

## *Determination 2005/08*

# *Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 7*

## **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 applicants are the owners of the property (referred to 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 house unless changes are made to its monolithic cladding system.

1.2 The question to be determined is whether on reasonable grounds the external wall cladding (“the cladding”), which is applied to the walls of this house, 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 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 Building Act or the building code.
- 1.6 The house itself is described in paragraphs 2.1 to 2.4 and paragraph 8 sets out my decision.

## 2 PROCEDURE

### The building

- 2.1 The building is a two-storey detached house situated on a gently sloping site, which is moderately exposed to the wind. The house is of conventional light timber frame construction with a concrete slab and concrete block foundations on the ground floor. The ground floor is on one level except for a one-storey attached garage, which is at a lower level. All windows are aluminium, and external walls are sheathed with monolithic cladding. There are no balconies attached to the upper levels of the house. The house shape is reasonably simple in plan, with the 35° pitched roof clad in asphaltic shingles laid over plywood. The roof is made up of a series of gables set at various levels, with a number of valley and wall to roof intersections. The verges have 500 mm wide projections and the eaves have 620 mm wide projections, with the exception of one short length above a stairwell at the upper level where the fascia is fixed directly to the cladding. The house has two attached pergolas, both with roofs. One pergola is supported on rafters that penetrate the cladding while the other is supported from a ribbon plate fixed against the cladding.
- 2.2 The specification calls for timber wall framing to be H1 treated, but I have not received any evidence, by means of invoices or other documentation, as to the framing timber purchased for the house construction.
- 2.3 The cladding system is what is described as monolithic cladding. As specified in the manufacturer's data sheets ("the manufacturer's instructions"), the cladding to the walls of the house incorporates 40 mm thick expanded polystyrene (EPS) backing sheets fixed through the building wrap directly to the wall framing and finished with a reinforced textured sponge float finish and a further paint system. The system has been subject to an independent appraisal ("the appraisal"). The manufacturer's instructions include details for flashings at various junctions and require uPVC flashings to the heads, jambs and sills of exterior joinery units. The jointing, sealing, sponge finished coating and painting system used in this instance is one of those systems referred to in the appraisal.
- 2.4 The cladding supplier issued a "Workmanship Guarantee" and a "Materials Components Guarantee", both dated 14 June 2004, each of which contain the qualification that the proprietor will not accept responsibility for damage resulting from the use of untreated timber. The installer supplied a "Producer Statement" dated 28 June 2004, covering the entire cladding system, and noting that the cladding installation has been carried out in accordance with the manufacturer's specifications, installation instructions and the current "Appraisal Certificate". The statement also notes that, if installed in accordance with the appraisal, the cladding will meet the relevant requirements of the building code. The manufacturer and installer note the date of completion as July 2001.

## Sequence of events

- 2.5 The territorial authority issued the building consent number A16876, on 22 January 2001, based on a building certifier's certificate. None of the "Building Consent Conditions" attached to the consent referred to the cladding. The building certifier was engaged to carry out site inspections of all aspects of the construction, as confirmed by a copy of the "Scope of building certifier's engagement certificate: E/2001-1523" dated 8 March 2001.
- 2.6 The building certifier made various inspections during the course of construction including prior to lining installation ("Pre-lining") on 4 July 2001, and following lining installation ("Gibnail") on 9 July 2001, as confirmed by a copy of the "Building Certifier's Inspection Report" to the territorial authority of 31 July 2001. The house appears to have been substantially completed in August 2001.
- 2.7 On 1 July 2002, the territorial authority was informed that the building certifier was formally withdrawing from the project. The building certifier also noted that:
- The last inspection was undertaken on 9 July 2001, a Gib nail which passed.  
To date we have not been able to undertake the final inspection.
- The building certifier attached to the letter a revised "Scope of Building Certifier's Engagement certificate: E/2001-1523" dated 1 July 2002. This noted, in regard to site inspections that:
- Final inspection and issue of the Code Compliance Certificate to be undertaken by [the territorial authority].
- The building certifier also attached to the letter a building certificate dated 1 July 2002 which noted that:
- The proposed building work would comply with the listed provisions of the Building Code if properly completed in accordance with the listed plans and specifications.
- 2.8 The territorial authority carried out a final building inspection on 9 August 2002 and noted that two items required attention. The only item in regard to the cladding was the requirement for a flashing to the garage door head. This work appears to have been undertaken and approved as satisfactory, as confirmed by a copy of the "Development Building Control Officers Field Memorandum 40816".
- I have not received any advice on why a code compliance certificate was not issued following the completion of outstanding matters raised by the final inspection.
- 2.9 The territorial authority carried out a visual inspection on 11 May 2004, as confirmed by the "Completed Monolithic Dwellings without a Cavity", which noted that all items able to be viewed appeared satisfactory and that the condition of the coating system was "excellent". Concluding comments were that:
- Being a certifiers job there are so many unknowns. We did not have so many cladding inspections in early to mid-2001 and it appears [the building certifier] didn't either.
- 2.10 The territorial authority wrote to the owner on 13 May 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. Visual inspection has also revealed the following –

- 1) Timber treatment of external wall frames unknown
- 2) No cladding inspections carried out
- 3) ...cladding system was specified in approved plans. There are no producer statements and manufacturer's warranty for the installed system.

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.

If you still wish to seek a code compliance certificate, you may request a determination from the Building Industry Authority as per section 17 of the Building Act 1991.

2.11 The territorial authority did not issue a Notice to Rectify as required under section 43(6) of the Act.

2.12 The owner wrote to the territorial authority on 23 May 2004 in response to the refusal to issue a code compliance certificate and included the following notes:

In response to the points raised in your letter:

1. Timber treatment. If you do not have details of the timber treatment used, then it must be determined that the building contractors complied with the Specification document, which states that "Internal timbers to be H1 treated..."
2. No cladding inspections carried out. As cladding inspections were not carried out by council when our property was built, I do not believe that you can now call on this as a reason for denying a Code Compliance Certificate.
3. Producer Statement and Manufacturer's Warranty for the installed plaster system. This has been requested and a copy will be forwarded to you once received.

At the time of building our house in 2001, every one of Council's requirements was adhered to. Our house is of solid construction, and was

built by reputable contractors. I do not believe the usual weather-tightness concerns apply to us as the house has eaves, does not have any balconies and the plaster system is of an excellent standard with no visible cracks or points of water ingress...

I do not believe that Council can justifiably refuse a Code Compliance Certificate when all requirements were met at the time of building...

2.13 The owner applied for this determination on 16 July 2004.

### 3 THE SUBMISSIONS

3.1 The owner, in a covering letter to the application for a determination dated 16 July 2004, noted that:

As detailed in the "Matter of Doubt or Dispute", the crux of our issue is that we believe a CCC should be forthcoming given that we built according to the council specifications at that time, and with a quality product by quality contractors. We feel that if the suppliers and fitter of the cladding system are prepared to guarantee their work and product, then council should too.

Within the documentation that accompanied the application was a note covering the "Matter of doubt or dispute", which included:

The building of our house was completed in August 2001. Due to a number of inconsequential reasons...., we were delayed in obtaining our final building inspection until January 2004. At this point, the inspector informed me that [the territorial authority] had made a decision the previous October that no Code Compliance Certificates would be granted to properties of a plaster cladding system that did not have cavity breathers installed. This decision was irrespective of whether cavity breathers were a requirement during building or not.

The inspector commiserated with us, and said that there were no problems he could see with the property. Our house has eaves, does not have balconies... There is no visible cracking or points of water ingress in our plaster system, after three years of movement and settling.

We have a producer statement and product/contractor guarantee for the cladding system. Our house has a master builder's guarantee. I do not see how the council can refuse a CCC when we built to their specifications at the time of building. I believe that they have to stand behind the specifications they made at the time. I strongly believe it is unethical and unfair to make a retrospective decision of this type.

The owner also supplied copies of:

- The plans and specifications of the house, dated march 2001;
- The building certifier's handwritten inspection notes;
- The correspondence with the building certifier and the territorial authority;
- A producer statement from the installer of the cladding system; and
- Guarantees on the materials and workmanship of the cladding system.

- 3.2 Under a covering letter to its submission, dated 12 August 2004, the territorial authority supplied copies of:
- The consent documentation;
  - The plans and specification;
  - Engagement certificates and inspection reports from the building certifier;
  - The correspondence with the building certifier;
  - Correspondence with gas suppliers on 9 July 2001;
  - The territorial authority's inspection documentation of 9 August 2002;
  - Notes taken during the visual inspection of 11 May 2004; and
  - The correspondence with the owner.
- 3.3 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, 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, 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 The Authority commissioned an independent expert (“the expert”) to inspect and report on the cladding. The expert inspected the building and furnished a report, noting that the cladding appeared to have been installed in accordance with the manufacturer’s instructions at the time of construction, and that the quality of the exterior cladding was generally good, with the exception of some minor defects. The expert removed the plaster coating at the jamb to sill junction of one representative window and observed that window and door flashings complied with the manufacturer’s details at the time of installation. The expert also made the following comments regarding the cladding:

- Ground clearances are inadequate in two areas, outside the lower level toilet wall and along the western wall of the garage, where the cladding has been extended down to finished ground levels;
- Timber decking along the western side of the house has no drainage gap, with the edge of the deck slat butting against the wall cladding;

- The rafters of a pergola penetrate the wall cladding on the western side of the house. Removal of a small area of plaster revealed that the rafter penetrations have been sealed with sealant applied between the timber and the polystyrene, and that there is evidence of a membrane behind the sealant. There was no evidence of moisture penetration associated with the pergola penetrations and the pergola is roofed above the rafters, although the upstand of the apron flashing at the roof to wall junction is sealed only to the outside of the cladding;
- The ribbon plate of the other pergola on the west wall has been bolted through the cladding, with no drainage gap or evidence of any sealant around the bolt fixings;
- The fixings of brackets holding down pipes, vent pipes and waste pipes to walls have not been adequately sealed;
- Penetrations through the cladding by waste pipes and water pipes have not been sealed;
- There is no flashing above the gas and electrical meter boxes, and the gas meter box has not been sealed against the cladding; and
- In several locations, the timber fascia board is embedded within the plaster coating of the cladding.

The expert noted that it was not possible to verify whether the wall framing was treated without removing a sample of the timber for analysis.

The expert also noted that control joints in the cladding were not required by the manufacturer's instructions at the time of construction. (I note that the manufacturer has more recently specified the installation of control joints in walls that exceed 20 metres in length, but the more recent specification would still not require such joints in this building).

- 5.2 The expert took non-invasive moisture readings through interior linings at 1-metre intervals along the base of external walls and under each side of window and door openings. The recorded moisture readings ranged between 6.1% and 13.7%. 2 further readings were taken through holes drilled through the exterior cladding beneath a window jamb flashing. These indicated moisture readings of 10%. 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.

## **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. 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 500 mm wide verge projections and, apart from one 2300 mm length, 620 mm eave projections that provide some protection to the cladding under them;
- Is on a site that is moderately exposed to the wind;
- Is a maximum of two storeys high;
- Has exterior windows and doors that are fully flashed;
- Has an overall envelope that is fairly simple on plan, but with a more complex roof system having a number of valley and wall to roof junctions;
- Has no upper level decks or balconies;
- Has two pergolas extending from exterior walls, one of which has rafters that penetrate through the cladding;
- Has cladding fixed directly to the framing with no drainage cavity; and
- Has external wall framing that is likely to be constructed of timber that is unlikely to resist the onset of 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 to the manufacturer's instructions, and I consider that the cladding has been effective to date in preventing the penetration of water. I consider also that the window investigated by the expert's removal of plaster is representative of the remaining windows in the house, and that these have been installed according to the manufacturer's instructions and have been effective to date in preventing the penetration of water. There are, however, some defective areas, as set out in paragraph 5.1, which if not remedied, will eventually allow the ingress of moisture behind the cladding. These are set out below:

- The insufficient ground clearance to the base of the cladding along the western wall of the garage and outside the toilet on the eastern wall;
- The abutment of the ground floor decking timber against the cladding on the western wall, with no gap to facilitate drainage;
- The inadequate weatherproofing of the junction of the roof above the pergola rafters that penetrate the cladding of the western wall;

- The abutment of the ribbon plate to the second pergola against the cladding on the western wall, with no gap to facilitate drainage and no evidence of adequate sealing to the plate fixings (despite the certifier having clearly annotated the drawings drawing attention to the need for flashing junctions where the pergola joined the walls;
- The lack of sealing of the various pipe bracket fixings;
- The lack of sealing of various pipe penetrations;
- The inadequate sealing of the gas and electrical meter boxes; and
- The embedding of the ends of fascia boards into the cladding coating at several locations.

6.9 Notwithstanding the fact that the cladding is 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 fully flashed exterior windows and doors;
- The coating and finish to the cladding appears to be in good condition, with no evidence of cracking at this time;
- The house has 500 mm wide verge and 620 mm wide overall eaves projections that will give some protection to the cladding; and
- There is no evidence at this time of moisture penetration into or accumulation within the external wall cavities.

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 that control joints in the cladding are not required to any of the walls of the house.

6.12 The territorial authority has claimed that no cladding inspections were carried out during construction of the house. However, I note that, as set out in paragraph 2.6, the building certifier reported to the territorial authority the satisfactory completion of both "Pre-lining" and "Gibnail" inspections.

6.13 I note that all elevations of the house demonstrate a low to 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 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 I decline to incorporate any waiver or modification of the building code in my determination.

## **8 THE DECISION**

- 8.1 In accordance with section 20 of the 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 on the building will require on-going maintenance to ensure its continuing building 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