

Determination 2008/75

Determination regarding the code compliance of a house with a monolithic cladding system at 8 Caulfield Place, Rotorua



1. The matters to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the Act”) made under due authorisation by me, John Gardiner, Determinations Manager, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicant is the owner, N Rendell (“the applicant”), acting through the builder, D Shirtliff (“the builder”), and the other party is the Rotorua District Council (“the authority”) carrying out its duties and functions as a territorial authority or building consent authority.
- 1.2 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a 1-year-old house because it was not satisfied that the monolithic cladding complied with Clause B2 “Durability” and Clause E2 “External Moisture” of the Building Code² (Schedule 1, Building Regulations 1992).
- 1.3 I therefore take the view that the matter for determination is whether the cladding as installed on the house complies with Clauses B2 and E2 (see sections 177 and 188 of the Act). By “the cladding as installed” I mean the components of the system (such

¹ The Building Act 2004 is available from the Department’s website at www.dbh.govt.nz.

² The Building Code is available from the Department’s website at www.dbh.govt.nz.

as the backing materials, the flashings, the joints and the coatings), as well as the way the components have been installed and work together.

- 1.4 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.1.
- 1.5 In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

2. The building work

- 2.1 The building work consists of a single-storey detached house, which is situated on a flat site in a low wind zone for the purposes of NZS 3604³. Construction is conventional light timber frame, with a concrete slab and foundations, monolithic cladding and aluminium windows. The building is fairly simple in plan and form, with a 25° pitch profiled metal hipped and gabled roof that has eaves and verge projections of more than 600mm overall.
- 2.2 The expert was not able to inspect the exterior wall framing. The drawings call for the exterior wall framing to be H1.2 with H3.2 bottom plates and cavity battens. I also note that the exterior wall framing would have been required to be treated to a minimum level of H1.2, and that the record of the authority’s pre-line inspection on 22 August 2006 states “timber treatment correct”. Given the date of construction, I consider that the external wall framing is likely to be treated to a level that will provide resistance to fungal decay.
- 2.3 The cladding system is what is described as monolithic cladding, and is a “Monotek Ventilated Cavity” system, with 7.5 mm thick fibre-cement sheets fixed through 20mm timber battens and the building wrap to the framing, and finished with flush finish jointing filler over mesh-reinforced joints and an applied textured plaster system. The 20mm timber battens form a cavity between the cladding sheets and the building wrap.
- 2.4 The plasterer has provided a “Producer Statement” and a 5-year “Workmanship Guarantee”, both dated 20 May 2008, for the jointing and coating system. Both included the statement that the plasterer is satisfied with the preparation of the substrate and the installation of the required flashings.

3. Background

- 3.1 The authority issued a building consent (No. 040100) on 5 July 2006, under the Building Act 2004.
- 3.2 The building certifier carried various inspections during construction, including pre-line inspections on 22 August 2006 and 10 September 2006. At an inspection of the cladding backing sheets on 22 September 2006, the authority noted:

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

Monotek cladding inspected – installed wrongly around doors and windows, informed builder who is to change cladding to these areas. Will call for reinspection when work done.

- 3.3 In a letter dated 23 September 2006, the builder acknowledged that some of the backing sheet joints lined up with window jambs, but noted that additional fixings had been used in order to avoid cracking and asked the authority to reconsider the requirement to replace the offending sheets.
- 3.4 It appears that the authority accepted the builder's assurances, as the inspection summary notes on 26 September 2006 that the cladding was approved "to stay as is", and:
Before CCC to be issued letter from [the builder] re monotek installation.
- 3.5 In a letter to the authority dated 16 October 2006, the builder confirmed that he would:
...take full responsibility for any cracks that may occur in the external plaster under the corners of any windows at the house at no. 8 Caulfield Pl. Rotorua. This absolves the Rotorua District Council of any liability.
- 3.6 Construction of the house was completed without changing the layout of the backing sheets. It appears that the inspection staff had changed by the time the authority carried out a final inspection on 20 August 2007, which again identified that the installation of the cladding was not in accordance with the manufacturer's instructions.
- 3.7 A meeting with the builder was held on 12 December 2007, during which the authority advised that a code compliance certificate could not be issued for the house, as the cladding had not been installed to the manufacturer's instructions. The meeting record notes that it was agreed that the authority would meet with the builder on site to:
...to see how things might progress. We will await [the builder's] meeting request through the inspection booking process.
- 3.8 In a letter to the authority dated 5 April 2008, the builder stated that he considered that the additional work was not necessary, as the only minor cracks that had appeared were at joints more than 200mm in from the corner of windows and these had been sealed and repainted. The builder noted that he had sought legal opinion and, because he "continued construction with the verbal authority of the then head inspector and in good faith", the authority would be liable for any extra work done now. The builder also noted that the applicant would not allow the cladding to "be pulled apart for some unnecessary reason", and again asked the authority to issue the code compliance certificate.
- 3.9 In a letter to the builder dated 15 April 2008, the authority confirmed its refusal to issue a code compliance certificate as:
Council has reservations as to whether the exterior cladding system as fixed will meet the NZ Building Code B2 Durability, where a possibility of the joints failing exists and if such an event occurs the building would not meet NZ Building Code E2.

- 3.10 The Department received the application for a determination from the builder on 29 May 2008, and on 9 June 2008 obtained the owner's approval for the builder to act as her agent for this determination.

4. The submissions

- 4.1 In a letter to the Department dated 17 April 2008, which accompanied the application, the builder described the cladding system and the background to the current situation, noting the correspondence and approval of the layout of the backing sheets during construction. The builder acknowledged that "a couple of sheets" did not comply but it was not important enough to warrant redoing and there was a cavity behind the cladding. The builder also stated that the owner:

...is very adamant she doesn't want her house opened up when it seems there is no reason to and I feel it is unfair at this late stage for one head inspector to overturn the decision of a previous one, and matching plaster with old will not look right.

- 4.2 The builder forwarded copies of:

- the drawings
- the building consent
- part of the inspection summary
- a sketch of the wall construction
- the letter to the authority dated 16 October 2006
- the plasterer's producer statement and guarantee.

- 4.3 The authority submitted a report on the background leading up to the refusal of a code compliance certificate:

...due to concerns over the ability of the cladding system to meet Building Code clauses B2 and E2. This concern stems from the existing cracks identified in correspondence to Council and any future ones brought about by incorrect installation methods.

- 4.4 Copies of the submissions and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission of the other party.

- 4.5 A draft determination was issued to the parties for comment on 9 July 2008. The authority accepted the draft without comment on 14 July 2008.

- 4.6 The builder made several comments on the draft determination in a letter to the Department dated 16 July 2008. I accept these comments, and have amended the determination accordingly.

5. The expert's report

- 5.1 As mentioned in paragraph 1.4, I engaged an independent expert to provide an assessment of the condition of those building elements subject to the determination.

The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the house on 16 June 2008 and furnished a report that was completed on 19 June 2008. The expert noted no significant variations from the consent drawings.

5.2 The expert obtained records from the authority, and provided copies of:

- the consent drawings
- the building consent
- the authority's inspection summary
- correspondence between the authority and the builder
- the record of the meeting held on 12 December 2007.

5.3 The expert noted that, except for the items outlined in paragraph 5.6, workmanship generally appeared to be "of good quality" with the cladding "generally straight and fair" and flashings "carried out in a good tradesman-like manner". The expert noted that the windows are face-fixed, with metal head flashings.

5.4 The expert inspected the interior of the house, and took non-invasive moisture readings that ranged from 7% to 11%. The expert also took non-invasive moisture readings through the external cladding, and no elevated readings were noted. Due to the cavity construction and the low moisture readings, the expert did not consider it necessary to undertake invasive moisture testing.

5.5 The expert noted that some cracks had occurred in interior linings, above and below some of the windows. The expert inspected the exterior, and identified 17 instances where the backing sheet joints lined up with the window jambs, as follows:

- East elevation – the bathroom and bedroom 2 windows.
- North elevation – the lounge and kitchen windows.
- West elevation – the lounge, dining and ensuite windows.
- South elevation – bedroom 3 and the western side of bedroom 1 windows.

5.6 Commenting specifically on the wall cladding, the expert noted that:

- there are no vertical control joints in many walls where the dimensions exceed the 5.4 m limit for Harditex recommended by the manufacturer
- some of the internal corners of the cladding are butted together and filled with stopping compound, in lieu of an 8mm sealant-filled gap as required by the manufacturer
- there are some repaired cracks in the cladding
- there are small unsealed holes at some window head flashing projections

- the gas water heater and pipe penetrations are unsealed, and there is unfinished fibre-cement below the heater.
- 5.7 The expert also noted that there was no evidence of sealant or in seal applied behind the window jamb flanges. However, I note that the builder has stated that a bead of sealant was applied behind the flanges prior to window installation.
- 5.8 The expert noted that, rather than removing the cladding, it could be possible to cut down the joints at the window jambs in order to provide sealant-filled 8mm gaps that would also act as control joints. (I address this matter in paragraph 6.4.3).
- 5.9 A copy of the expert's report was provided to the parties on 24 June 2008.
- 5.10 The builder commented on the expert's report in a letter to the Department dated 1 July 2008. The builder noted that the cracks reported as repaired were not at the corners of windows, but were 200mm in from the jambs and neither of these have re-cracked since being repaired. Other corner cracks now reported are hairline and only cosmetic. These cracks are too fine to risk moisture penetration and, even if that did happen, moisture would only reach the H3 batten. All that is needed for these cracks is sealant filling.

6. Evaluation for code compliance

6.1 Evaluation framework

6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions⁴, which will assist in determining whether the features of this house are code compliant. However, in making this comparison, the following general observations are valid:

- Some Acceptable Solutions cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
- Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add some other provision to compensate for that in order to comply with the Building Code.

6.2 Evaluation of external building envelope for E2 and B2 Compliance

6.2.1 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water, the cladding system, its installation, and the moisture tolerance of the external framing. The Department and its antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations⁵ (for example,

⁴ An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way (but not the only way) of complying with the Building Code. The Acceptable Solutions are available from The Department's Website at www.dbh.govt.nz.

⁵ Copies of all determinations issued by the Department can be obtained from the Department's website.

Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

- 6.2.2 The consequences of a building demonstrating a high weathertightness risk is that building solutions that comply with the Building Code will need to be more robust. Conversely, where there is a low weathertightness risk, the solutions may be less robust. In any event, there is a need for both the design of the cladding system and its installation to be carefully carried out.

6.3 Weathertightness risk

- 6.3.1 In relation to these characteristics I find that this house:

- is built in a low wind zone
- is a fairly simple single-storey building
- has monolithic cladding fixed over a drained cavity
- has eaves and verge projections of about 600mm
- has external wall framing that is treated to provide resistance to the onset of decay if the framing absorbs and retains moisture.

- 6.3.2 The house has been evaluated using the E2/AS1 risk matrix. The risk matrix allows the summing of a range of design and location factors applying to a specific building design. The resulting level of risk can range from 'low' to 'very high'. The risk level is applied to determine what claddings can be used on a building in order to comply with E2/AS1. Higher levels of risk will require more rigorous weatherproof detailing; for example, a high risk level is likely to require a particular type of cladding to be installed over a drained cavity.

- 6.3.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.3.1 show that all elevations of the house demonstrate a low weathertightness risk rating. I note that, if the details shown in E2/AS1 were adopted to show code compliance, the monolithic cladding would not require a drained cavity.

6.4 Weathertightness performance: exterior cladding

- 6.4.1 I consider that the expert's report has established that the the manufacturer's instructions for the cladding installation have not been followed in three respects:

- There are no vertical control joints in many walls where the dimensions exceed the 5.4 m limit.
- The window jambs have not been weather proofed.
- The sheet joints under the windows have not been constructed properly.

- 6.4.2 However, although the cladding has not been installed in accordance with the manufacturer's instructions in all respects, it generally appears to have been installed in accordance with reasonable trade practice. Taking account of the expert's report, I

conclude that remedial work is necessary in respect of the areas outlined in paragraph 5.6.

- 6.4.3 I note the expert's comment in paragraph 5.8 regarding possible remedial work to the cladding joints and I accept that, if such work was carried out to the satisfaction of the authority, it could avoid the need to replace cladding at those areas where joints line up with the window jambs. I also accept that, if successful, the altered joints would also provide control joints to allow movement to occur without cracking. Due to the generous shelter afforded by the 600mm eaves, I consider that such remedial work to joints may only be necessary to areas below the window corners, as any cracking occurring above windows is unlikely to lead to any moisture penetration. This work however would not address the matter of the inadequate window jamb weather proofing.

7. Discussion

- 7.1 I consider the expert's report establishes that the current performance of the cladding is adequate because it is currently preventing water penetration into the building. Consequently, I am satisfied that the house complies with Clause E2 of the Building Code.
- 7.2 In addition, the house is also required to comply with the durability requirements of Clause B2. Clause B2 requires that a building continues to satisfy all the objectives of the Building Code throughout its effective life, and that includes the requirement for the house to remain weathertight. Because the cladding faults on the house may allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.
- 7.3 Because the faults identified with the cladding system occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 5.6 will result in the house being brought into compliance with Clause B2.
- 7.4 Effective maintenance of claddings is important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building applicant. The Department has previously described these maintenance requirements (for example, Determination 2007/60).

8. What is to be done now?

- 8.1 A notice to fix should be issued that requires the owner to bring the house into compliance with the Building Code, identifying the items listed in paragraph 5.6 and referring to any further defects that might be discovered in the course of rectification, but not specifying how those defects are to be fixed. It is not for the notice to fix to stipulate directly how the defects are to be remedied and the house brought to compliance with the Building Code. That is a matter for the owner to propose and for the authority to accept or reject.
- 8.2 I would suggest that the parties adopt the following process to meet the requirements of paragraph 8.1. Initially, the authority should issue the notice to fix. The owner should then produce a response to this in the form of a detailed proposal, produced in

conjunction with a competent and suitably qualified person, as to the rectification or otherwise of the specified issues. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

9. The decision

- 9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the building does not comply with Clause B2 of the Building Code, and accordingly confirm the authority's decision to refuse to issue a code compliance certificate.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 11 August 2008.

John Gardiner
Manager Determinations