

Determination 2005/33

Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 28

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 of the property (referred to throughout this determination as “the owner”), and the other party is the territorial authority. The application arises from the refusal by the territorial authority to issue a code compliance certificate for a 10-year old house unless changes are made to its monolithic cladding system.
- 1.2 The question to be determined is whether on reasonable grounds that the external wall cladding as installed (“the cladding”), which is applied to the external timber framed walls of the 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 2.3, and paragraph 8 sets out my decision.

2 PROCEDURE

The building

- 2.1 The building is a two-storey detached house, with an attached single-storey garage section, situated on a slightly sloping site, which is in a medium wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The house is of conventional light timber frame construction, built on concrete block foundation walls. All the timber framed external walls are sheathed with monolithic cladding. The house is of a fairly simple shape with hipped trapezoidal longrun pitched roofs at two levels that have continuous wall to roof junctions at the lower level. The aluminium windows and doors are surface mounted over the cladding. A bay window projects from one elevation of the house. The eaves and verges have 600mm wide projections, with the exceptions of the lower eaves to the southeast elevation that have 1200mm wide projections, and the reduced eaves width over the bay window.
- 2.2 The expert commissioned by the Authority is of the opinion, based on an on-site inspection, that the timber used to construct the external wall framing is H1 Boric treated. I have received no other written evidence as to the level of treatment, if any, of the timber framing used in the external walls.
- 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 7.5mm thick fibre-cement backing sheets fixed through the building wrap directly to the wall framing and finished with a textured plaster finish and a further paint system. The system has been subject to an independent appraisal. The manufacturer’s instructions include details for flashings at various junctions and require PVC flashings to the heads, jambs and sills of exterior joinery units.

Sequence of events

- 2.4 The territorial authority issued a building consent on 16 January 1995.
- 2.5 The territorial authority made various inspections during the course of construction, and carried out a preline re-inspection on 5 April 1995 that met the approval criteria, apart from a requirement for a producer statement from the plumber.
- 2.6 The territorial authority wrote to the owner on 30 April 2004, noting that it considered the original building consent to have lapsed in accordance with section 41 of the Act, and that the durability requirements of the house were compromised by the 9-year delay in applying for a code compliance certificate. In addition, the maximum 10-year liability of the territorial authority did not commence until the code compliance certificate was issued. The territorial authority suggested that the owner engage a recommended expert to inspect the house and provide a report that the territorial authority could acknowledge, even though it would not result in the issue of the certificate. The territorial authority also noted that the cladding system lacked an appropriate drainage cavity, and as such may not meet the requirements of clauses B2 and E2 of the building code. The territorial authority understood that there may be a problem with the cladding as a claim had previously been made to the Weathertight Homes Resolution Service.
- 2.7 In a letter dated 23 June 2004, the Weathertight Homes Resolution Service informed the owner that the owner's claim under the Weathertight Homes Resolution Services Act had been found to be ineligible.
- 2.8 The territorial authority did not issue a Notice to Rectify as required by section 43(6) of the Act.
- 2.9 The owner applied for a determination on 27 August 2004.

3 THE SUBMISSIONS

- 3.1 The owner under the heading of "Matter of doubt and dispute" noted that the territorial authority had declined the code compliance certificate on the basis of:
- Application made nearly 9 years after the consent had been issued; and
 - The process of fixing the cladding does not now meet "current specifications".
- 3.2 The owner supplied copies of:
- The plans and specifications;
 - The consent documentation;
 - The territorial authority's inspections forms;
 - The correspondence from the territorial authority; and

- The correspondence from the Weathertight Homes Resolution Service.

3.3 The territorial authority, in a letter to the Authority dated 19 October 2004, stated that in its opinion, the first reason set out by the owner why a code compliance certificate had not been issued was not a matter that could be decided by the Authority.

3.4 Copies of the 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 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 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 the 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 furnished a report on the cladding that was completed on 8 February 2005. It noted that the cladding finish is patchy as some areas have a good thick paint film while others appear slightly transparent and have pinholes in the surface. The expert cut away various sections of the plaster to establish its construction. The expert also made the following comments regarding the cladding:

- No vertical or horizontal relief or control joints as required by the manufacturer's recommendations had been installed;
- Cracking is evident in some locations, including down the jambs of most of the exterior windows and doors;
- There are areas where the texture and paint is peeling off;
- The backs and edges of some backing sheets are not sealed;
- Some sheet joints are incorrectly placed, and some break down of the jointing system was apparent over the lower roof apron flashings;
- There are no capillary gaps formed between the base of the cladding and the apron flashings or the foundation walls behind it;

- The nail fixings are showing around the bay window and one northwest window and in some cases the nails are protruding and are splitting the paint finish;
- There is insufficient ground clearance to the base of the cladding above paving and garden areas at some locations;
- The flexible sealant between the cladding and the jambs of the external windows and doors is not correctly installed;
- There is inappropriate sealing under the sill flashings of the external windows and doors;
- The required 5 mm gap between the base of the cladding and the head flashings of the external windows and doors has not been formed, and the head flashings do not extend sufficiently past the jambs;
- The junctions between the apron flashings, hip flashings and the cladding are not completed, resulting in holes through into the wall cavity;
- The vent pipe from the upstairs toilet where it passes through the roof is located directly below the apron flashing and compromises the efficiency of the flashing; and
- Some penetrations through the cladding are not sealed.

5.2 The expert took non-invasive moisture content readings through the internal linings of the external walls throughout the house, and found only 3 locations with slightly elevated 20% readings. Further external penetration moisture readings were also taken at several locations and the following readings were obtained.

- 19% in the linings around the bay window;
- 20% in the cladding on the right-hand side of the kitchen window;
- 21% under the northwest facing window in bedroom 2;
- 53.3% at the left-hand side upstairs toilet skirting; and
- 69.0% at the right-hand side upstairs toilet skirting.

Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

5.3 The expert forwarded a sample of timber to an independent testing laboratory for investigation of fungal contamination. The laboratory identified the presence of *Chuppia* fungi, but no evidence of soft rot damage. The expert had also noted that the invasive testing revealed that the building paper was wrinkled. The expert opined that water damage had possibly caused this.

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 extensions 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 consider 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 600mm or 1200mm wide eaves and verge projections that provide good to excellent protection to the cladding;
 - Is in a medium wind zone;
 - Is generally two storey;
 - Has exterior windows and doors that are incorrectly sealed;
 - Has an overall envelope that is fairly simple in plan;
 - Has no decks or balconies;
 - Has lower level roof spaces that provide some ventilation to the upper wall cavities; and
 - Has external walls that are constructed with H1 Boric treated timber that is likely to resist decay if it absorbs and retains moisture.

Weathertightness performance

- 6.8 I find that the monolithic cladding in general does not appear to have been installed according to good trade practice. As a result, there are a number of identified defects, set out in paragraph 5.1 and in the expert's report, which have contributed to the levels of moisture penetration already evident in locations in the external walls of the house.
- 6.9 In making this decision, I have not considered the issue of the late application for the code compliance certificate as raised by the owner.

- 6.10 I note that all elevations of the buildings demonstrate a low weathertightness risk rating when calculated by 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 actually built is assessed for the purposes of issuing a code compliance certificate.

7 CONCLUSION

- 7.1 I am satisfied that the performance of the monolithic cladding is inadequate because it has not been installed according to good trade practice. In particular, it demonstrates the key defects listed in paragraphs 5.1. I have also identified the presence of very few known weathertightness risk factors in this design. The presence of the risk factors on their own is not necessarily a concern, but, as explained in paragraph 6.10, they have to be considered in combination with the identified number of significant faults that are, in this case, indicative of a low level of workmanship in the cladding system. It is that combination of risk factors and faults that indicate that the structure does not have sufficient provisions that would compensate for the lack of a ventilated cavity. Consequently, I am not satisfied that the cladding system as installed complies with clause E2.3.2 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 the house are allowing the ingress of moisture, the house does not comply with the durability requirements of clause B2.
- 7.3 I find that because of the apparent complexity of the faults that have been identified with this cladding, I am unable to conclude, with the information available to me, that remediation of the identified faults, as opposed to partial or full recladding, could result in compliance with clauses B2 and E2. I consider that any final decisions on whether code compliance can be achieved by either remediation or recladding, or a combination of both, can only be made after a more thorough investigation of the cladding. This will require a careful analysis by an appropriately qualified expert as to the correct remedial option to be followed. Once that decision has been made, it should be submitted to the territorial authority for its comment and approval. If the territorial authority chooses to reject the proposal, then the owner is entitled to seek a further determination that will rule on whether the proposed remedial work will comply with the requirements of 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.

7.5 In the circumstances, I decline to incorporate any waiver or modification of the building code in its determination.

8 THE DECISION

8.1 In accordance with section 20 of the Act, I hereby determine that the monolithic cladding system as installed does not comply with clauses B2.3.1 and E2.3.1 of the building code and accordingly confirm the decision of the territorial authority to refuse to issue a code compliance certificate.

8.2 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.

8.3 Finally, I consider that continuing maintenance of the cladding will be required to ensure its continuing building code compliance.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 11 March 2005.

John Gardiner
Determinations Manager