Determination 2005/11

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 of a dispute referred to the Chief Executive of the Department of Building and Housing ("the Chief Executive") under section 17 of the Building Act 1991 as amended by section 424 of the Building Act 2004 ("the Act"). The applicant is the owner and the other party is the territorial authority ("the TA"). The application arises from the refusal by the TA to issue a code compliance certificate ("CCC") for a 6-year old house unless changes are made to its monolithic cladding system.

1.2 The question to be determined is whether on reasonable grounds that the external wall cladding as installed ("the cladding"), which is applied to all the timber framed walls of the house, complies with the building code (see sections 18 and 20 of the Act). By "external 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 In making my decision, I have not considered any other aspects of the Building Act or the building code.

1.6 The house itself is described in paragraphs 2.1 to 2.3, and paragraph 8 sets out my decision.

2 PROCEDURE

The building

2.1 The building is a two-storey detached house, including a basement garage, and is situated on a level site, which is in a high wind zone in terms of NZS 3604: 1999 "Timber framed buildings". The house is of conventional light timber frame construction, built on concrete block foundation or basement walls. All the timber framed external walls are sheathed with monolithic cladding. The house is of a fairly simple shape, but the metal tiled pitched roof has numerous valley and hip junctions. A timber-framed close-boarded deck extends around two partial elevations of the house at the first floor level. The deck has timber-framed balustrades that are lined on the top and both faces with monolithic cladding. A small lean-to roof supported on two monolithic clad 100 x 100mm posts is constructed over the main entry. The eaves have 600mm wide projections, and there are larger roof overhangs at the northeastern and northwestern corners of the building.

2.2 The specification describes that all external timber wall framing is to be either BAH Rimu/Matai or approved treated Pine, with a further alternative of Douglas Fir for all members other than top and bottom plates. While the owner believes that the external wall framing was treated, I have not received any further evidence as to what timber was actually used on the house.

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 40 mm thick expanded polystyrene (EPS) backing sheets fixed through the building wrap directly to the wall framing and finished with a reinforced sponge float finish and a further paint system. The system has been subject to an independent appraisal ("the 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. I have not been given any information as to what jointing, sealing, coating and painting systems were used in this instance.

Sequence of events

2.4 The TA issued a building consent on 23 December 1996.

2.5 The TA made various inspections during the course of construction, and on 22 April 1997 approved the preline inspection. The TA undertook three final inspections on 10 November 1998, 5 February 2002, and 22 June 2004 respectively, but the house did not pass any of these. The ground levels to the front garden beds was one of the 5 issues raised after the second inspection. The TA noted after the last final inspection:

> See cladding NTR on reverse (see letter) re: Monolithic Cladding and producer statements.

2.6 Following this inspection, the TA wrote to the owner on 23 June 2004, identifying the matters requiring attention:

> 1. Producer statement from [Named cladding] installer.
>
> 2. PS4 from Engineer for Masonry (Building Grade).
>
> 3. In regard to the monolithic cladding applied to your dwelling and barrier and not withstanding the approval in your building 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 irrevocable damage to the structural elements of the building. Doubt has arisen to the extent that monolithic claddings that do not have all of 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 building CCC can be issued. If you made an application to the Building Industry Authority for a determination on this issue under Section 17 of the Building Act 1991, it would decide the matter…

2.7 I note that the TA did not issue a Notice to Rectify as required by section 43(6) of the Act, but has referred to its letter of 23 June 2004, which sets out the reasons for withholding the CCC.

2.8 The owner applied for a determination on 18 August 2004.

3 THE SUBMISSIONS

3.1 Neither the TA nor the owner made a submission. The owner supplied copies of:

- The construction plans and specifications;
- The building consent documentation;
- The TA's "Details of Items Requiring Rectification" of 6 February 2002;
- The TA's inspection sheets;

- The letter from the TA of 23 June 2004; and
- A "Producer Statement-Construction Review" supplied by the plumber.

3.2 Copies of the evidence were provided to each of the parties. Neither the owner nor the TA 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 TA's decision to refuse to issue a CCC 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 sub floor 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 can be considered to be an alternative solution.

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

- 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, 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 EXPERTS REPORT

5.1 Because the information provided by the parties contained insufficient detail on how the building had been constructed, the Department commissioned an independent expert ("the expert") to inspect and report on the cladding. The expert furnished a report on the cladding. It noted that the plaster is of a consistent thickness and has been evenly applied. The recessed external windows and doors were fully flashed and an appropriate slope had been formed on the cladding sill faces. The expert was of the opinion that neither vertical and horizontal control joints nor expansion joints were required to the cladding on this house. The expert removed 2 areas of cladding to check on various details. The expert also made the following comments regarding the cladding:

- There is minor damage in the form of chipping, cracks and holes in the cladding;
- There is minor cracking around the joinery units that has been repaired with an unsuitable clear silicone;
- There is no air gap between the fascia board over the front porch and the cladding, and the plaster and paint at this location requires rectification;
- The timber decking is fixed hard against the cladding, whereas a 12 mm gap should be provided;
- The top of the deck balustrade lacks the required slope;
- There is a small hole in the cladding at one jamb/sill junction of the lounge window;
- There are no seals or sealants to the downpipe bracket screw fixings;

- The pipe and duct penetrations through the cladding lack properly sealed flanges;
- The electrical meter box lacks a flashing system and sealants; and
- The electrical light fitting cables penetrating the cladding lack sealed conduits or ducts.

5.2 The expert also noted that the downpipe over the entry roof lacked a spreader and taking into account the internal type spouting system, the expert was of the opinion that the distance between the main downpipes is too great. The owner also informed the expert that the cladding was to be repainted in the near future.

5.3 The expert took non-invasive moisture content readings of the external walls throughout the house and found only one location with a high reading. The expert subsequently removed a panel of internal lining and obtained a reading of 25.5% at the jack stud at this location. The expert attributed this higher moisture content to water ingress through the hole located at the sill/jamb junction. 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.

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 Research data and experience, both internationally and locally, indicates that the impact of weathertightness problems in monolithic clad extensions 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:

- 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;

- 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;

- 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 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. It is believed 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 consider 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 this house:

- Has 600 mm, wide eaves projections, which together with the additional roof projections, provide good protection to the cladding under them;

- Is in a high wind zone;

- Is two storeys high;

- Has exterior windows and doors that are fully and adequately flashed;
- Has an overall envelope that is fairly simple in plan, but with roofs having complex hip and valley junctions;
- Has a deck at first floor level; and
- Has external walls that are constructed with timber treated to a level that is likely to 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 to the manufacturer's instructions, but some elements are not well constructed. These areas are:

- The minor damage in the form of chipping, cracks and holes in the cladding;
- The minor cracking around the joinery units that has been repaired with an unsuitable clear silicone;
- The lack of air gap between the fascia board over the front porch and the cladding, and the poor plaster and paint finishes at this location;
- The lack of a 12 mm gap between the timber decking and the cladding;
- The lack of a slope to the top of the deck balustrade;
- The small hole in the cladding at one jamb/sill junction of the lounge window;
- The lack of flanges, seals and sealants to various penetrations and fixings;
- The lack of a flashing system and sealants to electrical meter board; and
- The lack of a spreader to the downpipe discharging over the entry porch roof.

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 and to manufacturer's specifications;
- The external windows and doors are fully flashed; and
- The extension has minimum 600mm wide eaves projections.

6.10 I note that the expert has commented that the distances between the main downpipes are too great, taking into account the spouting system that has been used. Accordingly, I suggest that the TA further examine this matter, and if required, that additional downpipes with their associated drainage be installed.

6.11 I note that all elevations of the house demonstrate a low weathertightness risk rating, as calculated 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, but must be supplemented at the time of issuing a CCC by careful inspection of the building as actually built.

7 CONCLUSION

7.1 I am satisfied that the current performance of the cladding is not adequate because it is allowing water penetration into the wall framing to one location at present. Consequently, I am not satisfied that the cladding system as installed complies with clause E2.3.2 of the building code.

7.2 In addition, 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 are allowing the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.3.1.of the building code.

7.3 I find that, because the faults that have been identified with this cladding occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.8 is likely to result in the building being weathertight and in compliance with clauses B2.3.1 and E2.3.1, notwithstanding the lack of a ventilated cavity

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. I observe that the recoating of the cladding is an essential maintenance requirement in this particular instance. I recognise that a TA does not have any statutory responsibility for the ongoing maintenance of a building. However, the maintenance programme adopted by the owner could be undertaken after consultation with the TA, bearing in mind that the nature of the advice, and the basis on which it is provided to the owner, are for the TA to decide.

7.5 I emphasise 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.

7.6 I decline to incorporate any waiver or modification of the building code in its determination.

8 THE DECISION

8.1 In accordance with section 20 of the Act, I determine that the cladding system as installed does not comply with clause E2 of the building code. There are also a number of items to be remedied to ensure that the house remains weathertight and thus meets the durability requirement of the code. Consequently, I find that the house does not comply with clause B2, and confirm the TA's decision to refuse to issue a CCC.

8.2 I find that rectification of the items outlined in paragraph 6.8 to the approval of the TA, along with any other faults that may become apparent in the course of that work, is likely to result in the house being weathertight and in compliance with clauses B2 and E2, notwithstanding the lack of a ventilated cavity.

8.3 I note that the TA has not issued a Notice to Rectify on the prescribed form as required by the Act. The TA should do so, and the owner is then obliged to bring the house up to compliance with the building code. It is not for me to decide directly how the defects 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 TA 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 on the building will require on-going maintenance to ensure its continuing building code compliance.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 1 February 2005.

John Gardiner
Determinations Manager