

Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 5

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 a 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 paragraphs 5.1 to 5.3 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 the acceptance of a building certificate issued by a building certifier, on 28 July 2003. The consent was subject to one page of “Conditions of Building Consent”, and item 4 on this page stated:

Plaster system to be installed in strict accordance with manufacturer’s instructions.
- 2.2 The building certifier made various inspections in the course of construction, including the inspection and approval of the cladding on 22 October 2003. The building certifier issued an interim code compliance certificate on 23 December 2003, which excluded the cladding. This occurred, because the limitation on its authorisation prevented it from inspecting or approving the cladding in question. The territorial authority declined to issue a final code compliance certificate as it believes it could not be satisfied, on reasonable grounds, that the cladding would achieve the functional requirements of clause E2.2 of the building code or the performance requirements of clause E2.3.2.
- 2.3 On 21 January 2004, the territorial authority issued “Notice to Rectify Building Work No 21/01”, which had attached a “Particulars of Contravention”, which stated

Monolithic cladding systems without a 20 mm cavity, provision for adequate ventilation, drainage, and vapour dissipation will, in the event of leakage and/or

the effect of residual moisture, cause irrecoverable damage to the structural elements of the building

As you have used a cavity system that has not had the required inspections:-

You are required to:

- Provide adequate ventilation to the monolithic cladding and into the wall frame space by means of either a ventilated cavity or alternative approved system; or
- Remove the monolithic cladding and replace with an approved cladding system and;
- Lodge with Council an application for an amended building consent and provide all necessary information that may be requested to allow this consent application to proceed.”

The Authority notes the reference to a “cavity” in the “Particulars of Convention”. It takes this to be a reference to the brick cavity construction to the lower storey of the house.

2.4 The territorial authority made no other comment on the cladding as built details in its Notice to Rectify

2.5 The owner, who is also the builder, applied for this determination on 16 December 2003.

3 THE SUBMISSIONS

3.1 The owner provided:

- Copies of the manufacturer’s instructions;
- The building consent documentation;
- The building certifier inspection reports; and
- The 21 January 2004 “Notice to Rectify Building Work”.

3.2 The owner in a covering letter:

- Described some of the construction features of the building;
- Described the warranty and applicator of the cladding;
- Stated that as builders they had been established for 100 years;
- Confirmed that a Master Builders’ Guarantee came with the property; and
- Stated that 74 other homes built by them in the same street had all been granted code compliance certificates.

3.3 In addition, the owner also submitted:

- A producer statement for the installation of the entire cladding, and
- Warranties for the cladding and for the jointing and coating system.

3.4 The territorial authority made a submission on the issues in which it stated that

In the absence of any inspections by Council, and in the absence of a cavity as a first line of defence...the Council does not believe that it is able to be satisfied, on reasonable grounds, that the cladding applied to this dwelling will achieve the functional requirements of Clause E2.2, or the performance requirements of Clause E2.3.2, of the building code.

- 3.5 The Authority commissioned an independent expert to inspect and report on the cladding.
- 3.6 The copies of the submissions, the expert's report and other evidence were provided to each of the parties. The applicant responded and stated in a letter that they had undertaken remedial work. The territorial authority did not respond to the report and neither party commented on the other's submission.

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 on the grounds that it was not satisfied that the cladding complied with clauses 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 clauses 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 detached two-storey house on a level site. It is of conventional light timber frame construction and is of a simple shape, incorporating some wall-roof intersections. The cladding in question is to the top storey only and the ground floor is faced with a brick veneer. There are no balconies and the eaves overhangs are generally 300 mm wide. The building is in a low wind zone in terms of NZS 3604: 1999 "Timber framed buildings".
- 5.3 H3 LOSP treated framing timbers were used in the external walls.
- 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 fifteen 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 fifteen 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. Both the jointing and textured coating systems used on this house are among those that are mentioned in the manufacturer's instructions.

The expert's report

- 5.5 The expert stated that the house is generally weatherproof and that the quality of finish is good. The surface coating coverage is 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:
- It was not possible to verify whether compressible foam or sealant had been provided to the window flanges before the window units were fixed to the cladding
 - Fascias stop ends had been fitted prior to jointing and texture coating, which could result in moisture penetration;
 - Two apron flashings as installed were likely to allow water ingress into the building;
 - One end of the spouting had been left too long and the means to accommodate this had compromised the cladding at this juncture; and
 - Some downpipe saddle fixings and penetrations were not correctly sealed.
- 5.6 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 9.9%. 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

- 5.7 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.
- 5.8 The installation of exterior cladding to manufacturers specifications and to accepted good trade practice is a fundamental requirement to ensure good weathertightness performance.
- 5.9 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:
- 5.10 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.
- 5.11 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%.

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

- Has eaves soffits that are generally 300 mm wide, and that are considered to be of minimum effectiveness in shielding the cladding. However, as pointed out by the expert, the spouting attached to the fascia effectively extends the eaves width by an additional 125 mm, making it more effective;
- Is in a low wind zone;
- Is constructed to two levels, with the cladding in question to the top storey only and the lower storey faced with low-risk brick veneer;
- Incorporates some wall/roof intersections but has an overall envelope that is relatively simple in shape;
- Has windows installed with head flashings only and with jamb and sill edges effectively sealed against aluminium joinery flanges;
- Has no decks or balconies;
- Has face-fixed cladding with no drainage cavity; and
- Has external walls constructed from H3 LOSP treated timber, a treatment level considered effective in delaying the onset of decay.

Weathertightness performance

5.13 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, related to flashings, spouting, fascias and services penetrations. These need to be addressed to ensure ongoing weathertightness.

- 5.14 The manufacturer of the backing board is a well-known and well-established building products company, as is the jointing and coating supplier. A joint warranty was produced in the names of the backing board manufacturer and the jointing and coating supplier. The entire cladding system was installed by one organisation, who provided a producer statement covering their workmanship
- 5.15 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, with the exception of the fairly extensive but non-complex wall/roof intersections, does not display to any significant extent any of the weathertightness risk factors;
 - The cladding in all areas overhangs the lower brickwork; and
 - The moisture level readings do not indicate any undue moisture ingress behind the cladding at this time.
 - Has external walls constructed from H3 LOSP treated timber, a treatment level considered effective in delaying the onset of decay.
- 5.16 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.

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. As at the time of the consideration of this determination there is no evidence of external moisture entering the building, the Authority has decided that the cladding on this particular building complies with clause E2
- 6.2 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. The Authority finds that when the cladding faults have been satisfactorily rectified this house will comply with clause B2 requirements. It is essential that all the following items of rectification be competently carried out to ensure such compliance, even though the exterior framing is constructed in H3 LOSP treated timber with its inherent resistance to decay. 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. In particular, the rectification includes:
- Remedial work to repair and seal faults identified with apron flashings and spouting installation; and
 - The sealing of downpipe saddle fixings 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

- 6.3 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 complies with clause E2, but does not comply with clause B2 of 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 6.2 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 16 April 2004

John Ryan
Chief Executive