

Determination 2005/36

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 Chief Executive of the Department of Building and Housing (“the Chief Executive”) under section 17 of the Building Act 1991 (“the Act”), as amended by section 424 of the Building Act 2004. The applicant is the owner and the other party is the territorial authority. The application arises from the refusal by the territorial authority to issue a code compliance certificate for a 9-year old house unless changes are made to its monolithic cladding system.
- 1.2 My task in this determination is to consider whether I am satisfied on reasonable grounds that the external monolithic wall cladding as installed (“the cladding”) to the walls of the house complies with the building code (see sections 18 and 20 of the Act). By “external monolithic wall cladding as installed”, I mean the components of the system (such as the backing sheets, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.
- 1.3 This determination is made under the Building Act 1991 subject to section 424 of the Building Act 2004. That section came into force (“commenced”) on 30 November 2004, and its relevant provisions are:
- “ . . . on and after the commencement of this section,—
- “(a) a reference to the Authority in the Building Act 1991 must be read as a reference to the chief executive; and
 - “(b) the Building Act 1991 must be read with all necessary modifications to enable the chief executive to perform the functions and duties, and exercise the powers, of the Authority”

It should be noted that the new legislation does not amend the determination process set out under the 1991 Act, other than to transfer the power to make a determination from the Building Industry Authority (“the Authority”) to the Chief Executive.

- 1.4 This determination refers to the former Authority.
- (a) When quoting from documents received in the course of the determination, and
 - (b) When referring to determinations made by the Authority before section 424 came into force.
- 1.5 No other aspects of the Act or the building code have been considered in this determination.
- 1.6 The house itself is described in paragraphs 2.1 to 2.3 and paragraph 8 sets out the decision.

2 PROCEDURE

The building

- 2.1 The building is a single-storey house with an attached basement garage situated on a excavated sloping site in a medium wind zone in terms of NZS 3604: 1999 “Timber framed buildings”. The house is of conventional light timber frame construction on either a concrete slab or a piled timber-framed floor. The timber-framed external walls of the building are lined with monolithic cladding. The house is of a relatively simple shape, but the metal tiled pitched roof has numerous hips and valleys. The building is cantilevered at the south elevation, at the kitchen bay window, and at the two dining room bay windows. The wide-flanged external aluminium windows and doors are surface mounted over the cladding. A large close-boarded deck with associated steps is constructed along the west elevation. A flight of timber steps with a close-boarded top landing lead up to the main entrance, and these have timber-framed balustrades that are lined on both faces and the top with monolithic cladding. There are varying width eaves and verge projections. They are 70mm wide over the bay widows, 600mm or 620mm wide to the balance of the north, south and west elevations, and 300mm and 550mm wide to the east elevation.
- 2.2 The specification calls for all wall framing to be Boric treated. No documentary evidence has been produced as to the treatment, if any, of the timber used in the construction of the exterior walls.
- 2.3 The cladding system is what is described as monolithic cladding. As specified in the manufacturer’s data sheets (“the manufacturer’s instructions”), the cladding to the walls of the house incorporates 7.5mm thick fibre-cement backing sheets fixed through the building wrap directly to the wall framing and finished with a textured plaster finish and a further paint system. The system has been subject to an independent appraisal. The manufacturer’s instructions include details for flashings at various junctions and require PVC flashings to the heads, jambs and sills of exterior joinery units.

Sequence of events

- 2.4 The territorial authority issued a building consent on 11 December 1995. The consent noted that certain inspections had to be requested, including the pre-lining and final inspections.
- 2.5 The territorial authority made various inspections during the course of construction, and carried out 2 “Final Code Compliance Certificate Building” inspections. The second of these was carried out on 5 March 2004, and the house did not pass this inspection. The “Field Sheet” for this inspection noted that four issues required attention. None of these issues related to the cladding.
- 2.6 On 9 March 2004, the territorial authority wrote to the owner noting that the same four issues previously noted on the “Field Sheet” required attention before the file could be finalised.
- 2.7 The territorial authority issued a Notice to Rectify, dated 10 March 2004, and the “Particulars of Contravention” were:
- 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 system of inspections:-
- You are required to:
- Provide adequate ventilation to the monolithic cladding and into the wall frame space by means of a ventilated cavity 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 be processed.
- 2.8 The owner applied for a determination on 14 August 2004.

3 THE SUBMISSIONS

- 3.1 The owner in reference to the “Matter of Doubt or Dispute” noted that the house had been built in 1996 without a cavity and it was of “strong construction”, with Boric treated framing and conventional design. The cladding met the installation instructions current at the time and had passed all progress inspections. The house had been maintained, was repainted during 2003, and had no leakage problems.
- 3.2 The owner provided copies of:
- The building plans and specification;

- The consent documentation;
- The Notice to Rectify;
- Some of the territorial authority’s inspection sheets; and
- The correspondence with the territorial authority.

3.3 The territorial authority made a submission in the form of a letter, dated 26 August 2004, which confirmed that a building consent had been issued for the cladding and also stated:

The work was undertaken during the period January 1996 to February 2004;
Construction of the cladding was not the subject of the changed inspection procedures implemented by this Council as a consequence of a [Named] adjudication;

In the absence of the additional inspections implemented as a consequence of those changed inspection procedures, and in the absence of a cavity as a first line of defence, the Council does not believe 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 E2.3.2, of the Building Code...

3.4 The territorial authority provided copies of:

- The Notice to Rectify;
- Some of the territorial authority’s inspection sheets; and
- The correspondence with the owner.

3.5 The copies of the submissions and other evidence were provided to each of the parties and neither party made a further response.

4 THE RELEVANT PROVISIONS OF THE BUILDING CODE

4.1 The dispute for determination is whether the territorial authority’s decision to refuse to issue a code compliance certificate because it was not satisfied that the cladding complied with clauses B2.3.1 and E2.3.2 of the building code (First Schedule, Building Regulations 1992) is correct. Those provisions of the building code say:

Clause B2—DURABILITY

B2.3.1 Building elements must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the specified intended life of the building, if stated, or:

- (a) The life of the building, being not less than 50 years, if:
 - (i) Those building elements (including floors, walls, and fixings) provide structural stability to the building, or
 - (ii) Those building elements are difficult to access or replace, or

(iii) Failure of those building elements to comply with the building code would go undetected during both normal use and maintenance of the building.

(b) 15 years if:

(i) Those building elements (including the building envelope, exposed plumbing in the 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. I am therefore of the opinion that the cladding system as installed must now be considered to be an alternative solution.

4.3 In several previous determinations, the Authority has made the following general observations, which in my view remain valid in this case, about acceptable solutions and alternative solutions.

- Some acceptable solutions cover the worst case, so that in less extreme cases they may be modified and the resulting alternative solution will still comply with the building code; and
- Usually when there is non-compliance with one provision of an acceptable solution, it will be necessary to add some other provision to compensate for that in order to comply with the building code.

5 THE EXPERT’S REPORT

5.1 The Authority commissioned an independent expert (“the expert”) to inspect and report on the cladding. The expert inspected the building and furnished a report that was completed in February 2005. It stated that the quality of the texture coating was constant and that the 2-year old paint film was uniform. There were no cracks in the cladding sheets or the textured finish. The wide-flanged external windows and doors lacked jamb and sill flashings, with weathertightness relying on a paint and sealant combination to their perimeters. The expert’s report made the following specific comments on the cladding:

- There were no vertical control joints in 3 of the walls whose dimensions exceeded those recommended by the manufacturer as requiring such joints;
 - The base of the cladding is concealed by the front elevation boulder garden;
 - The cladding is poorly finished over the head of the kitchen bay window;
 - There are gaps in the frame mitres of the aluminium kitchen bay window; and
 - The decking to both the main deck and the entrance steps is hard against the cladding and the deck ribbon plate is fixed through the floor joists through the cladding.
- 5.2 The expert referred to the areas adjoining the cladding where paving is yet to be laid and noted that special provision will have to be made to ensure that water is discharged away from the house.
- 5.3 The expert took moisture readings though the internal linings throughout the house using a non-invasive meter. There were no readings in the “damp” range. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.
- 5.4 Copies of the expert’s report were provided to each of the parties and neither party made a response.

6 DISCUSSION

General

- 6.1 I have considered the submissions of the parties, the expert’s report and the other evidence in this matter. The approach in determining whether building work complies with clauses B2.3.1 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 International and local research 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:

1. Data show a strong relationship between the width of the eaves and the incidence of wall leaks. An effective deflection mechanism, such as eaves greater than 600 mm wide, has been shown by Canadian data to manage more than 90% of rain incidence;
2. While most reported leaks are substantially caused by defects in the cladding that require little or no wind pressure differential, I believe that buildings in high and very high wind zones (as defined by NZS 3604) are likely to experience wind pressure differentials and thus a higher risk of water ingress;
3. 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;
4. Complex roofs and overall envelope shapes where the roofs frequently intersect with the walls on upper floors create opportunities for leaks into the wall; and
5. Recent data also shows that decks and balconies that are exposed in plan and/or cantilevered from the external walls are the most frequent location for water leaks.

6.6 Any likely penetration of moisture through the cladding can then be countered by a combination of effective drainage, ventilation of the drainage cavity and moisture tolerance in the external wall framing timber. In particular:

- The structure should allow water that has penetrated the cladding to drain out as quickly as possible. I believe that generally a drainage cavity should be provided behind the outer cladding barrier in monolithic construction;
- The design of the outer walls should allow walls to dry to the outside once moisture penetrates the cladding and the moisture barrier. If walls do not dry, decay fungi can become established in as little as 3 months. Until scientific data on the optimum depth and configuration of the ventilation mechanism in New Zealand conditions is available, I believe that the drainage cavity should be not less than 20 mm deep; and
- The external walls should have some degree of decay resistance or moisture tolerance to allow for situations when moisture circumvents the cladding and moisture barriers and moisture levels in the timber rise to more than 18%.

6.7 In relation to these characteristics, I find that the house:

- Has maximum 620mm wide eaves and verge projections that provide good protection to the cladding areas below them;
- Is in a medium wind zone;
- Is generally one storey high;

- Is of a relatively simple shape on plan, but with a roof that has some hip and valley junctions;
- Has one deck and one set of entrance steps fixed hard against the cladding; and
- Has external wall framing that I accept is not treated to a level that would prevent decay if it absorbs and retains moisture.

Weathertightness performance

6.8 Generally the cladding appears to have been installed according to good trade practice, and I consider it has been effective to date in preventing the penetration of water. There are, however, some defective areas of the house, which if not remedied, will eventually allow the ingress of moisture behind the cladding. These are set out below:

- The lack of vertical control joints in 3 of the walls of the house;
- The concealed base of the cladding at the front elevation boulder garden;
- The poorly finished cladding over the head of the kitchen bay window;
- The gaps in the frame mitres of the aluminium kitchen bay window; and
- The decking to both the main deck and the entrance steps being hard against the cladding and the deck ribbon plate being fixed through the floor joists through the cladding.

6.9 Notwithstanding the fact that the backing sheets are fixed directly to the timber framing, thus inhibiting drainage and ventilation behind the cladding sheets, I find that there are compensating factors that assist the performance of the cladding in this particular case. These are:

- Generally, the cladding appears to have been installed according to good trade practice;
- The house is basically single storey, with eaves and verge projections up to 620mm wide; and
- There is no moisture evident at this time in the external wall cavities.

6.10 I consider that these factors adequately compensate for the lack of a drainage and ventilation cavity and can allow the house to comply with the weathertightness and durability provisions of the building code.

6.11 I note that the expert has pointed out the need for the future paving to adequately discharge water away from the cladding. I endorse these comments and also require that the bases of the cladding at these locations have adequate clearances above the finished paving.

- 6.12 I note that one elevation of the house demonstrates a medium weathertightness risk rating, and the remaining elevations a low risk rating using the E2/AS1 risk matrix. The matrix is an assessment tool that is intended to be used at the time of application for consent, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage, but must be taken into account when the building as actually built is assessed for the purposes of issuing a code compliance certificate.

7 CONCLUSION

- 7.1 I consider that the expert's report establishes there is no evidence of external moisture entering the house, and accordingly, that the monolithic cladding does comply with clause E2 at this time.
- 7.2 However, the building is also required to comply with the durability requirements of clause B2. Clause B2 requires that a building continues to satisfy all the objectives of the building code throughout its effective life, and that includes the requirement for the house to remain weathertight. Because the cladding faults in the house will consequently allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.
- 7.3 I also consider that because the faults in the house cladding occur in discrete areas, I am able to conclude that rectification of the identified faults is likely to bring the cladding into compliance with the code. Once the cladding faults listed in paragraph 6.8 have been satisfactorily rectified, this house should be able to remain weathertight and thus comply with both clauses E2 and B2.
- 7.4 I note that effective maintenance of monolithic claddings is important to ensure ongoing compliance with clause B2 of the building code. That maintenance is the responsibility of the building owner. The code assumes that the normal maintenance necessary to ensure the durability of the cladding is carried out. For that reason clause B2.3.1 of the building code requires that the cladding be subject to "normal maintenance". That term is not defined and I take the view that it must be given its ordinary and natural meaning in context. In other words, normal maintenance of the cladding means inspections and activities such as regular cleaning, re-painting, replacing sealants, and so on.
- 7.5 I emphasise that each determination is conducted on a case-by-case basis. The fact that a particular cladding system has been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding system will be code compliant in another situation.
- 7.6 I decline to incorporate any waiver or modification of the building code in this determination.

8 THE DECISION

- 8.1 In accordance with section 20 of the Act, I determine that the house is weathertight now and therefore the cladding complies with clause E2. However, as there are a number of items to be remedied to ensure it remains weathertight and thus meet the durability requirements of the code, I find that the house does not comply with clause B2. Accordingly, I confirm the territorial authority's decision to refuse to issue the code compliance certificate.
- 8.2 I find that once the items of non-compliance that are listed in paragraph 6.8 are rectified to the approval of the territorial authority, together with any other instances of non-compliance that become apparent in the course of rectification, the cladding as installed on the house will comply with the building code, notwithstanding the lack of a drainage cavity.
- 8.3 I note that the territorial authority has issued a Notice to Rectify requiring provision for adequate ventilation, drainage and vapour dissipation. Under the Act, a Notice to Rectify can require the owner to bring the house into compliance with the building code. The Authority has already found in a previous determination (2000/1) that the Notice to Rectify cannot specify how that compliance can be achieved. A new Notice should be issued that requires the owner to bring the cladding into compliance with the building code, without specifying the features that are required to be incorporated. It is not for me to dictate how the defects described in paragraph 6.8 are to be remedied. How that is done is a matter for the owner to propose and for the territorial authority to accept or reject, with either of the parties entitled to submit doubts or disputes to the Chief Executive for another determination.
- 8.4 Finally, I consider that the cladding will require on-going maintenance to ensure its continuing code compliance.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 21 March 2005.

John Gardiner
Determinations Manager