

## *Determination 2005/133*

# *Refusal of a code compliance certificate for a house with a corrugated steel cladding system at 167 Woodlands Park Road, Titirangi, West Auckland – House 114*

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

- 1.1 This is a Determination under Part 3 Subpart 1 of the Building Act 2004 (“the Act”) made under due authorisation by me, John Gardiner, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. The applicants are the joint-owners Rachel Mooney and Pia Kotkassari (referred to throughout this Determination as “the owner”), and the other party is the Waitakere City 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 partially completed 6-month-old house, unless changes are made to its corrugated steel cladding system.
- 1.2 The question that I have been asked to determine is whether I am satisfied on reasonable grounds that the horizontal wall cladding as installed to the new steel-framed external wall to the eastern elevation of the house (“the horizontal cladding”), complies with the Building Code (see sections 177 and 188 of the Act). By “the wall cladding as installed” I mean the components of the system (such as the metal sheets, the flashings, and the joints) as well as the way the components have been installed and work together. The expert commissioned by the Department to inspect the building (“the expert”) has also identified major deficiencies relating to the vertical cladding installed on other three elevations of the house. While these issues are outside the scope of this Determination, I make reference to them later in paragraphs 6.5 and 7.4 of this document.
- 1.3 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 consists of a detached proprietary single-storey house, with provision for a future extensive basement development, situated on a sloping site that is in a high wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The house is of a fairly simple shape on plan with some complex features and has pitched roofs at two main levels that have wall-to-roof junctions. The exterior walls are of steel-frame construction built on timber-framed floors that are supported by timber piles or poles. These external walls are sheathed with metal cladding. There are no eaves or verge projections. A large suspended timber-framed open-boarded deck supported on beams and poles is constructed around two full and one part-elevation at the main floor level. The deck has access steps and a timber handrail that is partially clad with a “baby” corrugated steel cladding.
- 2.2 The cladding system to the exterior walls is “Zincalume” corrugated steel mechanically fixed over medium to heavyweight bituminous building paper to the steel wall framing. The cladding is fixed horizontally to the east elevation and vertically to the other three elevations. The horizontally fixed cladding is secured over steel vertical battens fixed to the steel framing.

### Sequence of events

- 2.3 The territorial authority issued a building consent on 12 November 2004.
- 2.4 The territorial authority carried out various inspections throughout the initial construction of the house. The house failed pre-line building inspections undertaken by the territorial authority on 23 and 24 February 2005. The “Field Sheet” relating to these inspections noted that the front (east elevation) wall required a cavity and that various items relating to the deck required rectification or amendment. The territorial authority also required amended plans to be supplied regarding the enlarging of bedroom 2 and the bathroom, and the amended position of the deck stairs
- 2.5 The owner has provided a document dated 30 March 2005, which addressed the concerns that the territorial authority had raised during its inspections. The document proposed that the east elevation cladding should be considered as being an alternative solution and noted that the cladding in question was not queried at the time the consent was issued. The arguments supporting the installed cladding can be summarised as being:
- Previous buildings clad with the horizontally fixed corrugated steel system [presumably without a cavity] had not leaked.
  - The flashings are proprietary, and the head flashings extend 100mm past the jambs and have a clear lap extending upwards.
  - The wall to the east elevation is away from the prevailing wind and is on a warm and sunny elevation ensuring the evaporation of any trapped water.
  - The structure is steel framed and cannot harbour rot or mould.

- The building is wrapped with building paper and the thermal strips form a cavity between the paper and the studs.
- Even if the building leaked, any water entering the building can flow horizontally and be expelled at the flashed joinery intersections or the corners. Any damage, which would be non-structural, would only affect the cladding.
- The boundary joist of the deck is set back from the boundary line and the cladding laps over the fibre-cement facing of the joist.

The document also responded to the other issues raised by the territorial authority.

- 2.6 The territorial authority did not issue a notice to fix as required by section 164 of the Act.
- 2.7 The owner applied for a Determination on 9 May 2005.

### **3 THE SUBMISSIONS**

- 3.1 The owner noted the “matter of doubt or dispute” related to the horizontal cladding and that only the top storey of the building was the subject of the Determination.
- 3.2 The owner provided copies of:
- the building plans and specifications
  - some design documentation
  - the document responding to the territorial authority’s inspection concerns
  - two warranties relating to the butyl-rubber membranes.
- 3.3 In a letter to the Department dated 19 May 2005, the territorial authority referred to the building consent, the dates that work commenced, and when the final inspection was carried out. The territorial authority noted that the cladding was installed without a cavity and due to changed inspection procedures it was unable to be satisfied, on reasonable grounds, that the cladding was code compliant.
- 3.4 The territorial authority provided copies of:
- the building consent
  - the inspection “Field Sheets”.
- 3.5 Copies of the submissions and other evidence were provided to each of the parties. Neither the owner nor the territorial authority made any further submissions in response to the submissions of the other party.

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

- 4.1 The matter to be determined is whether the territorial authority's decision to refuse to issue a code compliance certificate because it was not satisfied that the cladding to the east elevation of the house complied with clauses B2 and E2 of the Building Code (First Schedule, Building Regulations 1992) is correct.
- 4.2 There are no Acceptable Solutions that have been approved under section 22 of the Act or section 49 of the Building Act 1991 that cover the cladding. The cladding is not currently certified under section 269 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 remain valid in this case in my view, about Acceptable Solutions and alternative solutions.
- 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.

## **5 THE EXPERT'S REPORT**

- 5.1 The expert inspected the cladding on 17 August 2005 and furnished a report that was completed on 19 August 2005. The expert noted that the cladding is generally straight and there are no surface undulations. The sheets have been fitted with care and generally the surface is uniform and sound with only minor dents and scratches. The shape of the wall framing girts and the battens to the horizontal cladding will tend to shed water to the exterior and the joint between the two is such as to prevent water moving onto the girt. The cladding was pulled out at one location to expose the cladding details. I accept that the details exposed by this inspection are representative of other similar locations throughout the building. The expert made the following specific comments regarding the cladding.
- Many of the cladding fixings are incorrectly installed and will initiate leaking.
  - The bases of the cladding and the flashings are in contact with materials, including at the decks and apron flashings, which could create electrolytic corrosion.
  - No jamb or sill flashings are installed around the windows in the vertical cladding and there is no sealant installed at these locations.
  - No sill flashings are installed to the external joinery units in the horizontal cladding.

- The junctions between the head flashings to all the external joinery units and the cladding are sealed and are incorrectly formed.
- Horizontal joints are formed where the lower portion of the cladding overlaps the upper portion (instead of, correctly, vice versa).
- The base of the cladding is too close to the ground at the northwest corner of the building.
- The junction between the east wall barge flashing, the joiner, and the corner flashing is ineffectively formed.
- The penetrations through the cladding are poorly formed, incorrectly sealed and lack flashings.

5.2 The expert took non-invasive moisture readings through the interior of the exterior walls and elevated readings ranging from 18% to 30% were recorded around the windows of the north, west, and south elevations. The worst case was in bedroom 1, where all the readings were over 27%. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. The expert also had concerns regarding the corrosion of the steel wall framing that could be caused by electrolytic action or moisture ingress.

5.3 The expert also noted that there is the potential for moisture to get into the floor and deck joists, which in the expert's opinion were not treated to the specified H3.2 level. There are already signs that the deck joists are growing mould and fungi.

5.4 Copies of the expert's report were provided to each of the parties.

## 6 DISCUSSION

### General

6.1 I have considered the submissions of the parties, the expert's report and the other evidence 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 Building Industry Authority and the Department have described the weathertightness risk factors in previous Determinations (Refer to Determination 2004/01 *et al*) relating to monolithic cladding, and I have taken these comments into account in this Determination.

### Weathertightness risk

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

- lacks eaves and verge extensions that would provide protection to the cladding areas below them

- is in a high wind zone
- is equivalent to three-storeys high
- is of a fairly simple shape on plan but with some complex features
- has one suspended deck.

### **Weathertightness performance**

6.3 Generally, the cladding to the east elevation appears to have been installed according to reasonable trade practice, but some junctions, edges, and penetrations are not well constructed. These areas are described in paragraph 5.1, and in the expert's report, as being:

- the incorrectly installed cladding fixings
- the bases of the cladding and the flashings being in contact with materials that could create electrolytic corrosion
- the absence of sill flashings to the external joinery units
- the sealed and incorrectly formed junctions between the head flashings to the external joinery units and the cladding
- the penetrations through the cladding being poorly formed, incorrectly sealed and lacking flashings.

6.4 The fact that the building wrap is installed over the vertical metal battens fixed to the steel wall framing does not create a full drainage and ventilation cavity behind the metal cladding sheets. Nonetheless, I find that, as the horizontal cladding to the east elevation wall of the house appears to have been generally installed according to good trade practice, the partial cavity created between the wrap and the cladding can assist the wall cladding to comply with the weathertightness and durability provisions of the Building Code. This would remove any necessity to install a ventilated drainage cavity.

6.5 This Determination is limited to the assessment of the east elevation wall of the house. However, the expert has listed several deficiencies in the vertical cladding applied to the other house elevations. These are also listed in paragraph 5.1, and in the expert's report. In addition, the expert has found evidence that there is water ingress into each of the walls that are faced with vertical cladding. I strongly recommend that the territorial authority investigate these matters and that appropriate measures be taken to ensure that any faults are identified and rectified by the owner.

6.6 The same concerns relate to the floor and deck framing, which the expert has found to be at risk from water damage, and which in the case of the deck are already showing signs that damage has already occurred. The question of the adequate treatment of the framing should also be addressed.

- 6.7 I note that the territorial authority has refused in part to accept the vertical cladding because a revised system of inspection is required for claddings that lack a cavity. In view of the fact the building consent was issued for this house only some 6 months ago, on the basis of an application showing the proposed use of horizontally fixed corrugated metal cladding, I am surprised that the territorial authority now finds that the cladding as applied is not code compliant.
- 6.8 I note that one elevation of the building demonstrates a low weathertightness risk rating and the remaining three elevations demonstrate a moderate risk as 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 through the east elevation wall that is faced with the horizontal cladding. Consequently, I am satisfied that the cladding system as installed on this wall of the building complies with clause E2 of the Building Code.
- 7.2 However, the wall 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 building to remain weathertight. Because the cladding faults on the east wall of the building are likely to allow the ingress of moisture in the future, it does not comply with the durability requirements of clause B2 of the Building Code.
- 7.3 Subject to further investigations during the remediation process that may identify other faults, I consider that, because the faults that have been identified with the horizontal cladding occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.3, is likely to result in the east elevation wall being weathertight and in compliance with clauses B2 and E2.
- 7.4 I refer also to my comments in paragraph 6.5 concerning the remaining walls of the house. I consider that these walls do not meet the requirements of either clause B2 or E2 at this time.
- 7.5 I note that effective maintenance of monolithic 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, repainting, replacing sealants, and so on.

- 7.6 It is emphasised that each Determination is conducted on a case-by-case basis. 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.
- 7.7 I decline to incorporate any waiver or modification of the Building Code in this Determination.

## **8 THE DECISION**

- 8.1 In accordance with section 188 of the Act, I hereby determine that the horizontal cladding system as installed on the east wall of the building is weathertight now and therefore complies with clause E2 of the Building Code. However, as there are also a number of items to be remedied to ensure that it remains weathertight and thus meet the durability requirement of the code, I find that the wall does not comply with clause B2. Accordingly, I confirm the territorial authority's decision to refuse to issue a code compliance certificate.
- 8.2 I also find that rectification of the items outlined in paragraph 6.3, 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 east wall of the house being weathertight and in compliance with clauses B2 and E2.
- 8.3 I note that the territorial authority has not issued a notice to fix. The territorial authority should now issue a notice to fix, and the owner is then obliged to bring the house up to compliance with the Building Code. This notice may well include issues relating to the walls on the north, south and west elevations. It is not for me to decide directly how the defects are to be remedied and the cladding brought to compliance with the Building Code. That is a matter for the owner to propose and for the territorial authority to accept or reject.
- 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 appropriately qualified 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. Under subsection 179(2)(c) of the Act, “the Chief Executive may refuse an application if the Chief Executive has made a Determination...on the same matter”.
- 8.5 Finally, I consider that the wall cladding will require ongoing maintenance to ensure its continuing code compliance.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing  
on 20 September 2005.

John Gardiner  
**Determinations Manager**