

Determination 2005/17

Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 15

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 under section 17 of the Building Act 1991 as amended by section 424 of the Building Act 2004 (“the Act”). The applicants are the 2 joint owners of the property (referred to throughout this determination as “the owner”), and the other party is the territorial authority. The vendor of the property is designated as an affected person in terms of section 16(e) of the Act. The application arises from the refusal by the territorial authority to issue a code compliance certificate for a 2-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 external 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 Act or the building code.
- 1.6 The house itself is described in paragraphs 2.1 to 2.4, and paragraph 8 sets out the decision.

2 PROCEDURE

The building

- 2.1 The building is a two-storey detached house, with single-storey attached garage, study and lounge extension constructions, situated on an excavated sloping site, which is in a high wind/sea spray zone in terms of NZS 3604: 1999 “Timber framed buildings”. The external walls of conventional light timber frame construction are built partly on a patent concrete ground floor slab system, and partly on a timber framed and piled floor. I note that in this respect, the consented plans show the concrete slab to occupy the entire lower level. The timber-framed walls are sheathed with monolithic cladding. The house is of a fairly simple shape, with concrete tiled pitched roofs at varying levels that have hip, valley, and wall to roof junctions. There is a small upper-level pitched roof over the stairwell, and the wall below this roof contains a window with a radiused head. The house has a timber-framed deck to one elevation at the lower level, which is supported on timber piles and beams and decked with close-boarded timbers. The deck has a balustrade constructed with timber handrails and balusters. A horizontal projecting plastered strip has been applied at the first floor level. The eaves have 450mm projections and the verges have 150mm projections.
- 2.2 The expert has verified that the external wall-framing members were treated with a process that would only have a minimal resistance to fungal decay if it gets wet.
- 2.3 The building is clad with what is described as monolithic cladding. The cladding is a particular proprietary product, installed in accordance with the manufacturer’s instructions, which include flashings to heads, jambs, sills, trims and corners. As detailed in that manufacturer’s instructions (“the instructions”), it incorporates 40 mm thick expanded polystyrene (EPS) backing sheets fixed through building wrap directly to framing timbers and finished with a proprietary mesh reinforced product plaster system supplied by the manufacturer of the backing sheet system. The plaster is also finished with three coats of 100% acrylic exterior paint system. The system has been subject to an appraisal by an independent appraisal organisation. I note that the installed cladding differs from that shown on the consented plans. (The territorial authority has referred to this in its letter to the owner of 25 February 2004), and the territorial authority noted no amended plans had been submitted in respect of this amendment.
- 2.4 The plaster manufacturer provided a “Material Component Guarantee” dated 31 March 2004, covering the materials for a period of 15 years. The plaster and paint

applicator provided a “Producer Statement” dated 26 August 2003, covering the paint and texture products for a period of 10 years.

Sequence of events

- 2.5 The territorial authority issued a building consent on 8 October 2002, based on a certificate from a building certifier. In an “Appended Conditions to Plan” the building certifier noted in regard to the cladding:
- Ensure a pre-line inspection is called for prior to exterior cladding being fixed to enable checking of building wrap and flashings and an external cladding inspection prior to texture coatings being applied to enable checking of fixings and flashings.
- Ensure an external cladding inspection is called for prior to texture coating being applied to enable checking of fixings and flashings.
- Producer statement required from licensed applicator for [named] wall cladding system.
- 2.6 The building certifier made various inspections during the course of construction, and approved the “Preline Insulation Building Inspection” on 16 April 2003. The building certifier did not inspect the cladding in its final form.
- 2.7 On 6 October 2003, the building certifier wrote to the project manager stating that an inspection of the property had taken place on that date, and that certain items required attention to meet the requirements of the building code. As regards the cladding, these were:
- Producer statement required from [the cladding supplier] for [named] cladding.
- Please note that as [the building certifier] can not certify [named] cladding we will be relying on Council to issue the Full Code Compliance Certificate and as Council were not called for an inspection on the cladding they may be reluctant to accept the Producer Statement from [the cladding supplier] and thus issue the CCC.
- 2.8 The building certifier issued a code compliance certificate for the complete building work on 20 November 2003. However, in a letter to the building certifier, dated 21 November 2003, the territorial authority pointed out that the building certifier’s approval did not allow it to certify the type of cladding used on the house. Accordingly, the territorial authority was unable to accept the code compliance certificate.
- 2.9 On 26 November 2003, the building certifier wrote to the territorial authority acknowledging that the code compliance certificate had been issued in error and should in fact have been an interim code compliance certificate. The building certifier noted that it had not carried out any inspections on the cladding and were relying on the territorial authority to inspect this work. It appeared that the builder had not called for a cladding inspection.
- 2.10 The building certifier attached a revised interim code compliance certificate, dated 25 November 2003 to its letter. This stated:

This is:

An interim code compliance certificate in respect of part only of the building work under the above building consent as specified below:

Unit 1

All building work, but excluding outer wall cladding

- 2.11 On 22 January 2004, the cladding installer faxed a “Without Prejudice” letter to the project manager, stating that it had undertaken the cladding installation and that the system installed had been approved by an independent appraisal organisation. During the cladding process, the supplier of the system and technical expert visited the site and checked the fixings, cladding and flashing details as per the specifications. All was deemed to be acceptable in accordance with these specifications.
- 2.12 On 23 January 2004, the project manager wrote to the building certifier noting that the cladding system supplier had inspected the cladding and the installer had issued a producer statement. The project manager also noted that a final code compliance certificate had been issued and withdrawn. The project manager stated that while producer statements had been issued and accepted by the territorial authority for the footings and floor slab, the territorial authority had refused to accept the cladding installer’s producer statement. The project manager was of the opinion that there had been a lack of communication from the territorial authority and the building certifier regarding inspections and neither the contractor nor the consent holder were made aware that an additional inspection was required.
- 2.13 On 25 February 2004, the territorial authority notified the previous owner of the house (the vendor) that the original consent did not contain any exclusions relating to the building certifier’s work, and accordingly, the territorial authority were not required to undertake any inspections. The territorial authority pointed out that the cladding system as installed differed from that on the consented drawings and that no amended plans had been lodged for this change. The territorial authority noted that the first inspection for the project had been undertaken by the building certifier on 17 January 2003, and believed that there was an opportunity for the building certifier to notify the builder of the change to its approval and this would have allowed the territorial authority to inspect the cladding. At no time had the territorial authority been approached as to how it would regard a cladding producer statement.
- 2.14 The territorial authority did not issue a Notice to Rectify as required under section 43(6) of the Act.
- 2.15 The owner applied for a determination on 28 July 2004.

3 THE SUBMISSIONS

3.1 The owner also supplied copies of:

- The plans;

- The consent documentation and the building certifier's scope of engagement;
- The interim code compliance certificate;
- The building certifier's inspection documentation;
- The correspondence with the territorial authority and the building certifier;
- The cladding supplier's "Without Prejudice" letter of 22 January 2004 and "Materials Components Guarantee", and the cladding installer's "Producer Statement"; and
- The cladding appraisal.

3.2 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 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. It noted that the “general impression was of reasonably good trade practice in terms of the cladding”. The final plaster coat has a high standard sponge finish. The expert removed the textured coating to reveal the window flashing details at two locations, and noted that the windows were appropriately flashed. The expert also cut away a portion of the projecting strip at the first floor level to check whether a horizontal control joint had been installed. The expert also made the following comments regarding the cladding:

- In accordance with the manufacturer's recommendations, there should be vertical control joints to the downhill north east end wall, the south west rear wall (2), and the upper level of the south east uphill end wall. However, these are not evident;
- There are no horizontal control joints;
- There is no capillary gap at the base of the cladding;

- There is cracking evident under the bedroom 2 window, at the end of the apron flashing above the deck/lounge, and where the metal fascia board abuts the cladding at the rear corner of bedroom 2. The fascia is also fitted hard against the polystyrene and was installed prior to the plaster application;
- The sealant between the window sill and jamb flashings had not stuck well;
- The polystyrene is fitted hard against the garage door frame jamb, the sealant has separated at this location and a crack has formed. There is no flashing installed over the head of this frame;
- There are no appropriate finishes to the ends of the curved head flashing over the stairwell window, and there are unsealed holes at these locations;
- The ends of the apron flashings above the laundry, above the family room, and above the deck/lounge are inappropriately finished;
- There are buried fascias at the upper roof to the left and to the right of the stairway;
- There is minimal cover of the apron flashing over one tile above the entrance;
- There is insufficient ground clearance to the base of the cladding adjoining the garage door and over the concrete deck. However, there is no evidence of any problems at these locations;
- Some penetration through the cladding are inadequately sealed, including the downpipe saddle screw fixings; and
- Two downpipe spreaders direct water in one direction only.

5.2 The expert took non-invasive readings at the interior linings of the external walls throughout the house and no significant variations or elevated readings were obtained. The expert also took non-invasive moisture readings at the exterior of the cladding and obtained moisture readings of between 9% and 17%. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

5.3 The expert also took a moisture reading in a boundary joist under the house adjoining the northwest deck and obtained a moisture reading of 24%. In a verbal clarification, the expert was of the opinion that this moisture was associated more with ground moisture than with a cladding defect.

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, the I find that this house:

- Has 450 mm wide eave projections that provide some protection to the cladding under them, but has minimal verge projections that provide little protection;
- Is in a high wind/salt spray zone;
- Is two storeys high;
- Has exterior joinery units that are fully flashed;
- Has an envelope that is fairly simple on plan, but with a roof system having hip, valley and wall to roof junctions;
- Has a deck at the lower level; and
- Has external walls constructed with a timber whose treatment provides no resistance to decay if it gets wet and cannot dry out.

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, edges, and penetrations are not well constructed. These areas are:

- The lack of vertical control joints to the downhill north east end wall, the south west rear wall (2), and the upper level of the south east uphill end wall;
- The lack of horizontal control joints;
- The lack of capillary gap at the base of the cladding;
- The cracking evident under the bedroom 2 window, at the end of the apron flashing above the deck/lounge, and where the metal fascia board abuts the cladding at the rear corner of bedroom 2. The fascia is also fitted hard against the polystyrene;

- The polystyrene being fitted hard against the garage door frame jamb, and the lack of a flashing installed over the head of this frame;
- The lack of appropriate finishes to the ends of the curved head flashing over the stairwell window, and the unsealed holes at these locations;
- The inappropriately finished ends of the apron flashings above the laundry, above the family room, and above the deck/lounge;
- The buried fascias at the upper roof to the left and to the right of the stairway;
- The minimal cover of the apron flashing over one tile above the entrance;
- The insufficient ground clearance to the base of the cladding adjoining the garage door and over the concrete deck;
- Some inadequately sealed penetrations through the cladding, including the downpipe saddle screw fixings; and
- The two downpipe spreaders that direct water in one direction only.

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;
- The windows are fully flashed; and
- The cladding itself is not allowing the penetration of moisture at this time.

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

6.11 I note that the expert has commented on the sealant between the sill and jamb flashings as not being well sealed. However, as the windows are otherwise appropriately flashed, and there is no evidence of leaking at the window locations, I am prepared to accept that the window flashing systems are adequate.

6.12 I note that the expert has found a higher moisture measurement in a ground floor joist, but does not attribute this to a cladding failure. If, as the expert believes, this moisture ingress is due to ground moisture, this is a failure in terms of clause E2.3.2, which is outside the ambit of this determination. The cause of this moisture ingress should be further investigated and appropriate remedial work carried out. Furthermore, in the interest of ensuring structural integrity, the question of the treatment of the joist framing should also be considered.

6.13 I note that two elevations of the house demonstrate a low weathertightness risk rating, one elevation of the house demonstrates a medium weathertightness risk rating, and one elevation of the house demonstrates a high weathertightness risk

rating, as calculated using the E2/AS1 risk matrix. The matrix is an assessment tool that is intended to be used at the time of application for consent, but must be supplemented at the time of issuing a code compliance certificate by careful inspection of the building as actually built.

7 CONCLUSION

- 7.1 I consider that the expert's report establishes there is no evidence of external moisture entering the house, and accordingly, that the monolithic cladding does comply with clause E2 at this time.
- 7.2 However, the building is also required to comply with the durability requirements of clause B2. Clause B2 requires that a building continues to satisfy all the objectives of the building code throughout its effective life, and that includes the requirement for the house to remain weathertight. Because the cladding faults in the house are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.
- 7.3 I also consider that because the faults in the house 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. 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 Act, I determine that the cladding to 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 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 14 February 2005.

John Gardiner
Determinations Manager