

Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 17

1 THE DISPUTE TO BE DETERMINED

- 1.1 This is a determination by the Building Industry Authority (“the Authority”) of a dispute referred to it under section 17 of the Building Act 1991 (“the Act”). The applicant is the owner, who has appointed a lawyer to act as agent on their behalf. 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 new house unless changes are made to its monolithic cladding system.
- 1.2 The Authority’s task in this determination is to consider whether it is satisfied on reasonable grounds that the monolithic cladding as installed (“the cladding”) on this house complies with the building code (see sections 18 and 20 of the Act). By “wall cladding as installed” we 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 The house itself is described in paragraphs 2.1 to 2.4, and paragraph 9 sets out the Authority’s final decision.

2 PROCEDURE

The building.

- 2.1 The building is a single-storey detached house on a level site in a high wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The house is of conventional light timber frame construction faced with monolithic cladding constructed over a concrete slab. It is of a moderately simple shape and has no decks or balconies. There are no wall/roof intersections and the eaves projections are 400 mm wide. There is a pergola fixed over the entrance doors to the Sitting and Family Rooms and there is a lowered soffit over the main entrance doors.
- 2.2 The consent drawings show a second garage alongside the main garage. The door to this garage has been replaced by glass double hung French doors.
- 2.3 The framing in external walls is specified as H1 treated timber.
- 2.4 The cladding system is what is described as monolithic cladding. As specified in its manufacturer’s technical detail and installation manual (“the manufacturer’s instructions”), it incorporates expanded polystyrene (EPS) insulation boards fixed through

the building wrap directly to the framing timbers and finished with a thin polymer-modified cement-based plaster reinforced with a woven mesh. The plaster is then finished with either an acrylic or modified acrylic paint or texture. The manufacturer's instructions include details for flashings at various junctions. For the purposes of this determination, the manufacturer of the fibre-cement sheets and the flashing kit is regarded as the manufacturer of the system.

- 2.5 The Authority notes that the EPS monolithic cladding installed is a different EIFS system to that shown on the consent documentation. The territorial authority in its submission to the Authority refers to this issue.

Sequence of events:

- 2.6 The territorial authority issued a building consent on 7 May 2003.
- 2.7 The territorial authority made various inspections in the course of construction and one "Inspection Notice", which was dated 2 September 2003, contained the following:
- Plaster Exterior Cladding
- Plastering with Final. A Producer Statement Certificate Required prior to the issue of a Code of Compliance Certificate (*sic*)
- 2.8 The territorial authority wrote to the owner on 1 December 2003, in which the territorial authority said:
- In view of problems nationally associated with weathertightness issues, and the lack of verification used such as a [Named] appraisal that is satisfactory to the Council, a 'Notice to Rectify' has been issued under the Building Act 1991.
- 2.9 The territorial authority issued a Notice to Rectify on 1 December 2004. The Notice had a "Particulars of Contravention" attached, which stated:
- Contrary to Section 32(1) of the Building Act 1991, building work has been carried out otherwise than in accordance with Building Consent [Number] in that although the plans and specification submitted with the application for that building consent required a [Named] system an alternative plaster system was used.
- 2.10 The owner applied for this Determination on 9 February 2004.

3 THE SUBMISSIONS

- 3.1 The owner provided copies of:
- The building plans and specifications ;
 - The Inspection Notice of 2 September 2003 from the territorial authority;
 - The territorial authority's letter to the owner of 1 December 2003; and
 - The "Technical Detail and Installation Manual" issued by the issued by the cladding manufacturer.
- 3.2 The territorial authority made a submission dated 16 March 2004, in which they described the process undertaken up to the time that a Notice to Rectify was issued. The submission concluded with a Summary, which set out the main issues as follows:
- The reason why the dwelling subject of [Building Consent] has not received a Code Compliance Certificate, is therefore because the consented system approved as an alternative solution, was substituted with another product. An

amendment to date has not formally been requested by the owners, and the Council considers the system needs further verification that it complies with the requirements of the Building Code, prior to issuing an amendment as an Alternative Solution.

It was not possible to further inspect work because the process was continued, after all parties were advised by the Council to cease work until the matter was rectified. This meant confirmation of the substrate, flashings, and other weatherproofing systems after any amendment is issued can't be verified.

The Council requires a higher standard of verification for Alternative Solutions, since Weather Tightness issues which became evident in 2003.

- 3.3 In response to a letter from the Authority, the territorial authority on 26 May 2004 set out its reasons for not approving the substituted cladding. In particular, the territorial authority noted:

The Council has not issued a Code of Compliance (*sic*) for the dwelling, because it considers that insufficient information has been submitted with the application for an amendment to be approved.

The Council considers that at the present time as the alternative solution has not been approved as part of the Building Consent issued, it can not be satisfied on reasonable grounds that the cladding complies with the intent of the Building Code for the issue of a Code Compliance Certificate.

- 3.4 The copies of the submissions and other evidence were provided to each of the parties. Neither the applicant 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 subfloor space, and in-built chimneys and flues) are moderately difficult to access or replace, or
 - (ii) Failure of those building elements to comply with the building code would go undetected during normal use of the building, but would be easily detected during normal maintenance.

Clause E2—EXTERNAL MOISTURE

E2.1 The objective of this provision is to safeguard people from illness or injury, which could result from external moisture entering the building.

E2.2 Buildings shall be constructed to provide adequate resistance to penetration by, and the accumulation of, moisture from the outside.

E2.3.2 Roofs and exterior walls shall prevent the penetration of water that could cause undue dampness, or damage to building elements.

4.2 There are no Acceptable Solutions that have been approved under section 49 of the Act that cover this cladding. The cladding is not accredited under section 59 of the Act. The Authority is 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 about acceptable solutions and alternative solutions:

- Some acceptable solutions cover the worst case, so that in less extreme cases they may be modified and the resulting alternative solution will still comply with the building code.
- Usually, however, 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 and stated that generally the cladding is finished to a good standard but that the installation has not been carried out in accordance with the manufacturer's instructions in the following respects:

- The garage door has a decorative feature over it, which is finished without falls and is lacking a head flashing;
- There is insufficient ground clearance to the cladding in some areas and the cladding is buried into the paving at the front entry;
- Some external joinery reveals have cracked on the front edge/corner junction with the plaster;
- The external joinery head flashings are either cut short or imbedded into the plaster finish without the correct silicone sealants;
- Based on a random test undertaken by the expert on one window, the following conclusions could be reached about the flashings of windows and doors;
 - a) All windows and doors have head, jamb and sill flashings installed;
 - b) A number of sill flashing have been cut short at the junction with the jamb flashing and have not been installed with end caps; and
 - c) The jamb flashing also terminates short of the sill flashing;
- The pergola fixing brackets are incorrectly sealed where they penetrate the cladding;
- A number of fixings through the cladding, such as those at the gas bottle cover and seismic restraints, are not sealed correctly; and

- There are general small areas of damage to the plaster surface system that require repair and re-sealing.
- 5.2 The expert took a series of readings throughout the building, using a non-invasive type moisture meter. These readings showed higher moisture contents at 2 points only. Subsequently, the expert used an-invasive type moisture meter applied through the exterior cladding at these 2 areas and recorded readings of 11.7% and 14% respectively. While a moisture reading of less than 18% does not of itself indicate that the cladding is code compliant, it is indicative of the efficiency of the cladding in preventing moisture ingress to date.
- 5.3 Copies of the expert's report were provided to each of the parties. The territorial authority responded to the report in a letter that reiterated some of their reasons for refusing to issue a code compliance certificate. In regard to the report, the territorial authority stated:

It appears from the 'Report' that the assumption has been made that the cladding system has been accepted by the Council as an 'Alternative Solution' when that is not the case.

The issues raised in the 'Report' indicate non-compliance in the areas tested. Council therefore recognises that there is doubt that other areas within the system as a whole have been applied in accordance with the Building Code.

The owner acknowledged receipt of the report but did not raise any specific issues as to its content.

6 THE AUTHORITY'S VIEW

General

- 6.1 The Authority has considered the submissions of the parties, the expert's report and the other evidence in this matter. The Authority's 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 Recent New Zealand data and experience 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 a fundamental requirement to ensure good weathertightness performance.
- 6.4 The next priority is to reduce the ability of moisture to get through the cladding by utilising design measures that minimise the effects of the rain impacting on the walls:
- 6.5 The main areas for consideration are:
- Data shows 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 incidents;

- While most reported leaks are substantially caused by defects in the cladding that require little or no wind pressure differential, the Authority believes that homes 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 to directly penetrate into the wall; and
- Recent data also shows that decks and balconies that are exposed in plan and/or cantilevered out 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 addressed by a combination of effective drainage, ventilation of the drainage cavity and moisture tolerance in the external wall framing timber. These factors being:

- The structure should allow water that has penetrated the cladding to drain out as quickly as possible. The Authority believes 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, the Authority believes 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 Authority finds that this house:

- Has 400 mm wide eaves projections that afford moderate protection to the cladding;
- Is in a high wind zone;
- Is of single storey construction;
- Has no wall/roof intersections;
- Has an overall envelope that is moderately simple in plan;
- Has no decks or balconies;
- Has a pergola to one elevation;
- Has cladding that is face fixed with no drainage cavity; and
- Has external walls constructed from HI treated timber, which is not effective in delaying the onset of decay.

Weathertightness performance

6.8 Generally, the cladding appears to have been installed according to good trade practice and to manufacturer's instructions. It can, therefore, be considered to be reasonably effective in

preventing the penetration of water. There are, however, defects that are likely with time to allow the ingress of moisture behind the cladding.

- 6.9 Notwithstanding the fact that the backing sheets are fixed directly to the timber framing, thus inhibiting ventilation behind the cladding sheets, the Authority finds that there are compensating provisions that assist the performance of the cladding. These are:
- Apart from some flashing details, the cladding generally appears to have been installed according to good trade practice and to manufacturer's specifications;
 - The building does not display to any significant extent any of the weathertightness risk factors; and
 - The moisture level readings do not indicate any undue moisture ingress behind the cladding at this time.
- 6.10 The Authority considers that the design of this house presents a low risk of weathertightness failure. The simple building envelope and roof design, and the presence of eaves are such that face fixed cladding can meet the requirements of clauses B2 and E2 without requiring a cavity.
- 6.11 The Authority is concerned that the cladding was changed without any reference to the territorial authority or change to the original consent. Even if a territorial authority's officers note a subsequent change during the inspection process, it is important that the territorial authority approves the change and the consequent impact on flashings, jointing, sealants and other details. Building owners have a responsibility to inform territorial authorities when they intend to make changes to materials or systems that have been already been consented to. Subject to the approval of the territorial authority, the original consent can then be amended to accommodate any such change, prior to any construction work being carried out.

7 CONCLUSION

- 7.1 The Authority accepts that the expert's report establishes that the cladding complies in most respects with the manufacturer's instructions. As there is no evidence of external moisture entering the building, the Authority finds that the cladding on this particular building complies with clause E2.
- 7.2 While the building does not show any signs of water ingress at the present time, this building will also have to comply with the durability requirements of clause B2. B2 requires that a building continue to satisfy all the objectives of the code throughout its effective life, and that includes the requirement for the building to remain weathertight. Because the cladding faults in this building are likely to allow the ingress of moisture in the future, the building does not achieve the durability requirements of clause B2.
- 7.3 By invasive inspection of the cladding around one window, the expert was able to determine that the jamb flashings did not extend down to the sill flashing and that the sill flashing did not have a stop end. The expert was not able to determine whether the drainage tray specified by the manufacturer was in place within the window sill. This house exhibits few weathertightness risk factors and the flashings have generally been installed to good trade practice. The Authority finds that if the existing sill flashings can be modified by the addition of an appropriate stop end detail, the flashing system will be code compliant, even though the presence of the drainage tray has not been confirmed. The Authority also finds that external head and jamb flashings are acceptable, even though they are deficient in some respects, because the house presents a low weathertightness risk

- 7.4 The Authority also finds that when the other cladding faults have been satisfactorily rectified this house should be able to remain weathertight and will thus comply with clause B2. It is essential that all the required items of rectification set out below, and which are detailed more specifically in the expert's report, be competently carried out to ensure such compliance.
- The insufficient ground clearance to the cladding is to be rectified, and even though the cladding at the front entry is sheltered by the canopy, the cladding should be terminated to an appropriate height above the paving;
 - The cracked window reveals on the front edge/corner junction with the plaster should be repaired and made watertight, in conjunction with the remedial work to the sill flashings;
 - The exterior joinery sill flashings require an appropriate stop end detail;
 - The pergola fixing brackets are to be correctly sealed when they pass through the cladding;
 - The fixings through the cladding, such as those at the gas bottle cover and seismic restraints are to be sealed correctly; and
 - The general small areas of damage to the plaster surface system are to be repaired and resealed.
- 7.5 Clause B2.3.1 of the building code requires the cladding be subject to “normal maintenance”. That term is not defined, so that the Authority takes the view that it must be given its ordinary and natural meaning in context. In other words, normal maintenance of the cladding means such inspections and activities such as regular cleaning, re-painting, replacing sealants, and so on.
- 7.6 The Authority emphasises 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.
- 7.7 The Authority declines to incorporate any waiver or modification of the building code in its determination.

8 WHAT IS TO BE DONE?

- 8.1 It is not for the Authority to decide directly how the defects listed in 7.3 and 7.4 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 Authority for another determination.

9 THE AUTHORITY'S DECISION

- 9.1 In accordance with section 20 of the Building Act, the Authority determines 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, the Authority finds that the house does not comply with clause B2. Accordingly, it confirms the territorial authority's decision to refuse to issue the code compliance certificate.
- 9.2 The Authority finds that because of the compensating factors in this case, the lack of a drained cavity behind the cladding is not, on its own, sufficient grounds to withhold a code compliance certificate.
- 9.3 The Authority, therefore, finds that once the items of non-compliance that are listed in paragraph 7.3 and 7.4 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.
- 9.4 The Authority considers that the cladding will require on-going maintenance to ensure its continuing code compliance, and that this maintenance programme should be undertaken after consultation with the territorial authority.

Signed for and on behalf of the **Building Industry Authority** on 11 June 2004

A handwritten signature in black ink, appearing to read 'John Ryan', with a large, stylized flourish at the end.

John Ryan
Chief Executive