

## **Determination 2005/172**

### **Refusal of a code compliance certificate for a building with a “monolithic” cladding system at 14 Graceview Way, West Harbour**

#### **1. The dispute to be determined**

- 1.1 This is a Determination of a dispute under Part 3 Subpart 1 of the Building Act 2004 (“the Act”) made under authorisation by me, John Gardiner, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. The applicant is the owner, Mr Qian (“the owner”), and the other party is the Waitakere City Council (“the territorial authority”). The application arises because no code compliance certificate was issued by the territorial authority for this 2-year-old house.
- 1.2 The question to be determined is whether I am satisfied on reasonable grounds that the monolithic wall cladding as installed to the external walls of the building (“the cladding”), complies with the Building Code (see sections 177 and 188 of the Act). By “the 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 In making my decision, I have not considered any other aspects of the Act or the Building Code.

#### **2. Procedure**

##### **2.1 The building**

- 2.1.1 The building work consists of a detached house situated on a steeply sloping site, which is in a medium wind zone for the purposes of NZS 3604. The house is two storeys high, except for several single-storey ground floor projections, and floors are split-level with the three ground floor levels separated with part-height concrete block retaining walls that accommodate the site contours. Construction is conventional light timber frame, with concrete slabs and foundations, concrete block

retaining walls, monolithic wall cladding and aluminium windows. The house shape is reasonably complex in plan, with flat membrane roofs over two levels of upper roofs, and 20° pressed metal tiles over three stepped lower lean-to roofs. The upper roofs have parapets that form 400 mm deep perimeter bands with 300 mm eave projections, while lower roofs are at three levels and form lean-tos against the upper walls. The lower lean-to roofs have 400 mm eave projections and no verge projections. A flat membrane canopy, with a parapet band, extends above the main entry. A deck, supported on monolithic-clad circular columns, extends to the east from the upper level dining room, and has a membrane floor with metal balustrades fixed through the metal capping over a deck upstand.

- 2.1.2 As discussed in section 5 following, the expert commissioned by the Department to inspect the cladding (“the expert”) noted that the owner advised that the specification called for the wall framing to be untreated, and that the timber he was able to inspect did not appear to be treated. Based on this evidence, I consider that the external wall framing is unlikely to be treated.
- 2.1.3 The cladding system, originally specified as Insulclad, is what is described as monolithic cladding, and consists of 40 mm polystyrene backing sheets fixed through the building wrap directly to the wall framing and finished with a 16 mm lightweight mesh-reinforced “Putz Technik” plaster system. The cladding system includes purpose-made flashings to windows, edges and other junctions.
- 2.1.4 Agrichem Products Ltd provided a 15-year “Warranty for coating system” and a 5-year “Workmanship Guarantee”, both dated 6 May 2003, for the “Putz Technik” cladding system.
- 2.1.5 I note that 3 elevations of the building demonstrate a moderate weathertightness risk rating, and one a high 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, 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.
- 2.1.6 Accordingly I consider this EIFS cladding to be an alternative solution (refer to paragraph 4.2).

## **2.2 Sequence of events**

- 2.2.1 The territorial authority issued a building consent for the original house on 19 July 2002, which showed the cladding system as Insulclad, and carried out various inspections during construction, including pre-line, gib-nail and exterior plaster. The last inspection was carried out on 28 January 2004, and the territorial authority’s inspection summary notes that the inspection “failed”.
- 2.2.2 The territorial authority issued a notice to rectify dated 29 January 2004, attaching a “Particulars of Contravention” which stated that:

Monolithic cladding systems without a 20mm cavity, provision for adequate ventilation, drainage, and vapour dissipation will, in the event of leakage and/or the effect of residual moisture, cause irrevocable damage to the structural elements of the building.

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 alternate approved system; or
- Remove the monolithic cladding and replace with an approved cladding system ...

2.2.3 The owner applied for a Determination on 15 August 2005.

### **3. The submissions**

3.1 In the application, the owner noted that the “Matter of doubt or dispute” is:

The refusal of a code compliance certificate for a building with a “monolithic” cladding system.

3.2 The owner forwarded copies of:

- the drawings
- some of the inspection records
- the notice to rectify
- the warranties for the coating and various other statements.

3.3 The territorial authority made a submission in the form of a letter to the Department dated 4 October 2005, which summarised the consent and inspection processes, explained that new inspection procedures had recently been implemented, and noted that:

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 Clause E2.3.2, of the Building Code.

3.4 The territorial authority forwarded a copy of the building consent.

3.5 Copies of the submissions and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission 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 B2.3.1 and E2.3.2 of the Building Code (First Schedule, Building Regulations 1992) is correct.
- 4.2 There are no Acceptable Solutions that have been approved under section 22 of the Act that cover the monolithic cladding as installed on this house. The cladding is not currently certified under section 269 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 Department 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 they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
  - 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 expert inspected the cladding on 29 September 2005, and furnished a report that was completed on 5 October 2005. The expert noted that the surface finish to the plaster coating generally appeared uniform and sound, although there were a number of cracks and obvious undulations to the cladding. The expert noted that most work appeared to be reasonable, but that it demonstrated a "lack of thought, coordination, or guidance in respect of junctions of different materials and the interfaces of various trades". The expert noted that control joints are not required by the manufacturer as necessary for the dimensions of EIFS used on this building. The expert cut away a small section of plaster at the sill to jamb junction of a window and noted that flashings appeared to comply with the manufacturer's instructions with sealants and adequate overlaps. I accept that the location opened is typical of similar locations around the building.
- 5.2 The expert took non-invasive moisture readings at skirting level, under windows and at other risky areas through interior linings, and the following elevated readings were noted:
- 23% to 25% in walls near the northwest corner of the living room (near the junction with an exterior retaining wall and under roof parapets). An invasive moisture reading of 42% was recorded at skirting level in one of these walls

- 21% to over 50% in the external wall and internal retaining wall (in line with upper roof parapets) of the lower south bedroom, with water marks, mould growth and rust on carpet fixings noted at the corner of the two walls
- 25% and 35% at the garage door jambs, with moisture damage to the skirting noted, and 22% at the skirting near the living room wall
- 20% at the sill trimmer of the lower southwest bedroom
- elevated readings were also noted in the exterior wall and skirting (under roof parapets) of the family room, with water stains noted on the flooring
- elevated readings were also noted in the exterior walls and skirtings (under roof parapets) of the upper floor master bedroom

5.3 Further exterior non-invasive moisture readings were taken under windows and other risky areas, and the following elevated readings were noted:

- 22% to 24% in the soffit under the rainwater head on the southwest corner
- over 21% in the soffit under the entrance canopy, near the roof outlet
- 20% to over 30% (near cracks and close to the membrane) in the parapets to the upper roof levels

5.4 The expert removed linings around the junction of the external wall and internal retaining wall (under roof parapets) of the lower south bedroom, and noted that moisture contents in the framing was recorded at 26% to over 50% (off the scale).

5.5 Further invasive moisture readings were taken through the cladding around the deck, around the hexagonal window to the master bedroom and at the cut-out of the window jamb to sill junction, and no further elevated readings were noted. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

5.6 The expert made the following specific comments on the cladding:

- roof parapets have 15° sloped plastered tops with no cappings, and have cracks to the cladding at the tops and inner faces at several locations
- there are cracks to the cladding at a number of sill to jamb junctions and above the deck on the south corner
- ground levels fall towards the north and west walls of the building, and exterior loose-laid retaining walls appear to be failing by over-turning
- the cladding butts against paving beside the garage doors and at the main entry, and soil is against cladding outside the lower south bedroom
- clearances from the cladding to the deck membrane are insufficient

- the garage door jamb to wall junction are not flashed or sealed, and moisture is penetrating into the wall framing
- the garage door head flashing upstand appears to overlap the cladding
- the deck balustrades are poorly fixed through the capping on the deck upstand, with no sealants or washers
- penetrations and fixings through the cladding are poorly sealed or unsealed in some locations
- rainwater heads are poorly flashed with a membrane material, and there is exposed timber and polystyrene in some locations
- downpipes from upper roofs discharge onto lean-to roofs, with no spreaders
- an overflow from the roof cannot function as it does not penetrate through the parapet
- the outlet from the entry canopy roof has minimal projection past the face of the EIFS, and there is ponding on the canopy membrane
- the kickouts at the bottom of apron flashings to the lower lean-to roofs are poorly constructed and heavily reliant on sealant. Fascias and barge boards are buried in the plaster at some locations
- the exterior retaining walls near the main entry butt against the walls, with poor waterproofing at the junction

5.7 Copies of the expert's report were provided to each of the parties.

## **6. Discussion**

### **6.1 General**

6.1.1 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 and E2 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 Industry Authority and the Department have described the weathertightness risk factors in previous Determinations (Refer to Determination 2004/01 et al) relating to monolithic cladding, and I have taken these comments into account in this Determination.

## **6.2 Weathertightness risk**

6.2.1 In relation to these characteristics I find that the house:

- is built in a medium wind zone
- is a maximum of two storeys high
- has an attached deck
- is reasonably complex in plan and form, with stepped levels, parapets and a number of complex roof to wall junctions
- has eave projections of 300 mm to upper walls and 400 mm overall to lower walls with no verge projections
- has monolithic cladding which is fixed directly to the framing
- has external wall framing that is not treated, so providing no resistance to the onset of decay if the framing absorbs and retains moisture.

## **6.3 Weathertightness performance**

6.3.1 Generally the cladding does not appear to have been installed according to good trade practice, and some junctions, edges and penetrations are not well constructed. These areas are all as described in paragraph 5.6 and in the expert's report as being the:

- plastered tops, lack of cappings and cracks to roof parapets
- cracks to the wall cladding at some locations
- lack of cladding clearance to the garage and main entry paving, to the deck membrane and to the ground at a number of locations
- poor weatherproofing of the garage door reveals
- poor head flashing over the garage doors
- poor fixings and lack of sealing of the metal balustrades to the deck upstand
- lack of sealing or poor sealing of penetrations at a number of locations
- poor flashing and sealing of rainwater heads, and poor construction of overflows and outlets at a number of locations
- poor falls and drainage from the canopy roof
- lack of spreaders to downpipes discharging onto lower roofs

- poor kickouts and sealing of apron flashings to lower roofs
- burying of fascias and barge boards into the plaster at a number of locations
- the junctions of exterior retaining walls with the walls of the house

6.3.2 I note the expert's comment regarding the poor falls to surrounding ground levels, and the condition of the exterior retaining walls, and consider that these require attention.

6.3.3 I note the very high moisture contents recorded in walls associated with interior retaining walls, and consider that the uncertain cause for this requires further investigation, including the removal of linings from applicable interior walls, to determine whether water penetration relates to roof parapets above, rather than defects in the construction of the retaining walls or some other cause.

6.3.4 I also view with concern the very high moisture levels contents recorded at a number of locations, and consider that further opening up of the structure may reveal further decay of the untreated timber, which could compromise the structural integrity of the building.

## 7. Conclusion

7.1 I am satisfied that the current performance of the monolithic cladding is not adequate because it has not been installed according to good trade practice and is allowing significant water penetration into the walls at a number of locations at present. I have also identified the presence of some known weathertightness risk factors in this design. The presence of the risk factors on their own is not necessarily a concern, but they have to be considered in combination with the significant defects, identified in paragraph 5.6, in the cladding system. It is that combination of risk factors and defects, together with the current moisture penetration and possible timber decay, that indicate that the structure does not have sufficient provisions that would compensate for the lack of a full drainage cavity. Consequently, I am satisfied that the cladding system as installed on the building does not with clause E2 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 on the building are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.

7.3 I note the very high levels of moisture entry into walls associated with interior retaining walls, and consider that the cause of this requires further investigation and remedial work as appropriate. I also view with concern the very high moisture levels contents recorded at a number of locations, and consider that the extent of damage to untreated timber needs to be established, with repairs undertaken as necessary.



- 7.4 I find that the faults identified in this building, in particular those related to the roof parapets, may have allowed significant water penetration into both external and internal walls, causing widespread damage. I am therefore unable to conclude, with the information available to me, that remediation of the identified faults, as opposed to partial or full re-cladding, could result in compliance with clause E2. I consider that final decisions on whether code compliance can be achieved by either remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the extent and source of water penetration into the wall framing of external and internal walls below parapets. This will require further investigation and a careful analysis by an appropriately qualified expert. Once that decision is made, the chosen remedial option should be submitted to the territorial authority for its comment and approval. If the territorial authority chooses to reject the proposal, then the owner is entitled to seek a further determination on whether the proposed remedial work will led to compliance with the requirements of clauses E2 and B2.
- 7.5 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 checking (including periodic moisture content checks of the wall cavities and framing), cleaning, re-painting, replacing sealants, and so on. As it is likely that the external wall framing is not treated, periodic checking of its moisture content should be carried out as part of normal maintenance.
- 7.6 In the circumstances, I decline to incorporate any waiver or modification of the Building Code in this Determination.

## **8. The decision**

- 8.1 In accordance with section 188 of the Act, I hereby determine that the monolithic cladding system as installed does not comply with clause E2 of the Building Code. Accordingly, I find that the house does not comply with clause B2 and I confirm the territorial authority’s decision to refuse to issue a code compliance certificate.
- 8.2 I note that the territorial authority has issued a Notice to Rectify, which includes a requirement to provide ventilation to the wall framing. The territorial authority should now withdraw this and issue a new notice to fix requiring 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 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 territorial authority to accept or reject.

- 8.3 I would suggest that the parties adopt the following process to meet the requirements of paragraph 8.2. Initially, the territorial authority should issue the notice to fix, listing all the items that the territorial authority considers to be non-compliant. The owner should then produce a response to this in the form of a technically robust proposal, produced in conjunction with a competent and suitably qualified person, as to the rectification or otherwise of the specified issues. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding 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 23 December 2005.

John Gardiner  
**Determinations Manager**