

## *Determination 2004/82*

# *Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 65*

## **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 as amended by section 424 of the Building Act 2004 (“the Act”). The applicant is one of the joint owners of the property (referred to throughout this determination as “the owner”), 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 house unless changes are made to its monolithic cladding system.
- 1.2 My task in this determination is to consider whether I am satisfied on reasonable grounds that the external wall cladding as installed (“the cladding”), which is applied to the upper walls of this house and to the infill panels over the ground floor windows, complies with the building code (see sections 18 and 20 of the Act). By “external wall 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 Authority to the Chief Executive of the Department of Building and Housing.

- 1.3 This determination refers to the former Building Industry Authority (“the 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 Building Act or the building code.
- 1.6 The house itself is described in paragraphs 2.1 to 2.3, and paragraph 8 sets out the decision.

## **2 PROCEDURE**

### **The building**

- 2.1 The building is a two -storey detached house situated on a level excavated site, which is in a medium wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The house has brick veneered timber framed exterior walls at the ground floor level constructed on a proprietary concrete slab, and there are monolithic clad infill panels over the ground floor windows. The first floor external walls are of conventional light timber frame construction built on the timber-framed floor and are sheathed with monolithic cladding. The house is of a fairly simple shape, but has a complex concrete tiled pitched main roof system with numerous hip and valley junctions. Small tiled roofs are constructed over the single storey garage extension and also over the main entrance, and these have associated wall to roof junctions. There is a small 900mm wide balcony set into the roof at the first floor level over the garage, with the deck covered with a butyl rubber membrane fixed over a plywood substrate and the membrane is dressed into an internal gutter. There is a metal balustrade to the front of the balcony and timber-framed balustrades to each end. The latter are monolithic clad on the sloping top and both faces. A freestanding pergola is adjacent to the west elevation of the house, supported on timber beams and columns. Decorative polystyrene bands are planted around the windows at the first floor level. The eaves have 450 mm wide projections and polystyrene mouldings have been fitted at the junction of the eaves and the cladding.
- 2.2 The specification calls for wall framing timber to be “Treated”, but does not describe the level of treatment. The owner has supplied a copy of a letter from the timber supplier to the owner, dated 17 May 2004, confirming that H3 LOSP timber was supplied for the pre-nailed external house wall framing.
- 2.3 The external first floor walls of the building and the infill panels over the ground floor windows are clad with what is described as monolithic cladding. In this instance it incorporates 7.5mm thick fibre-cement backing sheets fixed through the building wrap directly to the framing timbers and finished with textured reinforced plaster and an acrylic paint system. The system has been subject to a test by an independent organisation. The cladding applicator has identified the type of backing sheet, jointing, sealing, plaster and paint systems that were applied on this house.
- 2.4 The cladding installer supplied a “Producer Statement”, dated 3 March 2004, covering the entire cladding system, which contained a qualification that the statement did not cover the suitability or stability of the site. The cladding installer notified the expert engaged by the Authority that the installer takes no responsibility for ensuring that flashings or control joints are installed.

## Sequence of events

- 2.5 The territorial authority issued a building consent on 9 December 2002. The conditions attached to this consent included:

9.B. Installation of external cladding system shall comply with the manufacturer's specifications, and recommendations, including correct fixings, jointing, flashing, penetration and function details, type colour of coating system where applicable etc. Recommendations of appraisal certificate shall be adhered to.

H3 treated timber shall be used for framing of exposed decks.

Producer Statements – Construction (PS3) are required from licensed contractors for installation of cladding and application of coatings. In lieu of a producer statement from a licensed installer a Producer Statement – Construction Review (PS4) from a registered engineer is required certifying installation.

- 2.6 In March 2003, the territorial authority approved a variation to the consent that involved the lowering of the garage floor slab, a change to the building elevation, and a boundary dimension change.
- 2.7 The territorial authority made various inspections during the course of construction, and approved the “Preline Building Inspection” on 4 July 2003, and the “Post Line/Bracing Inspection” on 21 July 2003, apart from querying the position and length of bracing. A “Final Building Inspection” was carried out on 19 December 2003 and was finally approved on 15 March 2004, on receipt of a PS3 form from the cladding coating company.
- 2.8 In a list of observations concerning weathertightness issues relating to the house, dated 17 April 2004, the territorial authority noted:

The condition of the plaster/paint system – Excellent.

This top storey cladding appears to have been very well constructed but how can we be sufficiently sure to be able to issue CCC? The whole house has been very well constructed and maintained – spotless in fact – if only the builder had called for an inspection.

- 2.9 The territorial authority wrote to the owner on 21 April 2004, stating:

We have received your request for a code compliance certificate (CCC) for a dwelling at the above address

Before the council can issue a code compliance certificate, we must ensure that all building work meets the NZ Building Code requirements. In particular, the building code specifies that building work must remain durable for specific periods of time after the code compliance certificate is issued.

You will be aware of the current weathertightness issues often reported in the media. These issues have highlighted the care that must be taken to establish that all building elements, but particularly cladding, is durable before any CCC can be issued.

As your building is face fixed (monolithic) construction with no cavities we are unable to verify that it fully complies with the Building Code requirements, manufacturer's details application (*sic*) at the time and that it will remain durable for the required period.

There has been recent information and knowledge that face sealed cladding systems without an adequate drainage and ventilation cavity will cause irrevocable damage to structural elements in the event of leakage and/or the effect of residual moisture.

Council cannot be satisfied that the cladding system as installed on the above building will meet the functional requirements of Clause E2 External Moisture of the New Zealand Building Code and is therefore unable to issue a code compliance certificate. Council also has concerns over:

- 1) Timber framing treatment unknown
- 2) Deck areas at upper level over habitable space
- 3) No specific wrap, flashing and cladding inspections undertaken
- 4) No warranty for the installed cladding system

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 26 July 2004.

### **3 THE SUBMISSIONS**

3.1 Under a covering letter to its submission, dated 29 July 2004, the territorial authority supplied copies of:

- The plans and specifications, including the amendments;
- The consent documentation;
- The territorial authority's inspection documentation;
- The correspondence with the owner;
- Producer Statements relating to construction and the cladding;
- The letter from the timber supplier to the owner confirming the types of timber used in the external walls; and
- A set of photographs illustrating certain aspects of the house.

3.2 In a covering letter dated 25 May 2004, the owner outlined the facts leading up to this determination and in response to the 4 issues raised by the territorial authority in its letter of 21 April 2004 stated:

- While the territorial authority did not require the use of H3 treated timber this was actually installed, as confirmed by the supplier's statement;
- The owner had followed the plan to build the deck and it is 130mm lower than the upper level;
- A specific wrap was used around the house and window flashings were installed; and

- It was unreasonable to provide a warranty for the cladding, but a producer statement had been provided and the cladding installer was a very good builder.

3.3 The owner also supplied copies of:

- The plans and specifications;
- The consent documentation;
- The territorial authority's inspection documentation;
- The correspondence with the territorial authority;
- Producer Statements relating to construction and the cladding;
- A delivery docket from the window manufacturer showing the supply of flashings; and
- The letter from the timber supplier to the owner confirming the types of timber used in the external walls.

3.4 The 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 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 sub floor 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 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 can 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, which in my view remain valid:
- 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, 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 I 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 plaster thickness appeared to be consistent and has been evenly applied. The exterior finish of the cladding, including the plaster coating and painting is generally of good quality, with the exception of some areas as noted below. The exterior windows and doors have head flashings, with the exception of the ground floor windows and the garage door opening, which have the first floor cladding packed out to overhang the brick veneer at these locations. The expert considered this to be a satisfactory solution. While the expert was unable to check whether the required jamb flashings had been installed, it was considered that the planted polystyrene bands provided adequate protection at these areas. The expert also made the following comments regarding the cladding:
- The control joints are not correctly formed as the sheets at these locations are butt jointed and have no sealant set between them;
  - There is minor cracking on the sheet joints of the southern wall;
  - The backs of the cladding sheets that overhang the brick veneer or abut the balcony membrane are not painted;

- There are no sill flashings installed to the exterior joinery units. However, since making the report, the expert has verified that the installation of sill flashings is not a manufacturer's requirement;
- There is insufficient clearance between the roofing and the cladding over the garage in two very minor areas, and the flashings are required to be dressed down into the corrugations of the roof tiles;
- The bottom edge of the planted polystyrene band beside ranchslider at the master bedroom is not plastered or painted;
- A metal capping is required over timber framed balustrades of the balcony to provide proper protection to the top surface of these walls;
- The lower balustrade fixings are fixed into top surface of the deck upstand and are not separated by rubber gaskets;
- The junction between the cladding and the balcony deck membrane lacks a 45 degree fillet, which would allow the stress to be taken off this junction;
- The overflow to the balcony deck has not been properly constructed or waterproofed;
- The spouting and barge tiles abutting the wall beside garage and front entry areas are buried in the cladding;
- The cladding behind the ends of the spouting at various locations is not plastered or painted;
- Some of the pergola rafter ends are hard against the cladding;
- The plumbing pipes that penetrate the cladding are sealed with inappropriate clear silicone and there are no flashings at these positions;
- Neither the downpipe brackets fixing screws, nor the two lantern penetrations are sealed, and the brackets require gaskets behind them; and
- The remedial work to holes that have been cut in the wrong place above soil pipes has not been carried out in a tradesman like manner.

The expert also noted that the balcony had not been built in accordance with the consent plans and suggested that the treatment level of balcony framing be verified.

- 5.2 The expert took non-invasive readings at the interior of the external walls throughout the house and also took invasive moisture readings through the skirtings. The readings ranged from 7.9% to 14.8%. 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 territorial authority responded by e-mail on 1 December 2004 and queried the references to downpipe bracket flanges and the balustrade fixings, and the requirements for sill flashings and the sealing of the cladding overhanging the brick veneer. I consider that I have addressed the territorial authority's concerns in paragraphs 6.8.

## 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 B2.3.1 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 Research data 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 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 I believe 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. I believe 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, the I find that this house:

- Has 450 mm wide eaves projections that provide reasonable protection to the cladding under them;
- Is in a medium wind zone;
- Is two storeys high, but the subject cladding is generally fixed to the upper level only;
- Has exterior joinery units which have adequate protection at the head and jambs;
- Has an overall envelope that is fairly simple on plan, but with a roof system having numerous hip and valley junctions and some wall to roof junctions;
- Has an open balcony built over a garage; and
- Has external walls constructed with H3 LOSP treated timber, which provides excellent resistance to decay.

### **Weathertightness performance**

6.8 Generally the cladding appears to have been installed according to good trade practice and to the manufacturer's instructions, 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 below:

- Some of the control joints are missing, and those that are there are not formed correctly. There is also minor cracking at the sheet joints of the southern wall;
- The lack of a seal coat to the bottom edge of the cladding sheets that overhang the brick veneer or abut the balcony membrane;
- The insufficient clearance in two very minor areas between the roofing and the cladding over the garage and the need to dress down the apron flashings into the roof tile corrugations;
- The lack of plaster or paint to the bottom edge of polystyrene band beside the master bedroom ranchslider;
- A lack of a metal capping, and associated saddle flashings or an approved equivalent to the top of the timber framed balcony balustrades;
- The lack of rubber gaskets (referred to as “flanges” in the expert’s report) to the lower balustrade fixings;

- The incorrect construction and waterproofing of the balcony deck overflow;
- The buried spouting and barge tiles abutting the wall beside garage and front entry areas and the lack of plaster and paint to the cladding behind the ends of the spouting;
- The lack of a 12mm gap between the pergola rafter ends and the cladding;
- The inadequate sealing of the plumbing pipes penetrating the cladding; the downpipe brackets fixing screws, and the two lantern penetrations; and the lack of gaskets (referred to as “flanges” in the expert’s report) to the downpipe brackets; and
- The inadequate remedial work to the wrongly placed openings in the cladding.

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, and notwithstanding the deficiencies that have been identified, the cladding appears to have been installed according to good trade practice and to manufacturer’s specifications;
- The house has 450mm wide eaves projections that will protect the high level cladding;
- There is no moisture evident at this time in the external wall cavities; and
- The external wall framing is constructed in H3 LOSP treated timber.

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 accept the expert’s opinion that the planted facings to the perimeters of the first floor exterior windows and doors will prevent any water ingress around the jambs, and that, despite the lack of head flashings to the ground floor windows and the garage door opening; there is adequate cladding protection over them. In addition, I consider that sill flashings are not required for the exterior first floor joinery units in this case.

6.12 The territorial authority has claimed that it had not undertaken any previous inspections for the cladding. However, the I note that, as set out in paragraph 2.7, the territorial authority carried out both “Preline” and “Postline” inspections.

6.13 I note that all elevations of the house demonstrate a medium 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 find the expert's report establishes that there is no evidence of external moisture entering the building. Accordingly, I find that the cladding on this particular building at this time does comply with clause E2.
- 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 building 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 find 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 It is emphasised 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 its 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 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 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 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, with either of the parties entitled to submit doubts or disputes to the Chief Executive for another determination.
- 8.4 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  
13 January 2005.

**John Gardiner**  
Determinations Manager