

## ***Determination 2005/108***

# ***Refusal of a code compliance certificate for a building with a cedar weatherboard cladding system at 71 Kaipoi Flats Road, Onewhero***

## **1 THE DISPUTE TO BE DETERMINED**

- 1.1 This is a determination of a dispute referred to the Chief Executive of the Department of Building and Housing (“the Chief Executive”) under section 17 of the Building Act 1991 (“the Act”), as amended by section 424 of the Building Act 2004. The applicant is the owner acting through the builder Cedarshed Industries Limited (referred to throughout this determination as the “owner”), and the other party is the Franklin District Council (“referred to throughout this determination as “the territorial authority”). The application arises from the refusal by the territorial authority to issue a code compliance certificate for a 1-year-old house because it is “not convinced the cedar weatherboards will perform adequately to satisfy the requirements of clauses E2 and B2 of the building code”.
- 1.2 My task in this determination is to consider whether I am satisfied on reasonable grounds that the external weatherboard cladding system as installed (“the cladding”), which is applied to the external walls of this house complies with the building code (see sections 18 and 20 of the Act). By “external cladding as installed” I mean the components of the system (the weatherboards, the building wrap and plywood backing) as well as the way the components have been installed and work together.
- 1.3 This determination is made under the Building Act 1991 subject to section 424 of the Building Act 2004. That section came into force (“commenced”) on 30 November 2004, and its relevant provisions are:
- “ . . . on and after the commencement of this section,—
- “(a) a reference to the Authority in the Building Act 1991 must be read as a reference to the chief executive; and

- “(b) the Building Act 1991 must be read with all necessary modifications to enable the chief executive to perform the functions and duties, and exercise the powers, of the Authority . . .”

It should be noted that the new legislation does not amend the determination process set out under the 1991 Act, other than to transfer the power to make a determination from the Building Industry Authority (“the Authority”) to the Chief Executive.

- 1.4 This determination refers to the former Authority:
- (a) When quoting from documents received in the course of the determination, and
  - (b) When referring to determinations made by the Authority before section 424 came into force.
- 1.5 In making my decision, I have not considered any other aspects of the Act or the building code.

## **2 PROCEDURE**

### **The building**

- 2.1 The building work is a single storey detached house, situated on a flat site, which has been calculated as being in a medium wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The external walls are of conventional light timber frame construction built on concrete floor slab, and sheathed with cedar weatherboards. The house is of a simple shape, with a pitched roof with gable ends. Apart from the fascias, there are no eaves and minimal verge projections to one end wall. A colonial style 1600mm wide veranda protects the other three walls.
- 2.2 The wall framing is described as H1 treated. However, I have not received any evidence to confirm what treatment has been applied.
- 2.3 The cladding system is imported cedar weatherboard secured with stainless steel divergent staples to vertical H3.1 treated battens that are fixed over a “Pauloid” building wrap to form a 20mm cavity. The building wrap is laid over a 9mm H3 plywood substrate that is fixed directly to the framing.

### **Sequence of events**

- 2.4 The territorial authority issued a building consent on 10 March 2004 and carried out inspections during the course of construction.
- 2.5 The territorial authority issued “Interim Notice to Rectify on June 4 2004 that included the statement:

Weatherboard profile does not appear to comply with standards. No weather grooves and too thin and fixing with staples (5ply cladding under).

2.6 In a fax dated 24 June 2004 the territorial authority wrote to the applicant requesting the provision of either a BRANZ appraisal or a determination from the Authority that the cladding complied with clause E2 and consequently with clauses B1 and B2.

2.7 The owner applied for a determination on 2 February 2005.

### **3 THE SUBMISSIONS**

3.1 The territorial authority made a submission in the form of a letter to the Department dated 10 February 2005, which outlined concern about the thin profile of the weatherboards and quoted from BIA Determination 2004/04;

The sidings, due to a combination of factors, but primarily their dimensions and the exposure of the site are considered to be more in the nature of a rainscreen than a major component of the weather proofing system.

The territorial authority noted that the matter of doubt was whether the installed weatherboard cladding system complied with clauses B2 and E2 of the building code.

3.2 The territorial authority wrote again to the Department on 3 May 2005, referring again to the findings of the Authority in determination 2004/04, and stating that the territorial authority was not persuaded that the weatherboards would comply with the requirements of the building code.

3.3 The owner supplied a substantial submission, which covered:

- The history of the dispute;
- The basis of the application;
- The builder's proposal for alternative solution approval, including a comparison with other weatherboards and demonstrated in-service history in New Zealand;
- Laboratory tests of the fixing staples used to secure the weatherboards;
- Results of a survey of the house and moisture contents obtained;
- The engagement of an expert to give an opinion as to code compliance of the house; and
- References to previous determinations and publications.

3.4 The applicant described the features of the cladding and referred to specific references in Determination 2004/04, which also was concerned with this particular weatherboard. The applicant also made reference to BIA Determination 1999/014, and the widespread use of these weather sidings overseas as a basis for demonstrated in-service performance.

- 3.5 The owner attached, to a covering letter to the Department dated 24 March 2004, a copy of a letter from another territorial authority. This letter, which referred to a project where the cedar weatherboards were used, was dated 9 March 2005, and addressed to the builder. The territorial authority stated that, in that instance, the cedar sidings with additional detailing to high-risk areas, plus the inclusion of a cavity would be an acceptable alternative solution for recladding the buildings in question.
- 3.6 The owner provided further information in a fax to the Department dated 5 April 2005. The owner stated that the 50mm x 25mm treated vertical battens were installed at 450mm centres, and were fixed with 50mm x 2.5mm gun nails. The 9mm ply was fixed with the same nails at 150mm centres on each stud.
- 3.7 In a letter to the territorial authority and the Department dated 3 June 2005, an independent expert described his role in Determination 2004/04, and provided an abridged copy of the report and some photographs produced for that determination. The expert also attached a copy of a paper titled *Comparative Durability of Untreated Wood in Use Above Ground*.
- 3.8 The copies of the submissions and other evidence were provided to each of the parties.

#### **4 THE RELEVANT PROVISIONS OF THE BUILDING CODE**

- 4.1 The dispute for determination is whether the territorial authority's decision to refuse to issue a code compliance certificate because it was not satisfied that the cladding complied with clauses B2.3.1 and E2.3.2 of the building code (First Schedule, Building Regulations 1992) is correct.
- 4.2 There are no Acceptable Solutions that have been approved under section 49 of the Act that cover this cladding. The cladding is not accredited under section 59 of the Act. I am therefore of the opinion that the cladding system as installed must now be considered to be an alternative solution.
- 4.3 In several previous determinations, the Department has made the following general observations, which in my view remain valid in this case, about acceptable solutions and alternative solutions.
- Some acceptable solutions cover the worst case, so that in less extreme cases they may be modified and the resulting alternative solution will still comply with the building code; and
  - 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.

## 5 THE EXPERTS REPORT

5.1 The Department commissioned an independent expert (“the expert”) to inspect the house and make a report. The expert visited the property on 15 June 2005, and issued a report dated 19 June 2005. The expert noted the building is well constructed and had been well maintained to date. The expert also noted that, with one exception, the boards were securely attached with no signs of cupping or splitting. The expert made the following specific comments on the cladding:

- One board above the windows requires re-fixing;
- A bead of sealant should be applied to the edge of the window and door jamb scribes;
- An additional coat of sealer should be applied to the weatherboards; and
- The drained cavity requires better vermin proofing.

5.2 With respect to the last item listed above, although the expert confined her remarks on the lower wall detail to a comment on vermin proofing, the photograph in the report showing a horizontal base-board removed from below the weatherboards reveals two vertically fixed battens that appear to run from behind the weatherboards down into the soil. These battens, if left in place, would seem likely to provide a moisture bridge by which ground moisture could travel up into the cladding system.

5.3 The expert carried out a series of invasive moisture tests at selected positions in the south-facing wall. Tests were taken in the battens to which the weatherboards are fastened so that any moisture ingress would become apparent, and the readings were in the range of 12% to 14%. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. I also note that the applicant’s submission included the results of moisture tests carried out on 25 November 2004. These produced a total of 15 moisture readings that varied between 9% and 15%.

5.4 Copies of the experts report were provided to each of the parties.

## 6 DISCUSSION

### General

6.1 I have considered the submissions of the parties in this matter. The approach in determining whether building work complies with clauses B2 and E2, is to examine 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 Authority and the Department have described the weathertightness risk factors in previous determinations (Refer to Determination 2004/01 *et al*) relating to building cladding and I have taken these comments into account in this determination.

- 6.2 Section VIII of the owner's submission contains a risk assessment that describes the wind zone as very high risk. However, the photographs supplied show the terrain where the building is located as being open flat country surrounded by 100 to 200 metre high hills, with some buildings and trees. The most exposed southern face of the building is not subject to the prevailing westerly wind. Using NZS 4203 and the above parameters, the worst-case wind speed can be calculated as 36.4m/s (Medium). Within NZS 3604 this is defined as a medium wind zone.
- 6.3 In Determination 99/014, the Authority accepted that cedar weatherboards with a larger profile than those in question and that were installed onto a flexible backing would be code compliant, provided certain criteria relating to material quality were met. In Determination 2004/04, the Authority found that weatherboards of the same material and dimensions as those used on the house did not comply with the building code. In that instance, the weatherboards were fixed directly to a plywood substrate on a building that was sited in a very high wind zone. The Authority considered that the wind zone was a critical factor in arriving at its decision. The expert commissioned by the Authority for Determination 2004/04 noted in his report that "we believe that a drained and vented cavity would effectively decouple the sidings from the sheathing". I note that the weatherboards that are the subject of this determination have a drained and vented cavity installed behind them, and are attached to a building in a medium wind zone that also has wide veranda protection to 3 elevations.

### Durability

- 6.4 Council have expressed concern about the cross section of these boards, noting that:
- ...their flimsiness and fixing (using staples and battens) may not be sufficient to withstand cupping and movement that would occur with the seasonal changes. It is therefore appropriate to look to timber authorities for a guide as to durability and performance of this timber.
- 6.5 In the BRANZ publication, *Selecting Timber – A guide to choosing timber for use in building*, imported Western Red Cedar is categorised as being "highly durable". N C Clifton, in *New Zealand Timbers: The complete guide to exotic and indigenous woods*, notes that timber with a durability potential of 15 to 25 years is described as being "durable", and timber with a durability potential of over 25 years is described as being "very durable". I note that Western Red Cedar is rated as highly durable, which equates to a test life of at least 15 to 25 years. Clifton further describes this timber as being:
- ...one of the best exterior cladding and joinery timbers in the world. It is easy to machine, shrinks very little, and is very stable in service. It is also very durable and is one of the best timbers to paint or stain. It is probably the single most important timber imported into New Zealand.
- 6.6 Western Red Cedar is reported as having excellent dimensional stability because of its low wood density and low shrinkage. Fibre saturation point is 18 to 23% compared to most Canadian softwoods of 25 to 30% (Higgins 1957) (or 24 to 29% according to BRANZ). As a result, Western Red Cedar shrinks and swells minimally and is used for thin section applications such as roof shingles. The weatherboards on

this building are a thin section and such background information is relevant to this determination.

- 6.7 The boards on this house have been coated with a polymer protective sealant to improve their durability. Provided this is maintained, and taking into account the factors described above, I am of the view that these boards will resist cupping and splitting due to seasonal changes.

### **Weathertightness risk**

6.8 In relation to the weathertightness characteristics, I find that the house:

- Has no eaves or verge projections that would provide protection to the cladding areas below them. However, the wide veranda projections to 3 elevations afford excellent protection to the walls below them;
- Is in a medium wind zone;
- Is one storey high;
- Is of a simple plan, with a gable end roof;
- Has a cavity behind the weatherboards that is backed with treated plywood; and
- Has external wall framing that is unlikely to be treated to a level that would help prevent decay if it absorbs and retains moisture.

### **Weathertightness performance**

6.9 Generally, the cladding appears to have been installed according to good trade practice, but there are some areas of concern. These are described in paragraph 5.1, and in the expert's report, as being:

- The vermin proofing of the drained cavity;
- The re-fixing of one board above the windows;
- The application of a bead of sealant to the edge of the window and door jamb scribes; and
- The application of an additional coat of sealer to the weatherboards.

6.10 There is an additional area of concern, to which I alluded in paragraph 5.1, regarding the possible moisture bridge created by the baseboard fixing battens coming into contact with the soil.

6.11 I also find that there are compensating factors that assist the performance of the cladding in this particular case:

- Apart from several small faults, the cladding generally appears to have been

installed according to good trade practice;

- The house has wide veranda projections to 3 elevations that provide excellent protection to the cladding below them; and
- The house has cladding with a drained and ventilated cavity between it and the wall framing.

6.12 I consider that these factors allow the house to comply with the weathertightness and durability provisions of the building code.

6.13 I note that the house demonstrates a very low weathertightness risk rating calculated using the E2/AS1 risk matrix. The matrix is an assessment tool that is intended to be used at the time of application for consent, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage, but must be taken into account when the building as actually built is assessed for the purposes of issuing a code compliance certificate.

## **7 CONCLUSION**

7.1 I consider that the expert's report establishes there is no evidence of external moisture entering the house, and accordingly, that the weatherboard cladding does comply with clause E2 at this time. In addition, I am of the opinion that, in light of the drained and ventilated cavity and the other factors described in this determination, the major issues that made the similar profile weatherboards non-compliant in Determination 2004/4 are not relevant in this case.

7.2 However, the building 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 are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.

7.3 I also consider that because the faults in the house cladding occur in discrete areas, I am able to conclude that rectification of the identified faults will consequently bring the cladding into compliance with the code. Once the cladding faults listed in paragraph 6.9, have been satisfactorily rectified, this house should be able to remain weathertight and thus comply with both clauses E2 and B2.

7.4 I note that effective maintenance of claddings is important to ensure ongoing compliance with clause B2 of the building code. That maintenance is the responsibility of the building owner. The code assumes that the normal maintenance necessary to ensure the durability of the cladding is carried out. For that reason clause B2.3.1 of the building code requires that the cladding be subject to "normal maintenance". That term is not defined and I take the view that it must be given its ordinary and natural meaning in context. In other words, normal maintenance of the



cladding means inspections and activities such as regular cleaning, re-painting, replacing sealants, and so on.

- 7.5 It is emphasized that each determination is conducted on a case-by-case basis (See paragraph 7.1). Accordingly, the fact that a particular cladding system has been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding system will be code compliant in another situation.
- 7.6 I decline to incorporate any waiver or modification of the building code in this determination.

## **8 THE DECISION**

- 8.1 In accordance with section 20 of the Act, I determine that the house is weathertight now and therefore the cladding complies with clause E2. However, as there are a number of items to be remedied to ensure it remains weathertight and thus meets the durability requirements of the code, I find that the house does not comply with clause B2. Accordingly, I confirm the territorial authority's decision to refuse to issue the code compliance certificate.
- 8.2 I also find that rectification of the items outlined in paragraph 6.9 to the approval of the territorial authority, along with any other faults that may become apparent in the course of that work, will consequently result in the house being weathertight and in compliance with clauses B2 and E2.
- 8.3 I note that the territorial authority has issued a Notice to Rectify. In view of the decision reached in this determination, a new notice to fix should be issued that requires the owner to bring the cladding into compliance with the building code, without specifying the features that are required to be incorporated. It is not for me to dictate how the defects described in paragraph 6.9 are to be remedied.
- 8.4 I would suggest that the parties adopt the following process to meet the requirements of clause 8.3. Initially, the territorial authority should issue the notice to fix, listing all the items that the territorial authority considers to be non-compliant. The owner should then produce a response to this in the form of a technically robust proposal, produced in conjunction with an expert, 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. As indicated earlier in this determination, the Chief Executive might already have decided upon some of the issues that may be raised by the territorial authority in its notice to fix, including the territorial authority's requirement, if any, for a ventilated and drained cavity or equivalent.
- 8.5 Finally, I consider that the cladding will require on-going maintenance to ensure its continuing code compliance.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing  
on 22 July 2005.

John Gardiner  
**Determinations Manager**