

Determination 2005/25

Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 23

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 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 2-year old alteration and extension to an existing house (“the 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 majority of 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 2.4, and paragraph 8 sets out my decision.

2 PROCEDURE

The building

- 2.1 The building work comprises major alterations and additions to an existing single-storey detached house situated on a level site, which is in a high wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The house is of conventional light timber frame construction, built on new or existing concrete floors. All the new and existing timber framed external walls are sheathed with monolithic cladding, with the exception of some low brick veneered base walls and the large gable ends. The gable ends are lined with plywood panels and vertical H3 Tanalised battens. The existing weatherboards have been removed to accommodate the new cladding. A plastered polystyrene banding has been planted onto the base of the cladding adjoining the sills of the brick veneer walls. The resulting house is of a fairly simple shape, and the corrugated longrun pitched roofs have some valley junctions. A pergola is fixed to part of the north elevation the house and this is supported on timber beams and posts, with the base of the posts surrounded by brickwork plinths. Apart for one small run of roofing with a reduced overhang, there are 600mm wide eaves projections and 450mm wide verge projections. In addition, the roofs are extended to form additional overhangs at three locations and also over the main entry and these extensions are supported in the same way as the pergola.
- 2.2 The owner has confirmed that untreated timber was used to construct the new external wall framing. However, no information has been provided as to the treatment, if any, that was applied to the existing re-clad external framing. .
- 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 7.5mm thick fibre-cement backing sheets fixed through building wrap directly to framing timbers and finished with a proprietary fibreglass mesh reinforced polymer-modified cement plaster system supplied by the manufacturer of the backing sheet system. The system has been subject to an appraisal certificate from an independent testing organisation.
- 2.4 The coatings supplier provided a “Coating Compliance Form” dated 20 September 2002 that related to the coating system applied to the cladding.

Sequence of events

- 2.5 The territorial authority issued a building consent on 21 February 2002, based on a certificate issued by a building certifier.
- 2.6 The building certifier made various inspections during the course of construction, but did not carry out a final inspection. The territorial authority carried out a final inspection on 15 December 2003.
- 2.7 Following this inspection, the territorial authority wrote to the owner on 18 December 2003, identifying the matters requiring attention. The matter relating to the cladding was:
7. In regard to the plaster system [the territorial authority] has adopted the following policy. Notwithstanding that the [Named] cladding system was approved with your Building Application as being directly fixed to the framing, Council has taken advice that such systems shall be referred to the Building Industry Authority to consider whether compliance with the Building Code has been achieved...
- 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 1 September 2004.

3 THE SUBMISSIONS

- 3.1 The territorial authority in a letter to the Authority dated 19 October 2004, stated:

The Council has not been able to inspect any of the cladding on this dwelling extension during the course of construction. All inspections have been undertaken by [the building certifier (or its employee)] at a time when [its] scope of approval as a private building certifier may not have covered such work.

The Council is therefore not in a position to determine with any satisfaction that the cladding has been fixed in such a way that would meet the requirements of the Building code...

- 3.2 The owner in a letter to the Authority dated 10 September 2004, gave the following reasons why a code compliance certificate should be approved:
1. Untreated timber only used on new addition of house where cladding is on top half of walls. Bottom half cladding is brick.
 2. Approved flashings over all aluminium joinery and all joinery fitted to avoid leakage.
 3. Good eaves all round house – extra wide in one area.
 4. Builder extra careful with cladding to avoid any leakage at all.
 5. Has had some extreme weather conditions this winter with strong winds blowing rain against side of house with no sign of leaks anywhere.
 6. No sign of any dampness or mildew anywhere inside house.

3.3 The owner supplied copies of:

- The construction plans and specifications;
- Some of the consent documentation;
- The coating compliance form from the coatings supplier;
- The building certifier's inspections form; and
- The correspondence from the territorial 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 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 furnished a report on the cladding. It noted that the textured coating finish appears to be satisfactory throughout and no visible cracking was noted in the cladding. The expert considered that the face fixed external windows and doors were appropriately flashed or sealed. The expert also made the following comments regarding the cladding:

- No vertical control joints are formed in the cladding at 2 locations as required by the manufacturer's recommendations. However, the walls in question had reduced areas of cladding due to the presence of the glazed units;
- There is insufficient ground clearance to the base of the cladding adjoining the paving to the north elevation walls and the east and west elevations to the lounge; and
- The polystyrene bandings between the base of the cladding and the brick veneer sills lack weep holes that would allow drainage to the exterior of the cladding.

5.2 The expert took non-invasive moisture content readings through the internal linings of the external walls throughout the house, and found no locations with high

readings. Further external penetration moisture readings were also taken at 9 locations and only one higher reading of 20% was obtained. The other readings were between 10.7% and 18.0%. 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 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 generally 600mm wide eaves projections and 450mm wide verge projections. These, together with the additional veranda overhangs, provide good to excellent protection to the cladding;
- Is in a high wind zone;
- Is single storey;
- Has exterior windows and doors that are adequately flashed or sealed;
- Has an overall envelope that is fairly simple in plan;
- Has no decks or balconies; and
- Has external walls that are constructed with timber that is likely to 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, but some elements are not well constructed. These areas are:

- The lack of vertical control joints at 2 locations;
- The insufficient ground clearance to the base of the cladding adjoining the paving to the north elevation walls and the east and west elevations to the lounge; and

- The lack of weep holes to the polystyrene bandings between the base of the cladding and the brick veneer sills.

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, the cladding appears to have been installed according to good trade practice and to the manufacturer's specifications;
- The eaves, verge and veranda projections provide good to excellent protection to the cladding under them;
- The house is single storey;
- The external windows and doors are adequately flashed or sealed; and
- There are no decks or balconies.

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

7 CONCLUSION

7.1 I am satisfied that the current performance of the cladding is not adequate because it is allowing water penetration into the wall framing at one location at present. 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 may allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.3.1 of the building code.

7.3 I consider that, because the faults that have been identified with this cladding occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.8, together with the re-nailing of any loose weatherboards, will consequently result in the building being weathertight and in compliance with clauses B2.3.1 and E2.3.1, notwithstanding the lack of a ventilated cavity

7.4 I note that effective maintenance of monolithic claddings is important to ensure ongoing compliance with clause B2 of the building code. That maintenance is the responsibility of the building owner. The code assumes that the normal maintenance necessary to ensure the durability of the cladding is carried out. For that reason clause B2.3.1 of the building code requires that the cladding be subject to "normal maintenance". That term is not defined and I take the view that it must be given its

ordinary and natural meaning in context. In other words, normal maintenance of the cladding means inspections and activities such as regular cleaning, re-painting, replacing sealants, and so on.

- 7.5 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular cladding system has been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding system will be code compliant in another situation.
- 7.6 I decline to incorporate any waiver or modification of the building code in this determination.

8 THE DECISION

- 8.1 In accordance with section 20 of the Building Act 1991, I hereby determine that the cladding system as installed does not comply with clause E2 of the building code. There are also a number of items to be remedied to ensure that the house remains weathertight and thus meet the durability requirement 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 6.8, together with the re-nailing of any loose weatherboards, 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 4 March 2005.

John Gardiner
Determinations Manager