

Determination 2005/42

Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 36

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 joint-owners (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 1-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 cladding as installed (“the cladding”), which is applied to the external walls, beams and columns of this house complies with the building code (see sections 18 and 20 of the Act). By “external 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 situated on a steep excavated site, which is in a high wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The external walls of conventional light timber frame construction are built on blockwork foundation walls, and are sheathed with monolithic cladding. The house is of a simple shape, and the upper floor oversails the lower floor on 3 elevations. The metal-clad pitched roof has 4 hip and 2 valley junctions, and apart from one short section, has 600mm wide eaves projections. The aluminium external windows and doors are recessed into the cladding reveals.
- 2.2 A timber-framed balcony is constructed outside the main wall line for the majority of the west elevation. This is supported on monolithic-clad timber packed steel columns and beams, and the deck is lined with a paint-on fibreglass tanking system over a plywood substrate, and has an integral gutter formed in it for the length of the balcony. The balcony has a timber-framed balustrade that is entirely monolithic-clad. I note that the metal balustrade capping shown on the consent plans has not been installed.
- 2.3 The timber used to construct the external wall framing is untreated against decay, however the plans indicate that the balcony balustrade timber is H3 treated.
- 2.4 The cladding system is what is described as monolithic cladding. As specified in the manufacturer’s data sheets (“the manufacturer’s instructions”), the cladding to the walls of the house incorporates 40 mm thick expanded polystyrene (EPS) backing sheets fixed through the building wrap directly to the wall framing and finished with a reinforced plaster system and a further acrylic siliconised coating. 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.

- 2.5 The plastering contractor provided a “Construction/Producer Statement” stating that it had completed the work in accordance with the New Zealand Building Code and [the Manufacturer's] Specifications.

Sequence of events

- 2.6 The owner engaged a building certifier to certify the building consent and carry out inspections during the course of construction. The building certifier’s “Scope of Certifier Engagement” specifically excluded “E2 VM1 External Cladding”.
- 2.7 The territorial authority issued a building consent on 4 September 2003, based on a certificate provided by the building certifier, dated 18 August 2003. The consent was issued subject to details of the window sill flashings being provided, and it was noted that all building work could proceed “with the exception of the exterior cladding”. The territorial authority had also listed at the time of the consent the inspections that were to be carried out, 3 of which related to the cladding.
- 2.8 The building certifier carried out inspections during the course of construction, and carried out final inspections on 10, 19, and 20 February 2004.
- 2.9 The building certifier wrote to the territorial authority on 5 April 2004, stating that a pre-plaster had been conducted. The building certifier identified:
- claddings fixed as per details
 - window/door flashings installed and sealed
 - starter strip fixed to base correctly
 - external corner moulding to deck perimeter
 - all penetrations sealed with expandable foam
 - also required stick on bandage membrane to wall/balcony handrail junction. This was actioned by the builder on site

The building certifier went on to say that the territorial authority had then been phoned to request a pre-plaster inspection, and that it was satisfied that the installation was undertaken as per the manufacturer's guidelines.

- 2.10 The building certifier issued a final building certificate dated 6 May 2004 for all work it was approved to inspect. The building certifier noted;

Exclusions: Exterior Cladding outside Scope of E2/VM1.

Comments: This job is handed back to the [territorial authority] for the Inspection of building works and issue of the code compliance certificate pursuant to section 57 (3) of the Building Act 1991.

- 2.11 The territorial authority wrote to the owner on 6 May 2004, stating that the territorial authority had listed the inspections that it was required to carry out, and that as it had not undertaken the requisite inspections, it was unable to issue a code compliance certificate.

2.12 The territorial authority also wrote to the owner on 18 June 2004, referring to its letter of 6 May 2004, and stating that the house fell within a high risk category in terms of E2 as it:

Is two storey

Has some areas of minimal eave width

Contains a Balustrade wall junction

The territorial authority was of the opinion that all penetration flashings had to be exposed and proposed a method for complying with this request. If a full cladding replacement were an option, a new consent would be required, as would a drained ventilated cavity.

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

2.14 The owner applied for a determination on 29 October 2004.

3 THE SUBMISSIONS

3.1 The territorial authority made a submission in the form of a letter to the Authority dated 9 November 2004, which stated that the determination had to be based on whether the cladding complied with the building code. The territorial authority denied that the certifier had requested on site that one of its officers carry out a cladding inspection. The territorial authority had no record that inspections were requested or had been undertaken by the territorial authority.

3.2 The owner, through its legal advisor, wrote to the Authority on 29 October 2004, summarising the events arising from the completion of the house up to the request for a determination.

3.3 The owner supplied copies of:

- The plans and specifications;
- The consent documentation;
- The building certifier's inspection documentation and certificates;
- The correspondence with the territorial authority and the building certifier;
- The plasterer's producer statement;
- A copy of a 3-year home guarantee;
- The cladding system supplier's construction details; and
- A valuation report.

- 3.4 The copies of the submission 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 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 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 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 25 February 2005. The expert removed the plaster coating to reveal the window flashing details at two locations, and noted that other than the head flashings being cut level with the window jamb line, the windows were appropriately flashed and sealed. The expert was of the opinion that, as the jamb and sill flashing junctions were completely sealed and the windows are recessed into the cladding, these junctions would adequately prevent moisture ingress. The expert also made the following comments regarding the cladding:

- The balcony balustrade lacks a capping, and there are no saddle flashings at the balustrade/main wall junctions;
- The balcony lacks an overflow; and
- Some penetrations through the cladding, including the meter box, are inadequately sealed.

5.2 The expert took non-invasive readings at the interior linings of the external walls throughout the house and the highest recorded reading was 14%. The expert also took moisture readings on the exterior of these walls and obtained no "at risk" readings. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

5.3 The expert noted that the lack of a solid blocking to the deck floor framing could lead to movement that might damage the applied membrane. The expert also stated that while at present ground clearances at the base of the cladding are adequate, these needed to be maintained once the paving around the house has been completed. In addition, the manufacturer's recommendations that the foundation walls at these locations be coated with a damp-proof membrane should also be carried out.

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 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.

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, I find that this house:

- Has, apart from one short length, 600mm wide eaves projections, which together with the oversailing upper-floor, provide good cladding protection;
- Is in a high wind zone;
- Is two storeys high;
- Has an envelope that is simple on plan;
- Has one high-level balcony that is not constructed over a habitable space;
- Has external walls, apart possibly from the balcony balustrade, constructed with untreated timber that provides little resistance to decay if it gets wet and cannot dry out.

Weathertightness performance

6.8 I find that, generally, the cladding appears to have been installed according to good trade practice and to the manufacturer's instructions, but some details and penetrations are not well constructed. These areas are:

- The lack of a balcony balustrade capping and saddle flashings at the balcony/main wall junctions;
- The lack of a balcony overflow; and
- The inadequately sealed penetrations through the cladding, such as the meter box.

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:

- The cladding appears to have been installed according to good trade practice;

- The house has an envelope that is simple on plan; and
- There is no moisture entering the external wall cavities at the present 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 accept the expert's opinion that the windows are adequately flashed and sealed. I also recommend that the questions of the balcony deck bridging and the finishes and clearances at the foundation walls be fully investigated to ensure future compliance.

6.12 I note that one elevation of the house demonstrates a low weathertightness risk rating, and the remaining elevations a medium weathertightness risk rating, as calculated using the E2/AS1 risk matrix. The matrix is an assessment tool that is intended to be used at the time of application for consent, 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 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 will consequently 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 is likely to result in the building being weathertight and in compliance with clauses E2 and B2, 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 I emphasise that each determination is conducted on a case-by-case basis. 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 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 31 March 2005.

John Gardiner
Determinations Manager