

# ***Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 1***

## **1. THE MATTER TO BE DETERMINED**

- 1.1 This is a determination by the Building Industry Authority “(the Authority”) of a dispute referred to it under section 17 of the Building Act 1991 (“the Act”). The applicant is the owner. The only other party is the territorial authority. The application arises from the refusal by the territorial authority to issue a code compliance certificate for a new house unless changes are made to its monolithic cladding system.
- 1.2 The Authority’s task in this determination is to consider whether it is satisfied on reasonable grounds that the external cladding system as installed (“the cladding system”) complies with the building code. By “external wall cladding system as installed” we mean the components of the system (such as the backing sheets, the flashings, the joints and the coatings), as well as the way the components have been installed and work together.

## **2. THE BUILDING AND THE SEQUENCE OF EVENTS**

### **The building**

- 2.1 The building is a detached house with three floor levels on a sloping site. It is of conventional light timber frame construction and a moderately complex shape, incorporating balconies, and wall-roof intersections. Eaves overhangs are generally 300 mm. It is in a high wind zone in terms of NZS 3604: 1999 “Timber framed buildings”.
- 2.2 Framing timbers in external walls are H1 LOSP treated except for bottom plates, which are H3 LOSP treated.
- 2.3 The cladding system is known as a monolithic cladding system. As specified in its manufacturer’s July 2001 technical information manual (“the manufacturer’s instructions”), it incorporates fibre-cement backing sheets fixed through building wrap directly to framing timbers and finished with a choice of four joint and coating systems. The manufacturer’s instructions include details for flashings at various junctions (but not all of the junctions actually present in the house). For the purposes of this determination, the manufacturer of the fibre-cement sheets and the flashing kit is regarded as the

manufacturer of the system, despite the fact that each of the joint and coating systems is itself proprietary to one of four other manufacturers. The manufacturer's instructions identify the joint and coating systems by reference to those other manufacturers and their system brands, but give no other information about them. The joint and coating system used on this house has a name different from any of the four joint and coating systems mentioned in the manufacturer's instructions.

### **The sequence of events**

- 2.4 The territorial authority issued a building consent in October 2002. The consent was subject to 14 pages of "conditions/endorsements", and items 1 and 24 provided:

#### **1. PROPRIETARY PLASTER SYSTEMS**

The substrate used is to be installed to the manufacturer's specifications.

#### TAKE NOTE

Monolithic claddings to the exterior of buildings require regular inspection and maintenance to ensure the integrity of the surface is maintained to prevent entry of water into the underlying materials.

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#### **24. FLASHINGS AND MEMBRANES**

Particular care is to be taken to ensure that all flashings and membranes are installed correctly. Special care should be shown when installing flashings or membranes that the upstands behind cladding material are adequate. This will assist in ensuring that the building will be weathertight. These areas are to be inspected prior to installing any covering materials.

- 2.5 The house was constructed pursuant to the building consent. The territorial authority made various inspections in the course of construction. In November 2003, the territorial authority issued a completed form "Final Check List", accompanied by a handwritten "failed list" containing about 20 items for rectification, all of them comparatively minor except the item "No cavity system". That was, of course, a major item that would require significant changes to the completed cladding system.
- 2.6 Five days later, the territorial authority issued a "final recheck fail list" that listed three comparatively minor items carried over from the Final Check List and:
- No cavity system. Apply to BIA for determination
- 2.7 The Authority takes that to be an informal but clear indication that the territorial authority refused to issue a code compliance certificate.
- 2.8 The owner applied for this determination on 5 December 2003.
- 2.9 On 22 December 2003, the territorial authority issued a notice to rectify as required by section 43(6). The "Particulars of Contravention" attached to the notice to rectify consisted of:
- (a) A list of 13 items "that have not been installed per the manufactures [*sic*] specifications", some in the form "No evidence of . . .";
  - (b) A list of six items "that have not been installed per accepted trade practice";

- (c) A statement that the territorial authority “has recently received information” that meant it “cannot be satisfied that the cladding system as installed” complies with clause E2 External moisture of the building code.
- (d) A statement that the owner was required to:
  - (i) Provide adequate ventilation to the monolithic cladding and into the wall frame space by means of either a ventilated cavity or alternative approved system, and ensuring all issues related to the above are resolved.
  - (ii) Lodge with the council an application, within 28 days from the date of this notice, for an amended building consent, and provide all necessary information that may be requested to allow this consent application to be processed, alternatively.
  - (iii) Confirm to council, within 28 days from the date of this notice, your intention to apply to the Building Industry Authority for a determination in accordance with the building code 1991 [*sic*].

2.10 Apart from the requirement for a cavity or equivalent, only one of the listed items had also appeared on the “final recheck fail list”.

### **3. THE SUBMISSIONS**

#### **The owner’s submissions**

- 3.1 The owner provided copies of the manufacturer’s instructions, the building consent documentation, the territorial authority inspection reports, and the 22 December 2003 notice to rectify with its attached “Particulars of Contravention”.
- 3.2 The owner severely criticised the territorial authority for refusing to issue a code compliance certificate despite the fact that the house complied with the building consent. The territorial authority had inspected the building thoroughly during the course of construction and had not raised the question of a cavity behind the cladding (not required by the building consent) until it issued the Final Check List. The owner said:

The [territorial authority] should honour their own contract, the building consent.
- 3.3 The owner submitted a letter from the architectural designer for the house (“the designer”), who complained about the territorial authority having issued a building consent for a system it later rejected, drew attention to representations and warranties made by the manufacturer, and said:

I believe [the cladding system] can be classed as a proprietary system and as such should be considered as a system not a collection of flat sheets, nails, jointers, backing papers etc that the T.A.s are required to certify.
- 3.4 It appears from the letter that the designer played no part in the construction process.
- 3.5 The owner also submitted a workmanship guarantee from the subcontractor that applied the joint and coating system and a warranty for the coating system from the supplier of that system’s components.

#### **The territorial authority’s submission**

- 3.6 The territorial authority sent the Authority a copy of a notice to rectify dated 2 February 2004, which appears to be identical, except for the date, to the notice to rectify dated 22 December 2003, plus a series of photographs and marked-up drawings in support of the notice.

## **The report commissioned by the Authority**

- 3.7 The Authority commissioned an independent expert (“the expert”) to inspect the cladding system. The expert’s report largely confirmed the particulars of contravention that accompanied the notice to rectify, although some had been rectified in the meantime and some, in the expert’s opinion, were of a minor nature. The report identified other matters that, in the expert’s opinion, needed to be rectified.
- 3.8 The expert also used a non-invasive moisture meter to detect areas of moisture ingress. Moisture content readings were between 21% and 40% or more in several locations. The expert notes that the readings are indicative only, and not absolutely conclusive. Moisture levels of above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure and that there is a consequent risk of decay in the structural timbers.
- 3.9 The expert’s report was copied to the parties for their comments. The territorial authority was the only party to submit comments on the expert’s report. They said that they were:

Concerned that no comment has been made on what we believe is a key fundamental issue, in that the method of wall construction of the dwelling not complying with the Building Code, as set out in our notice to rectify.

We... request that the Authority ....not only take the method of wall construction into account, but to help clarify the situation further, in their determination decision make reference to the need or otherwise for a cavity.

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

- 4.1 Based on the exchanges of correspondence between the parties and their submissions, the Authority takes the view that the dispute for determination is whether the territorial authority’s refusal to issue a code compliance certificate because it was not satisfied that the cladding system complied with clause E2.3.2 of the building code (First Schedule, Building Regulations 1992) is correct. Clause E2.3.2 of the building code provides:

### **Clause E2—EXTERNAL MOISTURE**

#### **OBJECTIVE**

- E2.1** The objective of this provision is to safeguard people from illness or injury which could result from external moisture entering the building.

#### **FUNCTIONAL REQUIREMENT**

- E2.2** Buildings shall be constructed to provide adequate resistance to penetration by, and the accumulation of, moisture from the outside.

#### **PERFORMANCE**

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- 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 There are no acceptable solutions that have been approved under section 49 of the Act that are applicable to this cladding system and the cladding system is not accredited under section 59 of the Act.

## **5. THE AUTHORITY’S VIEW**

### **General**

- 5.1 The Authority takes the view that it must be satisfied on reasonable grounds that the cladding system as installed complies with the building code before it may issue a determination to that effect. The Authority may confirm, reverse or modify the territorial authority's decision (sections 18, 20 and 43 of the Act).
- 5.2 The Authority does not have jurisdiction to address the owner's and the designer's complaints to the effect that the territorial authority acted unlawfully when it refused to issue a code compliance certificate. However it notes with some concern that the "Particulars of Contravention" notice attached to the notice to rectify contains 19 individual items that should have been noted during the course of the territorial authority's regular inspections. Remediation is clearly more practical if it is carried out during construction, not afterwards.

### **The weathertightness risk factors**

- 5.3 Recent New Zealand data and experience, indicates that weathertightness problems with monolithic cladding systems have been particularly associated with buildings that have some or all of the following characteristics:
- 5.3.1 They are constructed on sites in high or very high wind zones (as defined by NZS 3604). While most reported leaks are substantially caused by defects in the cladding that require little or no wind pressure differential, the Authority believes that homes in high and very high wind zones are likely to experience wind pressure differentials and thus a higher risk of water ingress.
- 5.3.2 They are 2 or more storeys high. Increased storeys result in an effective increase in the catchment area of the wall. Available data suggests a clear correlation between increased number of storeys and an increased incidence of leaking.
- 5.3.3 They are built with complex roof and overall envelope shapes. Complex roofs that frequently intersect with walls on upper floors create opportunities for leaks to directly penetrate into the wall.
- 5.3.4 The cladding is not shielded from the effect of rain. Data shows a strong relationship between the width of the eaves and the incidence of wall leaks.
- 5.3.5 They are constructed with decks and balconies that are exposed in plan or cantilevered out from the external walls. Experience indicates that these areas are the most frequent location for water leaks.
- 5.4 In relation to these characteristics, the Authority finds the house that is subject to this Determination to:
- Be in a high wind zone;
  - Be constructed to 3 levels;
  - Incorporate complex wall/roof intersections and have an overall envelope that is also complex in shape;
  - Have eaves that are generally 300mm wide, and which are considered to be only moderately effective in shielding the cladding; and
  - Include a number of balconies that are exposed in plan.

### **Preferred weathertightness design features**

- 5.5 The Authority believes that effective design practice can minimize the impact of these risk factors. It has identified a group of specific design features that can significantly reduce the risks of damage through moisture ingress. These measures progressively address the need to keep rain away from walls, the need to allow water that has penetrated the walls to drain away, the need to allow a wet wall to dry out, and the need to incorporate a level of moisture tolerance in the external framing. The highest priority is to minimise rain impact on the walls, but the inevitable penetration of moisture through the cladding can be addressed by a combination of effective drainage, ventilation and moisture tolerance.
- 5.5.1 The structure should be able to deflect the rain away from the wall. This ability is reduced as wind speed increases, but an effective deflection mechanism, such as eaves greater than 600mm wide, has been shown by Canadian data to manage more than 90% of rain incidents.
- 5.5.2 The structure should allow water that has penetrated the cladding to drain out as quickly as possible. The Authority believes that generally face fixed cladding will only work in certain low risk circumstances and that in most other cases a drainage plane should be provided behind the outer cladding barrier.
- 5.5.3 The design of the outer walls should allow walls to dry to the outside once moisture penetrates the cladding and the moisture barrier. If walls do not dry decay fungi can become established in as little as 3 months. There is a lack of research on the most effective drying mechanisms in New Zealand conditions. Until scientific data on the optimum depth and configuration of the drainage plane that would facilitate effective drying in New Zealand is available, the Authority believes that the drainage plane should be not less than 20mm deep.
- 5.5.4 The external walls should have some degree of decay resistance, or moisture tolerance to allow for situations when moisture does circumvent the cladding and moisture barriers and moisture levels in the timber rise to more than 18%.
- 5.6 In relation to these measures, the Authority finds the house that is subject to this Determination to:
- Be constructed with moderately effective 300mm eaves;
  - Have cladding that was face fixed to the framing with no provision for any drainage plane;
  - Lack any drainage plane, which means that the external walls have less ability to dry to the outside; and
  - Have framing in the external walls that were treated to a level known as H1 LOSP, a level that is effective in controlling borer but not decay.

### **The cladding system**

- 5.7 The manufacturer's instructions do not specify the thickness of the proprietary coatings, but the Authority takes them to be of the order of 2-5 mm thick. That is not comparable to the 21-26 mm thick coating of sand-cement stucco complying with NZS 4251 that is specified in the acceptable solution E2/AS1<sup>1</sup>. There is no accredited system with which the cladding system can be compared.

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<sup>1</sup> That acceptable solution was very recently amended to require a drained cavity between the backing sheets and the framing.

- 5.8 The manufacturer is a well known and well established building products company, and it backs its opinion with a “warranty to the homeowner”<sup>2</sup>. The manufacturer’s instructions are dated July 2001. Given that the code requires a 15-year durability for cladding, the period since 2001 is too recent for the specified system to have established a history of satisfactory performance.
- 5.9 The manufacturer’s instructions refer to several manufacturing and type tests that it conducts in accordance with a number of national Standards documents, including Australian and joint Australian New Zealand Standards. However, those tests relate to some, but not all, individual components of the system, not to the system as a whole or even to coated sheets.

### **The installation of the cladding system**

- 5.10 For the purposes of this determination, the Authority accepts that both the owner and the territorial authority understood that the cladding system was to be installed in accordance with the manufacturer’s instructions, although that is not entirely clear from the plans and specifications for which the building consent was issued.
- 5.11 The Authority accepts the expert’s report as establishing that the cladding system as installed does not comply with the manufacturer’s instructions. The Authority is satisfied that the items of non-compliance detracted from, rather than improved, the performance of the cladding system.
- 5.12 As noted above, the expert’s report largely confirmed the particulars of contravention that accompanied the notice to rectify, and identified other matters that, in the expert’s opinion, needed to be rectified. Moisture content readings indicated above normal levels of moisture entering the structure.

## **6 CONCLUSIONS**

- 6.1 The Authority is satisfied that the performance of the cladding system has been reduced because it has not been installed according to manufacturer’s instructions. In addition, the Authority has identified the presence of a range of known weathertightness risk factors and the absence of design features that can reduce the risk of damage from water ingress. The presence of the risk factors on their own is not necessarily a concern. The Authority is concerned, however, when these risk factors are present in a cladding system not installed to manufacturer’s instructions, and in an overall structure that does not exhibit good weathertightness design features. For the reasons set out above, therefore, the Authority is not satisfied that the cladding system as installed complies with clause E2.3.2 of the building code.
- 6.2 In the circumstances, and taking account of the expert’s indicative moisture content tests, the Authority declines to incorporate any waiver or modification of the building code in its determination.

## **7 WHAT IS TO BE DONE?**

- 7.1 It is not for the Authority to decide how the building is to be brought to compliance with the building code (subject to any waivers or modifications granted by the territorial authority). That is a matter for the owner to propose, and for the territorial authority to

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<sup>2</sup> Issued on receipt of a “warranty checklist”, incorporating indemnities in favour of the manufacturer, completed by both the builder and the joint coating applicator.

