

## *Determination 2005/23*

# ***Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 21***

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

1.1 This is a determination of a dispute referred to the Chief Executive of the Department of Building and Housing (“the Chief Executive”) under section 17 of the Building Act 1991 (“the Act”) as amended by section 424 of the Building Act 2004. The applicants are the two joint owners (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 3-year old major extension to an existing house (“the extension”), together with a separate garage building, unless changes are made to their monolithic cladding systems.

1.2 My task in this determination is to consider whether I am satisfied on reasonable grounds that the external wall claddings as installed (“the claddings”), which are either applied to the new external walls of the extension and garage, or are fixed over the weatherboards of the existing house, comply with the building code (see sections 18 and 20 of the Act). By “external wall claddings as installed” I mean the components of the systems (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 In making my decision, I have not considered any other aspects of the Act or the building code.
- 1.6 The extension itself is described in paragraphs 2.1 to 2.5, and paragraph 8 sets out the decision.

## **2 PROCEDURE**

### **The building**

- 2.1 The building work involves a major extension and alteration to an existing house, together with the construction of an adjoining separate garage. The resultant single storey structures are situated on an excavated slightly sloping site, which is in a medium wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The external walls of the extension are of conventional light timber frame construction and built on concrete slab “thicknessings”. The new timber-framed external walls, including some high level narrow gables, are sheathed with monolithic cladding, as are the existing weatherboard clad walls of the original dwelling. The extension is of a simple shape, with the long-run steel pitched roofs at two levels having internal gutters and wall to roof junctions. The aluminium external windows and doors are surface fixed over the cladding. There are 700mm eave and verge projections to the house, with the exception of some higher roof verges that lack any projection. A new large timber framed close-boarded deck with attached steps is constructed at the northeast elevation of the extension, and an existing timber-framed deck is situated at the west elevation of the existing house. The new deck and steps have metal balustrades. A plastered concrete masonry chimney is constructed on the north elevation wall and this passes through the main roof.
- 2.2 The garage is of a simple shape with a single long-run steel pitched roof and has monolithic clad external timber-framed walls built on concrete slabs over concrete masonry foundation walls. The garage roof has only projections to the upper verge, which is 700 mm wide. A timber framed pergola, supported on timber beams and columns is fixed to the end of the garage.
- 2.3 No evidence has been forwarded as to the treatment, if any, applied to the new external wall framing. The expert engaged by the Department noted that the wall framing in the garage was untreated and was of the opinion that similar timber would have been used in the main body of the extension. The expert also

established through the invasive testing that the existing external framing timber and weatherboards of the original building were of “Native” timber.

- 2.4 The cladding system to the new timber framing of both the extension and the garage is what is described as monolithic cladding. The cladding to the walls of the extension incorporates 7.5mm fibre-cement backing sheets fixed through the building wrap directly to the wall framing and finished with a texture-coated finish and a further paint system.
- 2.5 The cladding to the weatherboard clad external walls of the original dwelling is a stucco system that consists of horizontal 40mm x 20mm tanalised battens covered with a building wrap, followed by reinforcing mesh spaced off the backing and a 25mm thickness of solid plaster. The plaster in turn is finished with a paint system. No information has been given as to what jointing and plaster systems were applied to the new or existing walls of the extension and garage. I also note that the plans designate all the external cladding finish as being “solid plaster spray texture finish”.

### Sequence of events

- 2.5 The territorial authority issued a building consent on 13 August 2001.
- 2.6 The territorial authority made various inspections during the course of construction, and approved the “Preline Building Inspection” on 31 October 2001, and the Postline/Bracing Inspection” on 6 November 2001. A “Final Building Inspection” was undertaken on 7 May 2002, and the territorial authority noted in a “Memorandum” that cracks in the plaster were to be repaired and ground levels were to be lowered around the garage. A further “Final Building Inspection” was passed on 30 August 2002 and the territorial authority noted on its “Field Inspection Sheet”: “Recheck all completed OK for CCC”. However, due to the non-payment of inspection fees by the original owner, a code compliance certificate was not issued.
- 2.7 The territorial authority carried out a weathertightness visual inspection on 23 February 2004 and subsequently wrote to the owner on 27 February 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 the Council are unable to issue a code compliance certificate for the dwelling because 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. Visual Inspection carried out on 23 February 2004 has revealed a number of defects including:

- Repairing of cracks in solid plaster
- Surface cracks on side of joinery
- Pergola fixed [fixed] through cladding
- Lack of clearance to paved area
- Surface defects

There has been recent information and knowledge that face sealed cladding systems without 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 ...

- 2.8 The owner responded to the territorial authority in a letter that was sent on 9 June 2004. The owner set out the background to the construction of the extension and garage, and claimed that after confirmation from the territorial authority that the code compliance certificate would be issued once the outstanding fees had been paid, purchased the property from the original owner in January 2004. The owner was of the opinion that as extension had been completed and signed off by the territorial authority in 2002, the territorial authority should have issued a code compliance certificate. The owner requested that the territorial authority provide more information why the code compliance certificate was not issued. In addition, the owner needed more information from the territorial authority as to the specific nature of the defects that it had listed and how these were to be rectified.
- 2.9 The territorial authority did not issue a Notice to Rectify as required under section 43(6) of the Act.
- 2.10 The owner applied for a determination on 14 August 2004.

### **3 THE SUBMISSIONS**

- 3.1 The territorial authority made a submission in the form of a letter to the Authority dated 30 September 2004, which summarised the consent and inspection processes relating to the extension. The territorial authority also noted that no specific cladding inspections had been undertaken for the external cladding system. The owner had been informed that, due to the type of monolithic cladding applied to the extension and its attendant risk factors, the territorial authority was unable, on reasonable grounds, to accept the compliance of the cladding.
- 3.2 The territorial authority supplied copies of:
- The consent documentation;
  - The territorial authority's inspection documentation; and
  - The correspondence with the owner

- 3.3 The owner supplied copies of:
- The plans and specifications;
  - The consent documentation;
  - The territorial authority's inspection documentation; and
  - The correspondence with the territorial authority.
- 3.4 The copies of the submission 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 either of the claddings installed on the extension or the garage. As neither of the claddings is accredited under section 59 of the Act, I am of the opinion that the cladding systems as installed can be considered to be an alternative solution.

4.3 In several previous determinations, the Authority has made the following general observations, which in my view remain valid in this case, about acceptable solutions and alternative solutions:

- Some acceptable solutions cover the worst case, so that in less extreme cases they may be modified and the resulting alternative solution will still comply with the building code; and
- Usually when there is non-compliance with one provision of an acceptable solution, it will be necessary to add some other provision to compensate for that in order to comply with the building code.

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

5.1 The Department commissioned an independent expert ("the expert") to inspect and report on the cladding. The expert inspected the building and furnished a report dated 19 January 2005. It noted that, as a general impression, the plastering had been carried out using good trade practice. The final coat on the textured plaster is "done to a reasonably consistent standard". The battens behind the solid stucco plaster were such that they did not provide a high degree of drainage or ventilation to the walls. The expert removed the plaster coating to reveal the window flashing details at one location, and noted that the window is appropriately flashed or sealed. The expert was of the opinion that every window and external door had been replaced during recent remedial work carried out on the house. The textured coating was also scraped away at a position where a projecting rafter penetrated the garage cladding and this inspection revealed the adequate sealing of this junction. The expert noted that there were few stress areas relating to the textured finished cladding as the wall heights are quite low and the joinery units are tall. The expert also made the following comments regarding the cladding:

- The stucco plaster is stopped well short of the existing weatherboards in some locations, enabling moisture to soak into the battens and the weatherboards;
- There are no capillary breaks between the base of the textured cladding and the concrete base at some locations;

- The backing sheet is not texture coated below the level of the new deck, and the cover over the bottom plate is minimal at these locations;
  - The recommended ground clearances to the base of the cladding are not achieved at some locations and where the cladding adjoins both the new and existing decks;
  - The cladding is buried by a retaining wall at the northwest corner of the garage;
  - There are inadequate differences between the internal floor levels and the level of the existing deck or the garage area paving; and
  - The fascia to the gable wall above the main internal gutter of the extension has been fixed prior to the application of the texture coating.
- 5.2 The expert took non-invasive readings at the interior linings of the external walls throughout the extension and one slightly elevated reading was recorded. Similar readings taken externally also revealed one elevated reading. The expert also took invasive moisture readings and obtained the high level results of 18%, 20% (3), 22%, 32%(2), and 40+% at the extension and 20%, 21%, 22% (2), 32%, and 38% at the garage. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.
- 5.3 The expert also recommended that further investigation be carried out on the state of the sub-floor under the study and where the existing deck adjoins the cladding. Drilling at both of these locations revealed the presence of rotting timber.
- 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 B2.3.1 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, I find that:

*The extension and garage:*

- Are in a medium wind zone;



- Are single-storey;
- Have exterior joinery units that are adequately flashed or sealed;
- Have envelopes that are simple on plan, and
- Have external walls constructed with what I accept, in the absence of evidence to the contrary, is timber that provides little resistance to decay if it gets wet and cannot dry out.

*The extension:*

- Apart from some higher roof verges, has 700mm eaves or verge projections that would provide excellent cladding protection;
- Has a roof system with secret gutters and wall to roof junctions; and
- Has two decks at ground level.

*The garage:*

- Has projections only to the upper verge, and these are 700mm wide; and
- Has a single pitched roof.

### **Weathertightness performance**

6.8 I find that generally, some aspects of the cladding appears to have been installed according to good trade practice and to the manufacturer's instructions, but some junctions and edges are not well constructed. These areas are:

- The stucco plaster being stopped well short of the existing weatherboards in some locations;
- The lack of capillary breaks between the base of the textured cladding and the concrete base at some locations;
- The lack of a texture coating to the backing sheet below the level of the new deck, and the minimal cover over the bottom plate at these locations;
- The recommended ground clearances not being achieved at some locations, including the decks;
- The cladding buried by a retaining wall at the northwest corner of the garage;
- The inadequate differences between the internal floor levels and the level of the existing deck or the garage area paving; and
- The fixing of the fascia to the gable wall above the main internal gutter of the extension, prior to the application of the texture coating.

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:

- The cladding appears to have been generally installed according to good trade practice;
- The extension has 700mm projections to most of its eaves and verges;
- The extension and garage are single storey; and
- The extension and garage have exterior joinery units that are adequately flashed or sealed.

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

6.11 I also accept the expert's opinion that there is no requirement to provide additional control joints in the cladding.

6.12 I note that all elevations of the extension and of the garage 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 am satisfied that the current performance of the cladding is not adequate because it is allowing water penetration into the wall framing at several locations at present. Consequently, I am not satisfied that the cladding systems as installed comply with clause E2.3.2 of the building code.

7.2 In addition, the buildings are 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 both the extension and the garage to remain weathertight. Because the cladding faults in the extension and the garage will allow the ingress of moisture in the future, neither complies with the durability requirements of clause B2.3.1 of the building code.

7.3 I consider that, because the faults that have been identified with the cladding systems occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.8 is likely to result in the buildings being weathertight and in compliance with clauses B2.3.1 and E2.3.1, notwithstanding the lack of a ventilated cavity.

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.

- 7.5 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.
- 7.6 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 1991, I hereby determine that the cladding systems as installed do not comply with clause E2 of the building code. There are also a number of items to be remedied to ensure that both the extension and the garage remain weathertight and thus meet the durability requirements of the code. Consequently, I find that neither the extension nor the garage 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 6.8 to the approval of the territorial authority, along with any other faults that may become apparent in the course of that work, is likely to result in both the extension and the garage being weathertight and in compliance with clauses B2 and E2, notwithstanding the lack of a ventilated 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 extension 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 25 February 2005.

John Gardiner  
**Determinations Manager**