

Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 9

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. 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 external cladding as installed (“the cladding”) on this house complies with the building code (see sections 18 and 20 of the Act). By “external wall cladding as installed” we mean the components of the system (such as the backing sheets, the flashings, the joints, the plaster and/or the coatings) as well as the way the components have been installed and work together.
- 1.3 The house itself described in paragraph 5.2 to 5.5 and paragraph 8 sets out the Authority’s final decision.

2 PROCEDURE

Sequence of events:

- 2.1 The territorial authority issued a building consent on 15 January 2002.
- 2.2 The territorial authority made various inspections in the course of construction, and a final inspection of the building works was carried out by the territorial authority on 14 October 2003.
- 2.3 In a response to a request for a code compliance certificate, the territorial authority informed the owner in a letter dated 22 April 2003 that;

The coating systems used in conjunction with the [named] cladding shall be applied by licensed applicants nominated by the coating manufacturer. Please provide a producer statement from the licensed applicant in this instance and the name of the coating manufacturer.
- 2.4 On 15 October 2003, the territorial authority sent a letter to the applicant relating to external cladding. In this letter, it was stated that

...we are not about to issue a Building Code Compliance Certificate when matters concerning the adequacy of the cladding are unresolved.
- 2.5 In a letter to the Authority, dated 22 December 2003, the territorial authority stated in relation to the building in question:

[D]oubt has arisen to the extent that monolithic claddings that do not have an appropriate drainage cavity may not meet the requirements of Clauses B2 and E2 of the NZ Building Code. Because of this, the Council is reluctant to issue a building code compliance certificate.

2.6 The territorial authority did not issue a Notice to Rectify as required by section 43(6).

2.7 The owner applied for this determination on 18 December 2003.

3 THE SUBMISSIONS

3.1 The owner provided:

- Copies of the manufacturer's instructions;
- The building consent documentation;
- The territorial authority inspection reports;
- Correspondence from the territorial authority, which, in general, related to its refusal to issue a code compliance certificate; and
- A statement from the plasterer that describes the stopping and plastering procedures that he carried out and a letter from the product supplier in relation to this.

3.2 The owner also summarised the sequence of events leading up to the refusal of the territorial authority to issue a code compliance certificate.

3.3 The territorial authority was invited by the Authority to make a submission on the issues but declined to do so.

3.4 The Authority commissioned an independent expert to inspect and report on the cladding.

3.5 The copies of the submissions, expert's report and other evidence were provided to each of the parties. The territorial authority commented on the expert's report and made the following comments:

- The owner had advised the territorial authority that they intended to remedy the identified problems and would inform the Authority when that work had been completed;
- It might be necessary to remove the a sheet of cladding where the high moisture content had been found; and
- Certain deficiencies indicated issues relating to workmanship qualities, especially as no inspection checks had been undertaken at critical points.

3.6 The owner informed the Authority that they had undertaken remedial work to correct the identified problems and subsequently forwarded to the Authority photographs of the areas that had been modified.

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

OBJECTIVE

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

FUNCTIONAL REQUIREMENT

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

PERFORMANCE

...

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 AUTHORITY'S VIEW

- 5.1 The Authority has considered the submissions of the parties, the expert's report and the other evidence in this matter. The Authority's approach to determining whether building work complies with clause 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.

The building

- 5.2 The building is a single storey detached house on a level site. It is of conventional light timber frame construction and is of a relatively simple shape, with eaves overhangs generally 600 mm wide and one roof/wall junction. It is in a medium wind zone in terms of NZS 3604: 1999 "Timber framed buildings".
- 5.3 The framing in external walls is kiln-dried untreated timber.
- 5.4 The cladding system is known as a monolithic cladding system. As specified in its manufacturer's July 1998 technical information manual ("the manufacturer's instructions"), it incorporates fibre-cement backing sheets fixed through the building wrap directly to the framing timbers and finished with a choice of fourteen joint and coating systems. The manufacturer's instructions include details for flashings at various junctions (but not all of the junctions actually present in the house). 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, despite the fact that each of the joint and coating systems is itself proprietary to one of fourteen other manufacturers. The manufacturer's instructions identify the joint and coating systems by reference to those other manufacturers and their system brands but give no other information about them. The joint and coating system used on this house is one of those systems mentioned in the manufacturer's instructions.
- 5.5 The manufacturer has not issued a materials guarantee.

The expert's report

- 5.6 The expert stated that the house is generally weatherproof and that the quality of finish is good. The surface coating coverage was also good with no evidence of pin-holing or areas of inadequate cover. The expert's report made the following specific comments on the as built cladding details:
- Vertical control joints have not been provided;
 - The cladding generally terminates above the finished ground level, but in places it is too close to the ground;
 - One overflashing was not correctly finished at its lower end;
 - One head flashing had not been sealed, and there was no indication that jamb and sill flashings had been installed; and
 - The front entry unit and some penetrations were not correctly sealed.
- 5.7 The expert also used a non-invasive moisture meter applied to the external face of external walls to detect areas of moisture ingress. His figures indicated that generally moisture levels were between 8.4% and 11%. However, there was one reading of 67% in the area under the overflashing, which the expert attributed to the inadequacy of the flashing to

deflect water away from the wall interior. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure and that there is a consequent risk of decay in the structural timbers. 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.

Weathertightness risk

- 5.8 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.
- 5.9 The installation of exterior cladding to manufacturer's specifications and to accepted good trade practice is a fundamental requirement to ensure good weathertightness performance.
- 5.10 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.
- 5.11 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 a 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.
- 5.12 The inevitable 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%.

5.13 In relation to these characteristics, the Authority finds that this house:

- Has eaves that are generally 600 mm wide and that are considered to be effective in shielding the cladding;
- Is in a medium wind zone;
- Is constructed to one level;
- Has only one wall/roof intersection and has an overall envelope that is relatively simple in shape;
- Has windows with head flashings;
- Has no decks or balconies;
- Has face-fixed cladding with no drainage cavity, and
- Has external walls constructed from non-treated timber, which will not delay the onset of decay.

Weathertightness performance

- 5.14 Generally the cladding appears to have been installed according to good trade practice and to manufacturer's instructions. It can be considered to be reasonably effective in preventing the penetration of water. There are some minor defects, including lack of control joints, the base terminations and some concern regarding flashings and services penetrations. These need to be addressed to ensure ongoing weathertightness.
- 5.15 The manufacturer of the backing board is a well-known and well-established building products company, as is the jointing and finishing material supplier. The latter will back its product with a materials guarantee to the homeowner. However, such a guarantee was not forthcoming in this instance. The jointing and finishing applicator was not a licensed contractor.
- 5.16 Notwithstanding the fact that the backing sheets are fixed directly to the timber framing, and thus inhibiting ventilation behind the cladding, the Authority finds that there are compensating provisions that assist the performance of the cladding. These are:
- Apart from some minor details, the cladding appears to have been carefully installed according to good trade practice and to manufacturer's specifications;
 - The building does not display any of the weathertightness risk factors; and
 - With one exception, the moisture level readings do not indicate any undue moisture ingress behind the cladding at this time.
- 5.17 The Authority considers that these compensatory provisions adequately compensate for the lack of a drainage cavity and can allow the house to comply with the weathertightness and durability provisions of the building code, notwithstanding the use of untreated exterior framing timbers.

6 CONCLUSION

6.1 The Authority accepts that the expert's report establishes that the cladding complies in most respects with the manufacturer's instructions. The Authority is also satisfied that once the following items of non-compliance are rectified, the cladding will be code compliant in terms of E2. In particular these items include:

- Vertical control joints;
- The cladding base terminations;
- One overflashing; and
- Sealing of the front entry unit and penetrations.

In addition, the Authority notes that the expert has been unable to determine whether sealant or compressible foam has been provided behind the joinery flanges. Accordingly, these important areas must be verified to ensure their continuing effectiveness.

6.2 The Authority also finds that this building will comply with the durability requirements of B2 when the cladding faults have been satisfactorily rectified. As the exterior framing is constructed in kiln-dried untreated timber, it is essential that all items of rectification are competently carried out to ensure such compliance. In addition, clause B2.3.1 of the building code requires "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.

6.3 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.

6.4 The Authority declines to incorporate any waiver or modification of the building code in its determination.

7 WHAT IS TO BE DONE?

7.1 It is not for the Authority to decide how the cladding is to be 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.

8 THE AUTHORITY'S DECISION

- 8.1 In accordance with section 20 of the Building Act, the Authority determines that the cladding, which is not installed to all the manufacturers instructions and may be unable to adequately prevent the ingress of moisture, does not comply with the building code. Accordingly, it confirms the territorial authority's decision to refuse to issue the code compliance certificate.
- 8.2 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.
- 8.3 The Authority, therefore, finds that once the items of non-compliance that are listed in paragraph 6.1 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.
- 8.4 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 18 May 2004

John Ryan
Chief Executive