

## ***Determination 2005/58***

# ***Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 50***

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

- 1.1 This is a determination by the Chief Executive of the Department of Building and Housing (“the Chief Executive”) under section 17 of the Building Act 1991 as amended by section 424 of the Building Act 2004 (“the Act”). The applicant is the owner of the property, acting through a legal representative, and the other party is the territorial authority. The application arises from the refusal by the territorial authority to issue a code compliance certificate for a 1-year old sleep-out (“the house”) unless changes are made to its monolithic cladding system.
- 1.2 The question to be determined is whether, on reasonable grounds, the external monolithic cladding as installed (“the cladding”), to the walls of this house, complies with the building code (see sections 18 and 20 of the Act). By “external monolithic cladding as installed” I mean the components of the system (such as the backing sheets, the flashings, the joints and the plaster and/or the coatings) 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 No other aspects of the Building Act or the building code have been considered in this determination.
- 1.6 The house itself is described in paragraphs 2.1 to 2.3, and paragraph 8 sets out the final decision.

## **2 PROCEDURE**

### **The building**

- 2.1 The house is a single storey sleepout of some 25m<sup>2</sup> in area, situated on a level site in a medium wind zone in terms of NZS 3604: 1999“Timber framed buildings”. The house, which is of conventional light timber frame construction on a concrete slab, is of a very simple shape, and the external wall framing is sheathed in monolithic cladding. The exterior joinery consists of a reused ranchslider door and reused aluminium windows that have all been cut down in size. The eaves have 500 mm wide projections.
- 2.2 As no evidence has been produced as to the treatment of the timber used for the external wall construction, it is accepted that it is kiln dried and untreated.
- 2.3 The external walls of the house are clad with what is described as monolithic cladding. In this instance it incorporates a 20 mm thick sand and cement stucco plaster reinforced with galvanised reinforcing mesh applied directly to the wall framing. The plaster in turn is finished with an undefined paint system. It is noted that the consent plans show the external cladding as being weatherboards and the building certifier engaged by the owner accepted the change and has noted it on the inspection certificate.

### **Sequence of events**

- 2.4 The territorial authority issued a building consent based on a certificate supplied by a building certifier dated 11 December 2002.
- 2.5 The building certifier carried out an inspection of the house on 5 January 2004, and issued a building certificate, dated 15 May 2004, which stated in part:

I AM SATISFIED ON REASONABLE GROUNDS THAT

The building work complied with the listed provisions of the Building Code on the date of certification.

Exclusions: Exterior Cladding outside scope of E2/VM1

Notes:

Exterior cladding changed to exterior solid plaster. (Alternative solution) No preplaster inspection done

- 2.6 The owner has advised that on referring the matter of the issuing of a code compliance certificate to the territorial authority, a territorial authority official advised that if a nominated plasterer certified the work, a code compliance certificate would then be issued.
- 2.7 On 8 June 2004, a consultant engaged by the owner wrote to the territorial authority stating that an inspection of the plaster on the house had taken place, and that:
- Plaster finish Undulating doby [adobe] finish is totally free of any random cracking except for one minor crack which [the owner] said [the owner] would seal prior to the final coat of paint.
- Aluminium window frames had been sealed with sealant [against the cladding].
- Having discussed with [the plasterer] plaster mixes and cement strengths plus protection and curing I believe this has been the result of a crackfree finish. Normally any cracking that may have occurred would have happened by now.
- Paint finish Not high yield but instead [the owner] is to apply 3<sup>rd</sup> coat of acrylic paint.
- Overall the job to me is satisfactory.
- 2.8 According to the owner, despite having received the report about the plaster from the consultant, the territorial authority still refused to issue a code compliance certificate.
- 2.9 The territorial authority wrote to the owner on 13 July 2004, noting that the cladding as installed was an alternative solution and as such, it must be benchmarked against the current acceptable solutions. Due to the number of variables between the alternative solution provided and the acceptable solutions, the territorial authority was unable to issue a code compliance certificate. The options open to the owner were to either remove the cladding and replace with a complying system, or to seek a determination.
- 2.10 The territorial authority did not issue a Notice to Rectify as required under section 43(6) of the Act.
- 2.11 The owner applied for a determination on 29 June 2004.

### **3 THE SUBMISSIONS**

- 3.1 The owner, under the “Matter of Doubt or Dispute”, summarised the background leading up to this determination and also noted:

The territorial authority has now refused to issue compliance and has said the cladding must be removed and the job ‘Started again’, or a determination made by the Authority.

3.2 The owner provided copies of:

- The building plans and specifications;
- The consent documentation;
- Correspondence with the building certifier;
- The building certifier’s inspection certificate; and
- The consultant’s letter of 8 June 2004 to the territorial authority.

3.3 The territorial authority did not make a submission.

3.4 The copies of the submissions and other evidence were provided to each of the parties.

3.5 Following the issuing of the first draft determination, the territorial authority wrote to the Department on 24 March 2004. In summary, the territorial authority noted:

- That there were no backing sheets installed for the cladding system;
- That the territorial authority had written to the owner on 13 July 2004 reviewing the situation;
- There was some doubt regarding the situation involving the external window and door flashings;
- That the building certificate issued by the building certifier should be withdrawn; and
- The territorial authority was of the opinion that the cladding was not E2 compliant.

The territorial authority also supplied a copy of its letter to the owner of 13 July 2004.

## 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. Those provisions of the building code provide:

### **Clause B2—DURABILITY**

**B2.3.1** Building elements must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the specified intended life of the building, if stated, or:

- (a) The life of the building, being not less than 50 years, if:
- (i) Those building elements (including floors, walls, and fixings) provide structural stability to the building, or
  - (ii) Those building elements are difficult to access or replace, or
  - (iii) Failure of those building elements to comply with the building code would go undetected during both normal use and maintenance of the building.
- (b) 15 years if:
- (i) Those building elements (including the building envelope, exposed plumbing in the subfloor space, and in-built chimneys and flues) are moderately difficult to access or replace, or
  - (ii) Failure of those building elements to comply with the building code would go undetected during normal use of the building, but would be easily detected during normal maintenance.

#### **Clause E2—EXTERNAL MOISTURE**

- E2.1** The objective of this provision is to safeguard people from illness or injury, which could result from external moisture entering the building.
- E2.2** Buildings shall be constructed to provide adequate resistance to penetration by, and the accumulation of, moisture from the outside.
- 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 approved under section 49 of the Act that cover this cladding. The current Acceptable Solution, E2/AS1, allows for solid plaster systems with fibre cement backing sheets, but requires that they be fixed on battens to create a 20mm cavity between the sheet and the framing. The previous acceptable solution E2/AS1, which was in force when this consent was issued, allowed for mesh reinforced solid plaster to be applied to fibre cement backing sheets that were face fixed to the framing. The cladding is not currently accredited under section 59 of the Act. I am 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 Authority has made the following general observations about acceptable solutions and alternative solutions, and in making this determination I accept these observations:
- 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.
  - Usually, however, 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 Because the information provided by the parties contained insufficient detail on how the building had been constructed, The Authority commissioned an independent expert ("the expert") to inspect and report on the cladding. The expert inspected the building and furnished a report. It noted that the quality of the exterior plastering appears to be adequate apart from a lack of flashings. The expert also removed a small area of cladding was removed to check on the sealant around the windows. The expert's report made the following specific comments about the cladding:

- There are no head, jamb or sill flashings or seals fitted around the exterior windows and doors. However, the eaves projections afford some protection; and
- There is minor cracking to cladding that requires cutting out and re-sealing.

5.2 The expert took moisture readings using both a non-invasive meter and an invasive meter, and readings of between 12.4% and 13.7% were recorded. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

5.3 Copies of the expert's report were provided to each of the parties. The owner responded through a letter from the builder dated 6 December 2004. The builder described the method that was used to waterproof the window and door heads and that they were protected by a 500mm wide eaves projection. The builder also described the inspection process that had taken place and his experience as a builder.

## 6 DISCUSSION

### General

6.1 I have considered the submissions of the parties, (including the territorial authority's comments on the draft determination), the expert's report and the other evidence in this matter. The approach in determining whether building work complies with clauses B2.3.1 and E2.3.2, 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.

### Weathertightness risk

6.2 Recent research and experience, both internationally and locally, indicates that the impact of weathertightness problems in monolithic clad houses can be minimised if good and effective design and construction practices are followed.

6.3 The installation of exterior cladding to manufacturer's specifications and to accepted good trade practice is an important but not the only requirement to ensure good weathertightness performance.

6.4 The next priority is to reduce the ability of moisture to get through the cladding by using design measures that minimise the effects of the rain impacting on the walls:

6.5 I consider that the important matters for consideration are:

- Data show a strong relationship between the width of the eaves and the incidence of wall leaks. An effective deflection mechanism, such as eaves greater than 600 mm wide, has been shown by Canadian data to manage more than 90% of rain incidence;
- While most reported leaks are substantially caused by defects in the cladding that require little or no wind pressure differential, it is believed that buildings in high and very high wind zones (as defined by NZS 3604) are likely to experience wind pressure differentials and thus a higher risk of water ingress;
- Taller buildings result in an effective increase in the catchment area of the wall. Available data suggests a clear correlation between higher number of storeys and an increased incidence of leaking;
- Complex roofs and overall envelope shapes where the roofs frequently intersect with the walls on upper floors create opportunities for leaks into the wall; and
- Recent data also shows that decks and balconies that are exposed in plan and/or cantilevered from the external walls are the most frequent location for water leaks.

6.6 Any likely penetration of moisture through the cladding can then be countered by a combination of effective drainage, ventilation of the drainage cavity and moisture tolerance in the external wall framing timber. In particular:

- The structure should allow water that has penetrated the cladding to drain out as quickly as possible. It is believed that generally a drainage cavity should be provided behind the outer cladding barrier in monolithic construction;
- 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. Until scientific data on the optimum depth and configuration of the ventilation mechanism in New Zealand conditions is available, I believe that the drainage cavity should be not less than 20 mm deep; and
- The external walls should have some degree of decay resistance or moisture tolerance to allow for situations when moisture circumvents the cladding and moisture barriers and moisture levels in the timber rise to more than 18%.

6.7 In relation to these characteristics, I find that this house:

- Has 500mm wide eaves projections that provide good protection to the cladding;
- Is in a medium wind zone;
- Is single storey;

- Has no flashings or sealants to the heads, jambs and sills of the exterior joinery units;
- Has an overall envelope that is very simple on plan; and
- Has external walls that are assumed to be constructed with untreated timber that is likely to decay if it absorbs and retains moisture.

### **Weathertightness performance**

6.8 Generally the cladding appears to have been installed according to good trade practice, and I consider that the cladding has been effective to date in preventing the penetration of water. There are, however, some defective areas, which if not remedied, will eventually allow the ingress of moisture behind the cladding. These are set out in below:

- The lack of flashings or appropriate seals to the jambs and sills of the exterior doors and windows. I consider that the heads of the windows and doors are sufficiently well protected by the eaves above them.
- The minor cracking evident in the cladding.

In respect of the flashings described above I have noted the comments of the territorial authority as to the flashing details supplied by the owner. The expert could not identify the presence of these items when a section of the cladding was removed. In addition, the owner has not commented on this issue after considering the draft determination.

6.9 Notwithstanding the fact that the backing sheets are fixed directly to the timber framing, thus inhibiting drainage and ventilation behind the cladding sheets, I find that there are compensating factors that assist the performance of the cladding in this particular case. These are:

- Generally, the cladding appears to have been installed according to good trade practice;
- The house has 500mm wide eaves projections;
- The house has no decks or balconies;
- There is no moisture present in the external walls as present; and
- Has an overall envelope that is very simple on plan.

6.10 I consider that these factors adequately compensate for the lack of a drainage and ventilation cavity and can allow the house to comply with the weathertightness and durability provisions of the building code.

6.11 I note that the expert's report has not referred to the need for vertical control joints in the plaster. However, I consider that the need for these joints should be examined against the requirements of E2/AS1 and that they should be installed if considered necessary.



- 6.12 I am concerned that there is no evidence that the building certifier informed the territorial authority about the change to the installed cladding from that shown on the consent documents, despite noting it on the inspection certificate.
- 6.13 I note that all elevations of the building demonstrate a low weathertightness risk rating 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, but must be supplemented at the time of issuing a code compliance certificate by careful inspection of the building as actually built.

## **7 CONCLUSION**

- 7.1 I consider that the expert's report establishes that there is no evidence of external moisture entering the building, and accordingly that the cladding on this particular building does comply with clause E2 at this time.
- 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 in this 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 this cladding occur in discrete areas, I am able to conclude that rectification of the identified faults is likely to bring the cladding into compliance with the code. Once the cladding faults listed in paragraph 6.8 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 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, re-painting, replacing sealants, and so on. I recognise that a territorial authority does not have any statutory responsibility for the ongoing maintenance of a building. However, the maintenance programme adopted by the owner could be undertaken after consultation with the territorial authority, bearing in mind that the nature of the advice, and the basis on which it is provided to the owner, are for the territorial authority to decide.
- 7.5 I emphasise that each determination is conducted on a case-by-case basis. 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 Building 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 meet the durability requirements of the code, I find that 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 find that once the items of non-compliance that are listed in paragraph 6.8 are rectified to the approval of the territorial authority, together with any other instances of non-compliance that become apparent in the course of rectification, the cladding as installed on the house will comply with the building code, notwithstanding the lack of a drainage cavity.

8.3 I note that the territorial authority has not issued a Notice to Rectify. The territorial authority should do so and the owner is then obliged to bring the house up to compliance with the building code. It is not for this determination to direct 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, with either of the parties entitled to submit doubts or disputes to the Chief Executive for another determination.

8.4 The building certifier has issued a building certificate that excluded cladding in relation to clause E2. I have also found that the cladding does not meet the requirements of clause B2. In this respect, the certificate issued by the building certifier should be amended to exclude the structural aspects of clause B2 that are affected by the cladding not meeting the requirements of clause E2. However, as I have been asked only to determine whether the cladding is code compliant, I make no formal ruling on this matter.

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 2 May 2005.

John Gardiner  
**Determinations Manager**