

## *Determination 2005/56*

# *Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 48*

## **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 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 7-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 monolithic wall cladding as installed to the timber-framed external walls and columns of the house (“the cladding”), complies with the building code (see sections 18 and 20 of the Act). By “the monolithic 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 Act or the building code.
- 1.6 The house itself is described in paragraphs 2.1 to 2.3, and paragraph 8 sets out my decision.

## 2 PROCEDURE

### The building

- 2.1 The building is a large detached house situated on a level site in a moderate wind zone in terms of NZS 3604. The house is on two levels, with the ground floor containing living, dining and kitchen areas, one bedroom, bathroom, laundry and garage, and first floor containing three bedrooms and two bathrooms. Construction of the house is conventional light timber frame, with concrete block foundations and a concrete slab. All windows are aluminium, with several large units incorporating curved tops, and the walls are sheathed in monolithic cladding. The house shape is reasonably simple in plan, with the 25° roof clad in concrete tiles. The roof is made up of a series of gables, hips and valleys, with a number of complex junctions, terminations and wall to roof intersections. Eaves projections are 450 mm over upper level walls and 570 mm over ground floor walls, with verge projections of 200 mm at gable ends on both floors. A large timber-framed monolithic-clad chimney structure passes through the eaves of one of the lower level roofs.
- 2.2 I have not received any written evidence on the treatment, if any, of the timber purchased for the house construction. However, as noted in paragraph 5.4, some evidence was obtained from on-site observation that the wall framing timber is likely to be H1 boric treated.
- 2.3 The cladding system is what is described as monolithic cladding (EIFS). As specified in the manufacturer’s data sheets (“the manufacturer’s instructions”), the cladding to the walls of the house incorporates 60 mm thick polystyrene backing sheets fixed through the building wrap directly to the wall framing and finished with a mesh reinforced plaster 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 purpose-made 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 manufacturer issued a “Workmanship Guarantee” and a “Materials Components Guarantee”, both dated 22 September 2004, the latter of which contains the qualification that the proprietor will not accept responsibility for damage resulting from the use of untreated timber. The cladding installer, supplied a “Producer Statement” dated 21 September 2004, covering the entire cladding system, and noted 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 1998.

### Sequence of events

- 2.5 The territorial authority issued a building consent on 11 February 1998. No conditions relating to the cladding were attached to this consent.
- 2.6 The territorial authority made various inspections during the course of construction, including prior to lining installation and following lining installation, with a final inspection on 19 July 2001 which noted that a number of outstanding items were to be completed. A further inspection was made on 30 August 2004, which noted:
- Recheck things on memo OK. Gave owner a weathertight standard letter.
- 2.7 The territorial authority carried out a site cladding inspection on 15 September 2004, and noted a number of risk factors relevant to the house, along with defects in the cladding.
- 2.8 The territorial authority wrote to the owner on 23 September 2004, stating:

We have received your request for a code compliance certificate (CCC) for building works 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 will remain durable for the required time before any CCC can be issued.

At the time your building consent was processed, it was not known to the extent it is now, that face fixed monolithic cladding systems particularly, were not performing. The allowance of moisture ingress, together with the use of untreated timber framing, has now become a major problem to the structural integrity of buildings.

Weathertightness risk factors identified with your building include:

- 1 No drainage/ventilation cavity behind monolithic cladding
- 2 Building is located in a medium wind zone
- 3 2 storey high building

- 4 Roof/wall intersection design
- 5 Eaves width
- 6 Building envelope complexity
- 7 Exterior wall framing is untreated
- 8 No previous inspections for cladding
- 9 No flashing above meter box
- 10 No knowledge of sill drainage
- 11 Flashing to half round window heads
- 12 Kickout at bottom of side flashing

A visual inspection recently carried out by council has revealed the following defects, which need remedying,

Defects to be remedied and a further recheck inspection called for

- 1 Cladding to be clear of concrete by garage doors
- 2 Cladding to be sealed behind fascias at ends
- 3 Clothesline bolts to be sealed adequately
- 4 Pipes to be sealed where they penetrate the cladding
- 5 Finished ground levels below floor slab to be 150 mm paved and 225 unpaved.

However even with the listed defects remedied, Council cannot be satisfied on reasonable grounds that the cladding system installed on this building will meet the functional requirements of Clause E2 External Moisture and B2 Durability, 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.

- 2.9 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 17 October 2004.

### **3 THE SUBMISSIONS**

- 3.1 The owner, in a covering letter, dated 2 November 2004, to the application for a determination noted that:

The [territorial authority] has refused to issue a code compliance certificate for [named address] on the grounds they can not be satisfied that the cladding system installed meets the functional requirements of the E2 External and B2 durability of NZ building code.

- 3.2 The owner also forwarded copies of;
  - The building plans;

- The cladding manufacturer's specifications;
- The correspondence with the territorial authority; and
- Various guarantees, producer statements and other statements.

3.3 In a covering letter to the Authority dated 23 November 2004, the territorial authority noted:

After assessment of the above consent for a "Code Compliance Certificate" (CCC) Council are unable to ascertain within reasonable grounds that some building work including cladding comply with relevant clauses of the building code.

A short summary of events is as follows.

- [The territorial authority] issued building consent E 12831 for a new dwelling at the above address in February 1998.
- Standard council inspections such as footings, preline, postline except the final inspection were undertaken during the period from March to September 1998. The final inspection was requested in July 2001. A field memorandum 37511 was issued on 19 September 2001. The issues were not addressed until August 2004.
- No specific inspection was recorded for external cladding.
- Face fixed cladding systems without cavities were under scrutiny by council at the time when the CCC was requested.
- A specific weathertightness visual inspection was undertaken in September 2004 and a copy is included under "Inspection Records".

The territorial authority then noted the risk factors and issues as outlined in their letter to the owner on 5 October 2004, and went on to say:

It is noted that monolithic cladding systems are being continuously tested, improved and detailing revised. New knowledge indicates that monolithic systems should have a drainage cavity to perform its function meeting durability requirements of the Building Code. The issues such as high risk design, installation by licensed installers, selection of approved coating system, coating application by licensed applicators, quality control systems of suppliers, installers and applicators, specific independent inspections during installation have further complicated compliance verification process. New E2 document confirms the importance of the above issues.

In regard to this application for a determination, specifically in this case the matters of doubt are:

- Whether the installed cladding system complies with clauses B2.3.1 and E2.3.2 of the Building Code.
- Whether building elements, which have 5 and 15-year durability requirements comply with clause B2 of the Building Code, considering the age of construction.

3.4 The territorial authority also forwarded copies of:

- The building consent documentation;
- The building inspection records; and
- The correspondence with the owner.

- 3.5 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 submission 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. The relevant provisions of the building code say:

##### **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 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.
- 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 that was completed on 29 March 2005. The expert noted that the cladding appeared to have been installed generally in accordance with the manufacturer's instructions at the time of construction, and that the quality of the coating was generally good, but that there were "some inferior detailing in parts". Most penetrations are adequately sealed and, while lacking a head flashing, the meter box is well sealed and sheltered by an overhang. The expert noted that, as walls do not exceed two storeys in height and 20 metres in length, control joints are not required by the manufacturer, and have not been provided in this house.
- 5.2 The expert removed a small section of the textured finish at the jamb to sill and jamb to head junctions of one window to examine the flashings, and noted that purpose made uPVC head, jamb and sill flashings, with sealant at the junction, have been used in accordance with the manufacturer's instructions and with the appraisal. The expert also removed a small section of plaster at the curved head to jamb junction of one of the windows with a curved top.
- 5.3 The expert took non-invasive moisture readings at the bottom of interior linings of exterior walls below windows and potentially vulnerable roof to wall junctions. All readings were found to be at an acceptable level. A further 29 moisture readings were taken through holes drilled through the exterior cladding at potentially vulnerable locations around the house. Four readings around the chimney area indicated moisture levels of 18% to 22%, while the remaining readings ranged from 11% to 14%. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. The expert made the following specific comments on the cladding:
- The aluminium head flashing at the curved window head does not lap over the uPVC jamb flashing, although there is no indication of moisture penetration;
  - There is fine cracking to the sill plaster on two upper level windows. Removal of plaster under one crack showed that fibre reinforcing was poor and the plaster was thicker than usual. However, the sills were steeply sloped and there was no indication of moisture penetration;
  - The junctions of gutters with the apron flashings against the sides of the clad chimney leave areas of unfinished cladding exposed and appear to rely on

sealant as protection against moisture entry. Moisture readings of 22% were recorded in the chimney framing below these junctions;

- Most of the other junctions where gutters of lower roofs butt into walls have no kick outs to the bottom of apron flashings, show exposed cladding (and in one case exposed framing) and rely on sealant to prevent water entry;
- The junctions of verges with walls are also inadequately flashed and rely on sealant to prevent water entry;
- Most valley gutters have inadequate clearance for cleaning, with debris building up in the gutters. The same lack of clearance applies to the flashings behind the framed chimney;
- A number of down pipes discharging onto lower roofs lack spreaders;
- The meter box, although lacking a head flashing, is well sealed and is sheltered by a large overhang;
- The separation of cladding from paving appears adequate, except for the walls adjoining the garage doors. However, there is no indication of moisture penetration into these areas;
- The bolt fixings of two side yard fences penetrate the cladding with no evidence of sealants; and
- Two vents to the base of the chimney wall have flat uPVC sills that will allow moisture to penetrate behind the cladding.

5.4 I noted in paragraph 2.2 that I have seen no written evidence regarding the treatment of timber used in this house. However the expert noted that, during inspections, small sections of the wall framing were accessible and H1 boric treatment markings were observed.

5.5 Copies of the expert's report were provided to each of the parties and both accepted the report.

## **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 and E2, 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. The Authority and the Department have described the weathertightness risk factors in previous determinations (Refer to Determination



2004/01 *et al*) relating to monolithic cladding and I have taken those comments into account in this determination.

### **Weathertightness risks**

6.2 In relation to the weathertightness risk characteristics I find that the house:

- Has verge projections of 200 mm and eave projections to all walls that are greater than 450 mm, which provide moderate protection to the cladding beneath them;
- Is built in a moderate wind zone;
- Is a maximum of two storeys high;
- Has an overall envelope that is reasonably simple in plan;
- Has a roof incorporating a number of complex junctions, terminations and roof to wall intersections;
- Has no decks attached to the walls;
- Has fully flashed external windows and doors;
- Has monolithic cladding which is fixed directly to the framing with no drainage cavity; and
- Has external wall framing that, on the basis of the expert's observations, is likely to be H1 boric treated which may delay but would not resist the onset of decay if the framing absorbs and retains moisture.

### **Weathertightness performance**

6.3 Generally the cladding appears to have been installed according to good trade practice, but some junctions, edges, and penetrations are not well constructed. These areas are all as described in paragraph 5.1 and in the expert's report as being:

- Inadequate weatherproofing at the termination of roofs, gutters and verges against wall cladding;
- The lack of clearance for cleaning roof valley and other internal gutters;
- The lack of spreaders to two down pipes discharging onto lower roofs;
- The broken barge tile above the front entry;
- The inadequately sealed bolt fixings of the yard fences through the cladding;
- The inadequately sloped and sealed sills to the vents in the chimney walls; and
- The cracking of the plaster to two window sills.

6.4 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 no decks, is relatively simple in plan and has a roof with 550 mm and 670 mm overall eaves projections, and 200 mm verge projections, that will give some protection to the walls;
- The external windows and doors are fully flashed; and
- Apart from the localised area outlined in paragraph 5.3, there is no evidence of moisture penetration into, or accumulation within, the external wall cavities.

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

6.5 I accept that control joints are not required to the walls of this house.

6.6 I acknowledge the territorial authority's concern regarding:

- the lack of a flashing to the meter box, but accept that this will not be necessary as the meter box is well sealed and sheltered by an overhang;
- the flashing to the curved window heads but accept that, although the head flashing does not lap over the jamb flashing, the junctions appear to be performing adequately;
- the lack of ground clearance at the garage doors, but accept that this area is well-drained and sheltered by eaves, which will protect against moisture penetration into the wall framing;
- the sealing of the clotheslines bolts and pipe penetrations, but accept that these appear to be sealed and performing adequately; and
- the clearances to the floor slab, but accept that these appear to be adequate.

6.7 I note that all elevations of the house demonstrate a moderate weathertightness risk rating 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, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage, but must be taken into account when the building as constructed is assessed for the purposes of issuing a code compliance certificate.

## 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 of the building code.
- 7.2 In addition, 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 currently allow, or are likely to allow in the future, the ingress of moisture, the house does not comply with the durability requirements of clause B2.
- 7.3 I consider that, because the faults that have been identified with the cladding system occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.3 is likely to result in the building being weathertight and in compliance with clauses B2 and E2, 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 a number of items to be remedied to ensure that the house becomes and remains weathertight and thus meets the durability requirements of the code. Consequently, I find that the house does not 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 6.3, 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 the house 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 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 28 April 2005.

John Gardiner  
**Determinations Manager**