



Determination 2017/011

Regarding the refusal to issue an amendment to a building consent for repairs and repainting of the AAC cladding system of a 4-year-old house at 4126/6 Hampden/Palmerston Road, Moeraki



Summary

This determination is concerned with the compliance of the AAC cladding to a four year old house and the authority's refusal to issue an amendment for repairs and repainting. The determination discusses damage caused by thermal movement due to the dark paint colour, and the authority's request for a producer statement and warranty for the cladding.

1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the current Act”) made under due authorisation by me, John Gardiner, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment (“the Ministry”), for and on behalf of the Chief Executive of the Ministry.
- 1.2 The parties to the determination are:
 - the owner of the house, M Judge (“the applicant”)
 - Waitaki District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3 This determination arises from the decision of the authority to refuse to issue an amendment to the building consent for repairs and repainting (“the repairs”) to the wall cladding of a 4-year-old house. The refusal arose because the authority is not satisfied that the proposed repairs will result in the house complying with certain clauses² of the Building Code (First Schedule, Building Regulations 1992). The

¹ The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.building.govt.nz or by contacting the Ministry on 0800 242 243.

² In this determination, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

authority's concerns about compliance relate to the weathertightness, and durability of the wall cladding and underlying structure as installed, taking into account the proposed repair work.

- 1.4 The matter to be determined³ is therefore the authority's exercise of its powers of decision in refusing to issue an amendment to the building consent for the repairs and repainting of the installed wall cladding. In deciding this matter, I must consider whether the autoclaved aerated concrete ("AAC") veneer system as installed to exterior walls of the house ("the AAC cladding") repaired and repainted as proposed will comply with Clause E2 External Moisture and Clause B2 Durability of the Building Code. By "the AAC veneer system as installed" I mean the components of the system (such as the AAC panels, the cavity battens, the plaster coating, the windows, the junctions and the flashings), as well as the way components have been installed and work together.
- 1.5 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Ministry to advise on this dispute ("the expert"), and the other evidence in this matter.

1.6 Matters outside this determination

- 1.6.1 In an email to the Ministry dated 6 October 2016, the authority clarified that its concerns in regard to the structure of the house related to the potential effect of moisture penetration on the timber frame structure which could result from the lack of weathertightness of the AAC cladding. The matter outlined in paragraph 1.4 includes consideration of the durability of the underlying timber framed structure and does not address other elements of the house or other clauses of the Building Code.
- 1.6.2 I note that the property includes a garage/workshop building ("the garage") constructed under a separate building consent (No.2013/1692). This determination is limited to the house constructed under building consent No.2012/625 issued on 1 June 2012.

2. The building work

- 2.1 The building work consists of a single storey detached house situated on a gently sloping rural site in a "very high" wind⁴ and sea spray zone as described in NZS 3604⁵. The L-shaped house is fairly simple in plan and form and is assessed as having a moderate weathertightness risk. The consent drawings take the main entry as facing west and this determination follows that convention.
- 2.2 Construction is generally conventional light timber frame, with some specifically engineered elements. The house includes concrete foundations and floor slab, plastered AAC veneer and weatherboard claddings, uPVC windows, and profiled metal roofing. The 12° monopitched roofs have eaves of about 700mm and verges of 500mm, with a low-pitched 1500mm deep membrane roofed walkway veranda attached to the west face of the south wing.

³ Under sections 177(1)(b) and 177(2)(a) of the Act

⁴ According to the engineer's bracing calculations

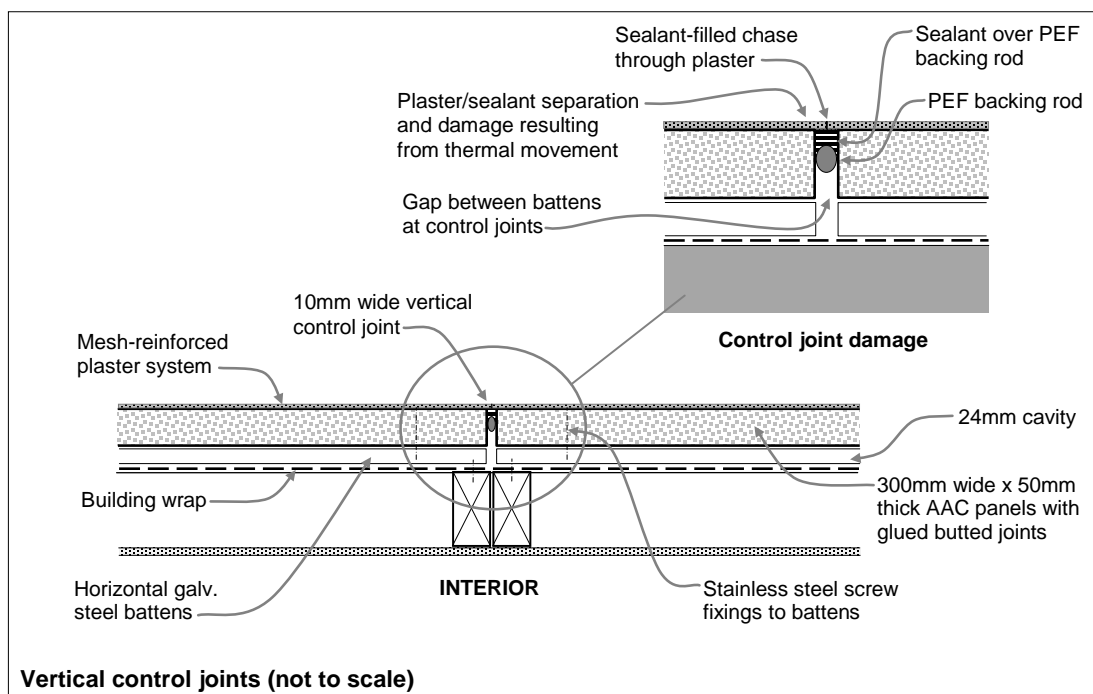
⁵ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.3 The drawing details note the timber framing as H1.2, although the schedule of construction materials in the consent documentation calls for framing to be 'H1.2 or UT Doug.Fir'. However, I note that the inspection record for 'wall framing/bracing/inspections on 7 November 2012 identifies framing timber as 'H1.2' and I therefore consider that the wall framing is treated to provide resistance to fungal decay.

2.4 The wall claddings

- 2.4.1 The west walls above and below the covered walkway are clad in bevel-backed cedar weatherboards. The weatherboards also clad the timber-framed 'chimney' structure and the perimeter edge of the walkway. The weatherboards are fixed through the building wrap to the timber framing.
- 2.4.2 The remaining cladding is a proprietary monolithic cladding system, with 50mm thick AAC backing panels finished with a proprietary mesh-reinforced plaster system to form a monolithic finish. Horizontal galvanised steel battens with a 'top hat' profile are fixed through the building wrap to the framing and form a 24mm cavity behind the AAC panels.
- 2.4.3 The 2400mm high x 300mm wide AAC panels are manufactured from a lightweight aerated concrete material and are screw-fixed to the metal battens. Panels are butt-jointed and glued, except where control joints are installed.
- 2.4.4 The AAC cladding includes recommended details for windows, edges and other junctions and the manufacturer's 2013 'Design and Installation Guide' sets out requirements for control joints to be installed which 'are designed to delineate the potential crack lines which may occur due to normal building movement', which includes movement resulting from timber shrinkage and seismic and wind forces.

Figure 1: Typical vertical control joint



- 2.4.5 The manufacturer's instructions note that for darker coloured⁶ paint finishes 'it is required that the building owner sign a colour waiver form.' For paler colours (LRV \geq 25%), vertical control joints are required at 4m maximum centres on straight runs of walls. Vertical control joints are also required (in summary):
- to one side of openings from 2.5m to 3.6m wide
 - on both sides of openings over 3.6m wide
 - at changes in wall height greater than 300mm
 - at corners and changes in slab levels.
- 2.4.6 The AAC cladding was appraised by a certificate (No.C803 completed July 2008). This confirmed that, when installed in accordance with the conditions specified, the system would comply with relevant performance requirements of Building Code Clauses B1, B2, C3, E2 and F2. The system was also issued with a CodeMark 'Certificate of Conformity' on 19 July 2013⁷ which confirmed compliance with the latter clauses.
- 2.4.7 The licensed cladding installer⁸ ("the installer") provided an 'Installation Producer Statement' dated 18 July 2013 certifying that the battens and AAC panels were installed in accordance with the manufacturer's requirements and construction drawings. The cladding manufacturer⁹ also provided a 'colour waiver' stating that:

Your coating system has a light reflective value (LRV) of 25% or lower. This means that less than 25% of the light which hits the coating will be reflected. Most of the light will therefore be absorbed by the coating. This can cause excessive heat build up, which increases the risk of substrate movement, hairline cracking and other issues with the coating.

For this reason [the manufacturer] give no guarantee or warranty in respect of coating systems which have an LRV of 25% or lower.

3. Background

3.1 The consent and construction

- 3.1.1 The authority issued building consent No.2012/625 on 1 June 2012 to the applicant for construction of the house. One of the consent conditions stated that 'an installation producer statement and warranty will be required for the [proprietary] cladding and coating'.
- 3.1.2 The authority's inspection summary shows that construction commenced in July 2012, with framing completed by about October. The authority carried out the following inspections during installation of the wall claddings:
- Building wrap, flashings and cavity battens on 20 November 2012.
 - Pre-lining and insulation on 22 January 2013.
- The last construction inspection (of drains) was recorded in March 2013.
- 3.1.3 On completion of the AAC cladding and exterior painting, the installer completed an 'Installation Producer Statement' for the backing sheets and battens dated 18 July 2013 and claimed to have provided the owner with a colour waiver form

⁶ Light reflective value (LRV) below 25%

⁷ No.CMA-CM40058

⁸ No longer operating as a licensed installer of the cladding system.

⁹ Trading under the name 'Hebel Limited' from 17 July 2012 to 7 June 2013, then removed from Companies register on 21 November 2013.

acknowledging that the paint finish had an LRV below 25% and no warranty could therefore be provided for the coating system (see paragraph 2.4.7). I have not seen a copy of a signed waiver form.

3.2 The final inspection and events following

3.2.1 In a letter to the authority dated 17 March 2014, the applicant forwarded some of the documentation required before the final inspection and explained the situation in regard to the AAC cladding, stating:

[The cladding manufacturer] will not issue a warranty for the cladding because the colour we selected was too dark with an LRV of 17. They initially told us any colour would be suitable.

3.2.2 The authority carried out a final inspection on 15 April 2014 and the authority's photographs of the completed house indicate that the AAC cladding had been painted a dark colour, with an LRV well below the manufacturer's minimum limit of 25% (see paragraph 2.4.5).

3.2.3 The authority wrote to the applicant on 17 April 2014, listing items to be completed before a code compliance certificate could be issued. Items 4 and 5 were relevant to the AAC cladding and stated:

[Item 4] The [AAC] cladding requires an installation warranty to cover both the substrate and the cladding.

[Item 5] The colour it is painted is identified as having a light reflective value that does not allow a warranty to be issued. An alternative colour is required.

3.2.4 In a letter dated 7 July 2014 the authority responded to the applicant's enquiry about requirements for the cladding, including the following comments (in summary):

- Producer statements and warranties for the above were a consent condition – the producer statement provided is limited to the substrate.
- The 'colour waiver form' is included in the manufacturer's technical literature and recommends approval from the authority for darker colours – the authority would not approve the darker colour.
- The manufacturer should be consulted about any repainting intended, as an appropriate colour could allow a producer statement for the coating.

3.2.5 In the meantime a similar cladding and plaster coating system with a lighter paint colour had been applied by a different plasterer to the garage building (see paragraph 1.5.2) and was accepted by the authority. By this time it appears that the control joints in the house walls were already exhibiting the effects of movement. Because the house plasterer was no longer operating as a licensed applicator of the proprietary plaster, the garage plasterer provided the applicant with a quotation dated 15 October 2014 for repairing joints and repainting the cladding with a lighter colour.

3.2.6 During 2015, the garage plasterer and the applicant discussed the situation with the authority. In a letter to the applicant dated 3 December 2015, the authority noted that:

It would appear that [the garage plasterer] can coat the [house] with a suitable top coat paint system for a texture coated cladding system. He can issue a Statement saying the product has a compliant light reflective value and that it has been correctly applied.

3.3 The consent amendment and determination application

3.3.1 On 5 July 2016 the applicant lodged an application to amend the building consent for:

Repainting of exterior plaster system to meet compliant light reflective value as originally specified by the substrate manufacturer.

3.3.2 In an email to the applicant dated 14 July 2016, the authority refused to issue the consent amendment until 'some certification/producer statements and warranty from the applicator of the plaster coating' was received. However the applicant was unable to obtain the specific documentation required by the authority because the house plasterer no longer operated and the cladding manufacturer's original company was no longer trading (see footnote to paragraph 2.4.7).

3.3.3 An undated email from the authority noted that the 'only course of action' was for the applicant to engage a building surveyor to 'provide a report on the weathertightness and structure' of the house. The applicant was unable to find a surveyor willing to undertake the work suggested by the authority.

3.3.4 In an email to the authority dated 31 July 2016, the applicant asked whether a determination would be acceptable and the authority responded on 1 August stating:

A determination in this instance would certainly give strong guidance as to how to proceed as this is a decision that is made by [the Ministry] that we have a legal obligation to adhere to.

3.3.5 The Ministry received an application for a determination on 12 August 2016 and sought additional records, information and clarification of the matters in dispute from the authority. In an email to the Ministry dated 6 October 2016, the authority noted that, even if the repainting was carried out and producer statements provided that covered the full cladding system:

..this would not be sufficient to comply with clause B2... due to the possible exposure to the structure of the building due to the failure of the building envelope. Hence the request for a report on the building envelope and structure from a suitably qualified person.

4. The submissions

4.1 The applicant briefly outlined the current situation, noting that the cladding manufacturer no longer operated under the same name and stating:

The plaster coating has some minor buckle over three of the expansion joints but is otherwise intact.

We have a plasterer who installs a similar product who can repair the joints and a painter who can repaint in a lighter colour (LRV over 40).

4.2 The applicant provided copies of:

- the 'supply, fix and coat agreement' with the cladding manufacturer
- the manufacturer's 'Installation Producer Statement' dated 18 July 2013
- some email correspondence with the authority.

- 4.3 The authority provided building consent and inspection records which included:
- the consent documentation
 - the inspection records and photographs
 - correspondence with the applicant
 - the application to amend the building consent dated 5 July 2016.
- 4.4 A draft determination was issued to the parties for comment on 8 December 2016.
- 4.5 The applicant's response, accepting the draft without further comment, was received on 9 January 2017.
- 4.6 Despite a reminder sent on 30 January 2017, the authority did not respond to the draft determination.

5. The expert's report

5.1 General

- 5.1.1 As mentioned in paragraph 1.5, I engaged an independent expert who is a member of the New Zealand Institute of Building Surveyors to assist me. The expert inspected the AAC cladding on 10 November 2016, providing a report which was completed on 14 November 2016 and forwarded to the parties on 15 November 2016.
- 5.1.2 The expert noted that the scope of the investigation was to assess 'the extent of the AAC panel control joint movement and damage' and to provide an opinion on the applicant's proposed repair work and 'continuing compliance with the Building Code'. The expert discussed the design and construction of the AAC panel cladding system with the applicant, who 'had a very good understanding of the system and the LRV requirements to minimise thermal movement.'
- 5.1.3 The expert discussed the background with the applicant, who stated that no advice had been 'received as to colour LRV requirements until all of the works had been completed and painted and the final plaster render warranty was requested.'

5.2 The AAC cladding investigations

- 5.2.1 The expert reviewed the locations of control joints and was satisfied that the layout of the 26 control joints accorded with the cladding manufacturer's instructions.
- 5.2.2 The expert inspected the 26 vertical control joint locations (see Figure 1), 14 internal corner junctions and wall sections with adhered joints, observing:
- 20 of the vertical control joints were uniform and without defects
 - 6 joints showed minor 'disruption' to the sealant joint ("the disrupted joints"), but no evidence of moisture migrating down to the base of the joints
 - there was no evidence of movement at adhered joints
 - 'very minor' movement to the control joint above the junction of the wardrobe lean-to roof with the south wall of the master bedroom was evident, which appeared to have resulted from thermal movement of the apron flashing
 - the above confirmed that excessive thermal movement was limited to designed control joints, with minor damage evident at only 6 locations.

- 5.2.3 The expert carried out thermographic investigations at each of the disrupted joints and found no evidence of thermal anomalies or temperature variation to indicate any moisture penetration at the joints. The expert also carried out non-invasive moisture testing on the interior wall surfaces behind the disrupted joints; moisture levels from 9% to 15% were recorded and there was no visual evidence of moisture penetration.
- 5.2.4 The expert also carried out invasive investigation of five of the disrupted joints by cutting back a small area of plaster to observe the underlying control joint, and noted:
- thermal movement of the joint had disturbed edges of render above the joint
 - underlying joint widths were 10mm, which is in accordance with instructions
 - cutting and lifting sections of sealant revealed PEF backing rods in place
 - sealant appeared well adhered with no separation observed.

5.3 Summary

5.3.1 The expert noted that:

- the paint colour has an LRV below 25%, allowing the potential for thermal movement at control joints that could cause damage and affect sealant
- the thermal movement to date has caused minor disruption of the plaster render over six sealant joints, but there is no evidence of moisture penetrating the joints or that the sealants have failed under the stress
- the control joints are constructed as detailed in the manufacturer's instructions
- there is no evidence of failure of adhered joints or internal corner junctions
- there is no evidence of any failure of the cladding system to comply with Clauses E2 and B2 to date
- the evidence supports the producer statement that installation of the battens and AAC backing sheets accorded with the manufacturer's requirements.

5.3.2 The expert concluded that his investigations supported:

...minor targeted repair to 6 control joints only and a paint colour change undertaken by a suitably qualified LBP trades person.

5.3.3 The expert considered that the repairs and repainting proposed by the applicant and described in the garage plasterer's quotation, followed by a producer statement for that work, would 'repair the joint sealant damage caused by the investigations and provide an appropriate repaint to the AAC claddings.'

6. Discussion

6.1 Evaluation of the AAC cladding for compliance

- 6.1.1 The evaluation of building work for compliance with the Building Code and the risk factors considered in regards to weathertightness have been described in numerous previous determinations (for example, Determination 2004/1).
- 6.1.2 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water and the wall cladding system as installed and/or proposed.

6.2 Weathertightness risk for the AAC cladding

- 6.2.1 The weathertightness of the AAC cladding is dependent on the features that protect the walls from the weather, features included in the cladding system, the workmanship of the installed cladding system and the consequences of failure on the underlying construction.
- 6.2.2 The AAC claddings have the following environmental and design features, which influence their weathertightness risk profile:

Increasing risk

- the house is in a very high wind zone
- there are some complex junctions at roof/wall intersections
- the low-pitched monopitched roofs include oblique eaves

Decreasing risk

- the wall claddings are installed over cavities
- despite some oblique eaves, generous roof overhangs shelter the cladding
- external wall framing is treated to a level that provides some resistance to decay if it absorbs and retains moisture.

- 6.2.3 The cladding system has been evaluated using the E2/AS1 risk matrix, which allows the summing of a range of design and location factors applying to a specific building design or specific parts of a building. The resulting level of risk can range from 'low' to 'very high'. In the case of this house, the wall cladding is assessed as having a moderate weathertightness risk profile.

6.3 Weathertightness performance of the cladding

- 6.3.1 It is clear from the expert's report that, excluding the paint colour, the AAC cladding system was installed in accordance with the manufacturer's installation instructions. It is also clear that the installed control joints have provided for the excessive thermal movement resulting from the dark paint colour, and the wall cladding has remained weathertight with no damage to the underlying structure despite superficial damage to six of the joints.

6.4 Weathertightness conclusion

- 6.4.1 I consider the expert's report establishes that the current performance of the AAC cladding is adequate because there is no evidence of moisture penetration into the cavity and the timber framing. Consequently, I am satisfied that the cladding currently complies with Clause E2 of the Building Code and the framing complies with Clause B1 of the Building Code.
- 6.4.2 In addition, the house is required to comply with the durability requirements of Clause B2, which requires a building to satisfy all the objectives of the Building Code throughout its effective life. The durability requirements of Clause B2 include a requirement for wall claddings to remain weathertight for a minimum of 15 years and for timber framing to remain structurally adequate for a minimum of 50 years.
- 6.4.3 Because the cause of the superficial damage has been confirmed as resulting from excessive thermal movement due to the dark paint colour of the cladding, I am able to conclude that satisfactory discrete repairs of plaster and joints at the limited areas identified in the expert's report, followed by an appropriate paint coating of a higher light reflective value will avoid future excessive thermal movement and result in the continued compliance of the cladding with Clause E2 and the underlying timber framing with Clause B1 for the period set out in Clause B2.
- 6.4.4 Effective maintenance of the house is important to ensure ongoing compliance with the Building Code and is the responsibility of the building owner. The Ministry has previously described maintenance requirements associated with the external building envelope (for example, Determination 2007/60). In the case of the AAC cladding, maintenance will include following the manufacturer's recommended maintenance and future repainting procedures.

6.5 The requirement for a producer statement for the AAC cladding

- 6.5.1 The authority required a producer statement and warranty for the AAC cladding system but due to the dark colour of the paint coating the installer's producer statement was limited to the battens and backing panels and a warranty for the complete cladding system was not issued. Although I acknowledge that an installation producer statement and warranty was a condition of the building consent, there is no basis in the Act for an authority to demand these as a condition for establishing compliance of completed and/or proposed building work and for issuing a code compliance certificate¹⁰.
- 6.5.2 The proprietary plaster and paint system formed part of the installation agreement between the cladding manufacturer and the owners – and was completed by the end of 2012 by the house plasterer as part of that contract. Neither the installer nor the cladding manufacturer now operate under trade names used at that time, so the applicant has been unable to resolve the situation.
- 6.5.3 The authority is entitled to accept producer statements and warranties if these are offered, but it should not rely on these to the exclusion of other evidence that demonstrates code-compliance. In the case of this particular proposed amendment, the evidence indicates that completion of minor repairs and repainting will result in the compliance of the cladding system, notwithstanding the lack of a producer statement for the original plaster or a warranty for the entire system.

¹⁰ For an expanded discussion on producer statements and establishing compliance with the Building Code, see *Determination 2010/096* (28 October 2010) Department of Building and Housing

7. The decision

7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:

- the AAC cladding as installed complies with Clause E2 of the Building Code, and satisfactory completion of the proposed repairs and repainting will bring the cladding into compliance with Clause B2 of the Building Code
- as I have concluded that the proposed work will result in the AAC cladding also complying with Clause B2 of the Building Code in this particular case, I reverse the authority's decision to refuse to issue an amendment to the building consent in respect of the above matter only.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 27 February 2017.

John Gardiner

Manager Determinations and Assurance