

Refusal of a code compliance certificate for a building with a “monolithic” cladding system: House 30

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 territorial authority and the other party comprises the owners of the buildings (described throughout this Determination as “the owner”). The application arises from the refusal by the territorial authority to issue a code compliance certificate for two new houses built on adjacent lots, unless changes are made to its monolithic cladding system. These have been designated as Unit 1 and Unit 2 for the purposes of this Determination.
- 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 these Units complies with the building code (see sections 18 and 20 of the Act). By “monolithic 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 Units themselves are described in paragraphs 2.1 to 2.6, and paragraph 9 sets out the Authority’s final decision.

2 PROCEDURE

The building.

- 2.1 Each of the Units is a single-storey detached house, situated on a level site, which is in a medium wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. They are of conventional light timber frame construction over a concrete slab and have relatively simple shapes. They have only one wall/roof intersection. The eaves projections are 600 mm wide and the gable projections are 620 mm wide.
- 2.2 Both Units were built on adjacent lots under one building consent.
- 2.3 The Authority was not provided with any verification that the timber to the exterior wall framing was treated, and concluded that it is not treated.
- 2.4 The external walls of the buildings are clad with what is described as monolithic cladding. As specified in its manufacturer’s technical information manual (“the manufacturer’s instructions”), it incorporates 7.5 mm thick fibre-cement backing sheets fixed through the building wrap directly to the framing timbers and finished with a choice of 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 Units). 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 the joint and coating systems are proprietary to other manufacturers. The manufacturer's instructions state that only appraised or recommended jointing and coating systems are to be used but give no other information about them.

- 2.5 The Authority notes that the cladding installed on the Units differs from the system shown on the consent documentation. This was noted by a territorial authority official on a "Field Inspection Record" after an inspection on 2 September 2002, and has not been noted as being an area of concern by the territorial authority.
- 2.6 The coating applicator issued a producer statement on 24 February 2003, covering the supply and application of the paint and textured products used on the Units.

Sequence of events:

- 2.6 The territorial authority issued a building consent on 9 May 2002, which covered both Units. The consent drawings required that external cladding comply fully with manufacturers specifications and recommendations.
- 2.7 The territorial authority made various inspections in the course of construction and passed the building work at the preline inspection. A series of "Final" inspections were carried out on 19 February 2003, 7 March 2003, and 10 March 2003, with the "Field Inspection Record" in relation to the latter inspection recording "all completed".
- 2.8 On 19 February 2003, the territorial authority issued an Interim Notice to Rectify. Among the items listed requiring rectification and completion, was a request for a "Producer Statement re plaster cladding application"
- 2.9 On 11 March 2003, the territorial authority wrote to the owner stating that the final inspection of the building work in relation to the two Units had been made and that before the code compliance certificate could be issued, an additional fee was to be paid. This was due to the fact that 5 extra inspections had been made at either the owner's or the builder's request.
- 2.10 On 27 January 2004, the territorial authority carried out a further "Final" inspection on both Units, and following this, wrote to the owner on 29 January 2004. This letter set out comments that were specific to each unit. These were:

Unit 1

1. Repair impact damage to column base at front entry.
2. Correct peaking on sheet joints beneath joinery on north and west walls.
3. Correct cracked joint beneath bedroom window.
4. Eliminate cracking to WC discharge pipe and seal with a flexible sealant.

Unit 2

5. Repair peaking and cracking to sheet joints beneath joinery on North and West walls
6. Repair impact damage to bottom of wall North East corner.

7. Eliminate cracks around W.C. discharge pipe and seal with a flexible sealant.
8. Provide a flexible seal around the water main point of entry wall penetration.

The general issues relating to both units were listed as:

9. It appears that all down pipe brackets fixings are penetrating the texture coating with out a sealant to the penetrations.
10. There is no apparent provision for sill drainage or sill trays beneath the joinery.
11. In regard to monolithic cladding applied to your dwelling, and notwithstanding approval in your consented plans and specifications, recent information has indicated that monolithic claddings that do not have appropriate drainage, adequate ground clearance, reinforcing, control joints, and external joinery weather flashings will, in the event of leakage and/or residual moisture, cause irrecoverable damage to the structural elements of the building. Doubt has arisen to the extent that monolithic claddings that do not have these features may not meet the requirements of Clauses B2 and E2 of the NZ Building Code. As the monolithic cladding system fixed to your building has been individually assessed as being such a cladding, Council needs to be assured that it meets the requirements of the NZ Building Code before a final code compliance certificate can be issued...

2.11 The owner wrote to the territorial authority on 29 January 2004, stating that the sale of Unit 2 was being processed, and that the owner believed that a code compliance certificate had been received back in March 2003.

2.12 The territorial authority issued a receipt for the additional inspections fee on 2 February 2004.

2.13 The owner wrote to the territorial authority on 9 February 2004, giving a review of certain events that had transpired from March 2003. The facts relevant to this Determination contained in that letter can be summarised as:

- A cheque for the cost of additional inspections as requested by the territorial authority on 11 March 2003 was paid during March 2003;
- A check by the owner's accountant discovered that this cheque had not been presented; and
- After the refusal of the territorial authority to issue the code compliance, certificate in January 2003, a building inspector from the territorial authority and the builder noted the problem areas and it was arranged for these to be rectified.

2.14 On 11 February 2004, the territorial authority wrote to the owner and in this letter stated:

On the basis of the facts relating to the monolithic cladding fixed to the units as we know them today, Council's corporate solicitor has agreed with and confirmed our earlier opinion that it would not be wise to issue the final building code compliance certificate, and that the matter should be referred to the Building Industry Authority for a determination under section 17 of the Building Act.

2.15 On 26 February 2004, the owner wrote to the territorial authority saying:

We have now completed all of the required repairs to the properties as identified by the building inspector [Named person]. [Owner] has rung [Named person]

regarding a further inspection, and we are now waiting to receive the Code of Compliance.

- 2.16 The territorial authority did not issue a Final Notice to Rectify as required under section 42 of the Act. However, the Authority accepts that the letter of 19 December 2003 to the owner, functions as an equivalent notification.
- 2.17 The territorial authority applied for this determination on 16 March 2004.

3 THE SUBMISSIONS

- 3.1 The owner in a covering letter dated 24 May 2004, set out an explanation of events leading up to the request for this Determination. In particular, the owner noted that:

The cladding specialists [Named company] who originally installed the cladding came out to fix all 8 matters listed by the Final Inspection sheet. Also installed another expanding joint. [Territorial authority] building inspector [Named person] visits to check that the problems had been fixed. [Named person] agrees verbally to [owner] that the problem had been fixed but will not put it in writing or sign the inspection off.

The owner also provided copies of:

- The sale and purchase agreement; and
- The correspondence between the owner and the territorial authority that is described in Section 2.

- 3.2 The territorial authority attached a “Matter of Doubt” document with its submission. This set out some of the history of the dispute, and then went on to say:

The owners arranged for repairs to be done to the cladding, but failed to have those repairs inspected as the work progressed.

As a result of a [Named] adjudication the [territorial authority] has doubts as to the complying nature of the monolithic cladding that has been fixed to the two dwelling units – in particular, compliance with Building Clause E2 – External Moisture to the extent that it believes it should not now issue the final code compliance certificate unless it is satisfied on reasonable grounds that it should do so.

The owners however, believe the monolithic cladding does comply, and that the [territorial authority] has a duty to issue the code compliance certificate forthwith.

The territorial authority also provided copies of:

- The plans and specifications;
- The building consent documentation, and the territorial authority’s inspection records and check lists;
- The Interim Notice to Rectify;
- The certificate of title and a sale and purchase agreement;
- The cladding manufacturer's instructions;
- Invoices from a timber and hardware supplier;
- The producer statement referred to in paragraph 2.5; and

- The correspondence between the owner and the territorial authority that is described in Section 2.
- 3.3 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 B.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 both Units and furnished a report, which stated that both the jointing and the finish appear to be of a good quality. The expert also noted the following specific faults during the inspection:

- Vertical relief joints are at a maximum of 6000 mm spacing, and while the manufacturer's instructions require them at a maximum of 5400 mm, the exceeding of this limit does not appear to be detrimental, as there is no cracking to the cladding;
- The minimum ground clearances were not met at all locations;
- There was no sealing to the bottom overlap detail of the cladding;
- The overlap gap requirement was not met at all locations;
- The bottom edge and the back of the backing sheet was not coated to prevent the wicking of moisture;
- There are no jamb flashings or sill tray flashings to the exterior joinery, which the manufacturer advises will give long-term protection to the cladding; and
- There is no confirmation that there are jamb seals between the exterior joinery flanges and the cladding.

5.2 The expert used a non-invasive type moisture meter applied through the exterior cladding to detect areas of moisture ingress. The moisture readings in these areas were not elevated. The expert undertook further invasive testing at various locations on the more weather-exposed faces of both Units. The four readings for Unit 1 were 12.8%, 15.2%, 15.6% and 16.6% respectively. The four readings for Unit 2 were 13.6%, 14.4%, 15.7% and 23.3% respectively. The latter reading occurred at a garage jamb at ground level. 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. Neither the territorial authority nor the owner made any comment on the report

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 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 that:
- 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 incidence;
 - 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 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. 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 these Units:

- Have eaves projections 600 mm wide and gable projections 620 mm wide, which are effective in shielding the cladding;
- Are in a medium wind zone;
- Are constructed to one level;
- Have one wall/roof intersection;
- Have an overall envelope that is simple on plan;
- Have head flashings, but no jamb or sill flashings to the exterior joinery units;
- Have no decks or balconies;
- Have no drainage cavity where the cladding is face fixed; and
- Have external walls that are constructed in timber that is not treated and thus provides no resistance to the onset of decay.

Weathertightness performance

6.8 Apart from the defects, which are set out in paragraph 5.1, and that are likely with time to allow the ingress of moisture behind the cladding, 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.

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 the faults identified by the expert, 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
- Apart from one location where moisture levels can be attributed to inadequate ground clearance, 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 these Units presents a low risk of weathertightness failure. The simple building envelope and roof design and the presence of eaves and head flashings to the exterior joinery units provide confidence that the face fixed cladding can meet the requirements of clauses B2 and E2 without requiring a cavity.

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. There is no evidence of external moisture entering Unit 1. Accordingly, the Authority finds that the cladding on this Unit complies with clause E2. However, there is evidence that moisture is entering Unit 2. The Authority finds that the cladding on this Unit does not comply with clause E2.
- 7.2 The Authority also finds that when the cladding faults are rectified in Unit 2 it should be able to remain weathertight and will thus comply with clause E2.
- 7.3 The cladding on both units must comply with clause B2 on durability. 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 on both units are likely to allow the ingress of moisture in the future, neither unit achieves the durability requirements of clause B2.
- 7.4 The Authority also finds that when the cladding faults have been satisfactorily rectified both Units should be able to remain weathertight and will thus comply with clauses E2 and B2. It is essential that all the required items of rectification, which are detailed specifically in paras 5.1 and qualified in paras 7.5 and 7.6, be competently carried out to ensure such compliance.
- 7.5 The Authority notes that the expert has advised that the vertical joints are set out at 6000 centres. The manufacturer's instructions require vertical relief joints at 5400 centres and vertical control (or construction) joints constructed over double studs at 10800 centres. The expert was not able to determine which types of joint had been installed. The Authority also notes the presence of an almost full height door in the longest wall which will allow some movement and thus result in an effective maximum panel size of less than 10800. As there is no evidence of cracking in the cladding, the Authority accepts, in this instance, that the joint layout does not cause the cladding to be non compliant with the code.
- 7.6 In addition, the expert has noted that there are no jamb or sill flashings installed to the exterior joinery units and could not confirm the presence of jamb or sill sealants. The Authority believes that flashings to window jambs and sills is the preferable long term solution. However it also accepts that sealants or sealant strips, correctly installed under joinery flanges of sufficient width and thus protected from UV attack, can provide adequate weathertightness. Accordingly, it finds that the presence of jamb and sill sealants should be thoroughly investigated, and if they are absent, the appropriate rectification should be carried out to ensure weathertightness integrity between the joinery units and the cladding.
- 7.7 The Authority notes the importance of the owner's responsibility for ongoing maintenance to the cladding. The code assumes that normal maintenance necessary to ensure the durability of the cladding, is carried out and thus clause B2.3.1 of the building code requires that 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 inspections and activities such as regular cleaning, re-painting, replacing sealants, and so on.

- 7.8 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.
- 7.9 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 dictate how the defects listed in paragraph 5.1 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:
- In the case of Unit 1, it 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 Units do not comply with clause B2. Accordingly, it confirms the territorial authority's decision to refuse to issue the code compliance certificate.
 - In the case of Unit 2, it does not comply with clause E2. Accordingly in respect of this Unit, the Authority 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 with regard to each unit that are listed in paragraph 5.1 and qualified in paragraphs 7.5 and 7.6, 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 both Units will comply with the building code, notwithstanding the lack of a drainage cavity.
- 9.4 The Authority considers that the cladding on each Unit 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 25 August 2004.

A handwritten signature in black ink, appearing to read 'J. Ryan', with a large, stylized flourish underneath.

John Ryan
Chief Executive