view that it is being asked to determine whether the fixings as installed are such that the exterior wall complies with clause E2.3.2 of the building code (the First Schedule to the Building Regulations 1992).
- 1.3 In making its decision, the Authority has not considered whether the wall complies with any other provisions of the building code, and has not considered any part of the building other than the weatherboards and their fixings.

2 THE PARTIES

- 2.1 The owners of the house were the applicant. The only other party was the territorial authority, but the builder was treated as an “appropriate person” under section 19(1)(b) of the Building Act and made submissions.

3 THE BUILDING

- 3.1 The two-storey light timber frame house appeared to have been originally constructed in the 1940s or 1950s. It was undergoing major additions and alterations including the removal and replacement of existing weatherboard claddings.
- 3.2 The new weatherboards were 150 x 25 mm bevel-back pinus radiata. The weatherboards were pre-primed, and on completion they were finished with two coats of a 100% acrylic paint.
- 3.3 The weatherboards were originally fixed with one 60 mm nail per weatherboard, but significant cupping occurred. After discussions with the manufacturer and the supplier of the weatherboards they were drilled and double nailed with 75 mm x 3.15 mm nails. The result was that each weatherboard (except the bottom one) was fixed with three nails as shown on the following page, where the fixings as installed are compared with the conventional single-nail fixings.

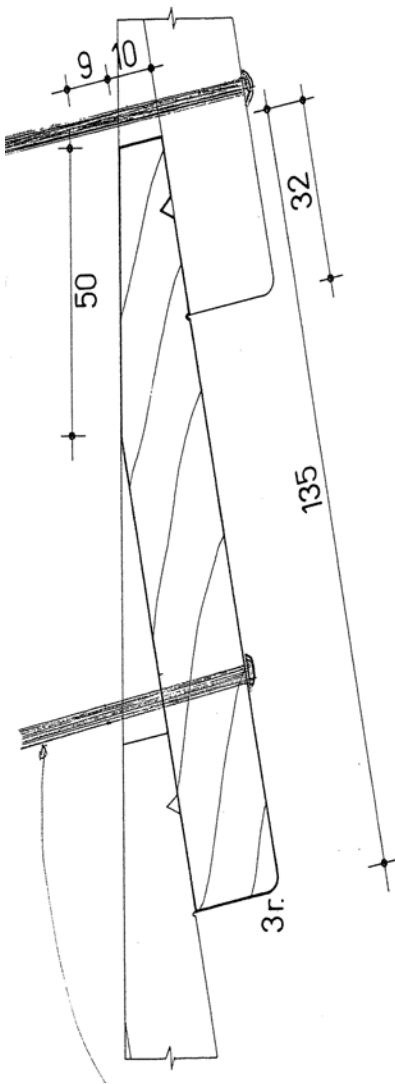
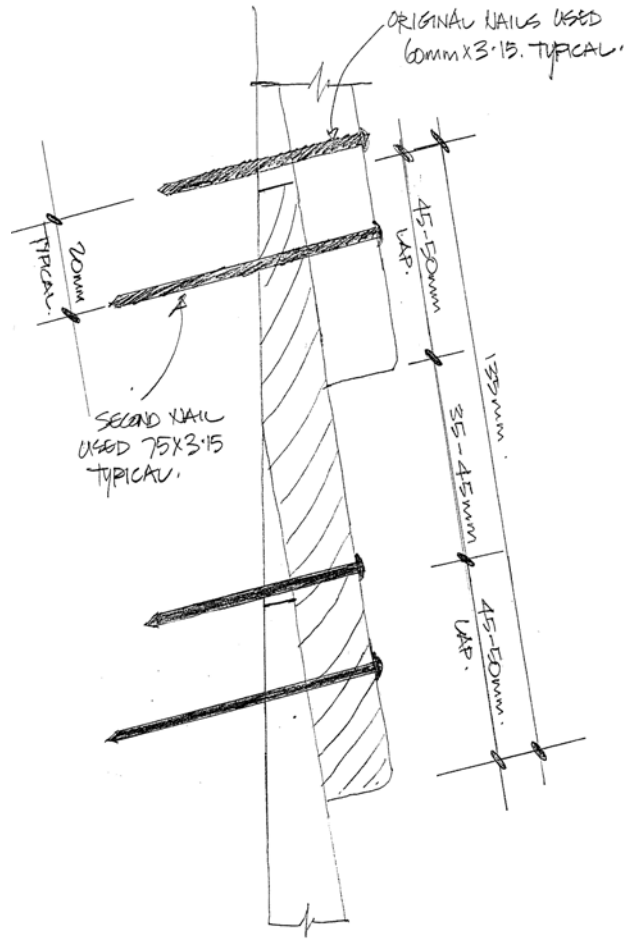


Fig. 3 150 mm x 25 mm PLAIN BEVEL-BACK WEATHERBOARD (full size)



Single nail (75mm x 3.15mm) per board shall be located immediately above, but within 10mm of the top

**SINGLE NAIL FIXING
AS REQUIRED BY NZS 3604***
(figure received from Territorial Authority)

**THREE NAIL FIXING
AS INSTALLED**
(figure received from owner)

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- 3.4 The owners directed the builder to cease work on the house, which would be completed by others.
- 3.5 The territorial authority said that it would not issue a code compliance certificate in respect of the fixing of the weatherboards.

4 THE BUILDING CODE AND THE ACCEPTABLE SOLUTION

- 4.1 The relevant provision of the building code is:

E2.3.2 Roofs and exterior walls shall prevent the penetration of water that could cause undue dampness, or damage to building elements.
- 4.2 The relevant provision of the acceptable solution E2/AS1 is:

2.1.1 Timber weatherboards shall comply with NZS 3617.

Figure 2 of E2/AS1 shows laps and the position of the one nail per weatherboard, and is effectively identical to the corresponding requirements of NZS 3617:1979 *Specification for profiles of weatherboards, fascia boards, and flooring*. Nail sizes are not specified, but NZS 3604:1999 *Timber framed buildings* provides:

11.5.2.2

Horizontal bevel back and rusticated weatherboards shall be fixed to *framing* at maximum 600 mm centres with a single nail located immediately above, but within 10 mm of the lap. Nails shall be 75 mm x 3.15 mm for bevel back . . . weatherboards

5 THE SUBMISSIONS

- 5.1 The territorial authority said:

“Movements due to temperature and moisture are effectively restrained as a result of three point fixings. We are unsure of the long-term effects on the performance of weatherboards due to fixing and are unable to accept as code complying.”
- 5.2 The owners submitted a letter to the territorial authority from the manufacturer of the weatherboards confirming that it considered that “drilling and double-nailing . . . is an appropriate method of fixing those weatherboards which should ensure that there is no splitting”. The owners reported that since the weatherboards were double nailed “there has been no ‘splitting or cupping’ of the weatherboards whilst encountering extreme weather changes”.
- 5.3 The builder said that the weatherboards for the house came from two suppliers. The ones that had cupped “had a moisture content exceeding 28%”.
- 5.4 In response to queries from the Authority, the owners provided photographs of the house and details of the moisture contents of the weatherboards at certain stages of construction. They also provided a report on the house as a whole by a building consultant (“the owners’ consultant”) that they had obtained shortly after the

weatherboards had been double nailed. That report mentioned relevant moisture contents but did not come to any conclusion about the fixing of the weatherboards. The report also listed various matters of concern that are not addressed in this determination.

- 5.5 The Authority commissioned a report from another building consultant (“the Authority’s consultant”). That report was based on a visit to the site in the presence of the owners and a representative of the territorial authority (the builder was given the opportunity to be present but had other commitments). Moisture content readings were taken. The report included a reasoned discussion of the situation and came to the following conclusions:

- “(a) If significant drying and splitting from shrinkage was going to occur, there would be evidence of that by now. However there was no evidence of splitting present, and only mild cupping.
- “(b) There is potential for perhaps another 3% drying, at worst, and that is unlikely to bring about serious and extensive failure.
- “(c) If further drying did cause splitting, then this is likely to be limited in extent, would be readily noticeable and could be attended to as maintenance before any more consequential failure occurred. . . .
- “(d) In my opinion, in this particular situation, it is unlikely that the unconventional nailing of the weatherboards will bring about a failure to comply with the performance requirements of the N Z Building Code but this opinion remains valid only if the issues listed below are addressed.”

The report then listed various matters of concern, along the same lines as those mentioned by the owners’ consultant.

- 5.6 The report by the Authority’s consultant was copied to the parties and the builder.
- 5.7 The owners accepted the report. The builder accepted the report but denied responsibility for the listed matters of concern. The territorial authority responded that inspections had not been completed and the matters of concern would be addressed in future inspections.

6 DISCUSSION

- 6.1 The Authority accepts that, as indicated by the Authority’s consultant, that the weatherboards have now “settled down” and are likely to experience comparatively little future expansion and contraction when they are wetted by rain or when the ambient temperature and humidity change.
- 6.2 The Authority accordingly considers that, with normal maintenance ensuring that the weatherboards continue to be protected by paint (preferably of a light colour), the unconventional fixing is unlikely to result in significant future cupping or cracking.
- 6.3 The Authority concludes that, in the particular circumstances concerned, the unconventional fixing of the weatherboards complies with the building code.

7 THE AUTHORITY'S DECISION

7.1 In accordance with section 20 of the Building Act, the Authority hereby:

- (a) Determines that, in this particular case, the fixing of the weatherboards is such that the exterior wall complies with clause E2.3.2 of the building code.
- (b) Reverses the territorial authority's decision to refuse to issue a code compliance certificate in respect of the fixing of the weatherboards.

Signed for and on behalf of the Building Industry Authority on 28 June 2004

John Ryan
Chief Executive