



Determination 2012/069

Regarding the refusal to issue a code compliance certificate due to concerns about durability of a wood/plastic composite deck to a house at 139 Pukehina Parade, Te Puke (to be read in conjunction with Determination 2010/025)



1. The matters to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Ministry of Business, Innovation and Employment (“the Ministry”)², for and on behalf of the Chief Executive of the Ministry.

1.2 The parties to the determination are:

- the owner of the house, V Moore (“the applicant”) acting thought the local supplier for the material (“the supplier”)
- Western Bay of Plenty District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.

1.3 The manufacturer and builder have been included as persons with interest in the matter.

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

² After the application was made, and before the determination was completed, the Department of Building and Housing was transitioned into the Ministry of Business, Innovation and Employment. The term “the Ministry” is used for both.

1.4 The reason for the application

- 1.4.1 I have previously described certain building matters in Determination 2010/025 issued on 22 March 2010 (“the first determination”), which considered the authorities refusal to amend a building consent due to concerns about the proposed use of a wood/plastic composite product (“the composite decking”) on a deck.
- 1.4.2 This second determination arises because, in response to the first determination:
- the manufacturer of the composite decking had an accelerated weathering test conducted to establish compliance with Clause B2 Durability
 - the authority did not accept the results of the testing established compliance and refused to issue the code compliance certificate.
- 1.5 The matter to be determined³ is therefore whether the authority was correct in its decision to refuse to issue the code compliance certificate. In making this decision I must also consider whether there is sufficient information available to establish whether the composite decking complies with Clause B2 of the Building Code insofar as it relates to Clause B1.
- 1.6 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”), the relevant earlier determination, and the other evidence in this matter.

2. The building work

- 2.1 The building work consists of a house with a low deck to the ground level sited in an area at high risk of windblown sea-spray salt for the purposes of NZS 3604⁴. The northeast facing deck is provided with some shelter by the dwelling and a portico covering approximately 40% of the deck.
- 2.2 The original plan for the dwelling was for 100mm x 25mm Kwila timber to be used for the decking material and the steps, but this was subsequently changed by the applicant to the composite decking material. The material used on the deck and steps (“the composite decking”) is 88mm x 23mm wood/plastic installed on joists at 450mm centres. The 139mm wide composite decking is installed on a vertical face around the perimeter of the deck.
- 2.3 The composite decking is an extruded composite product made from a mixture of ground sawdust or wood flour, recycled high-density polyethylene (rHDPE) plastic milk bottles, additives, stabilisers, bonding agents, and pigments. Over 50% of the product is from wood.
- 2.4 The manufacturer states that the composite decking has excellent water resistance; however, product information also makes it clear that it is not recommended for ‘use in water’ which will lead to absorption of moisture and swelling over time. The product carries a ten year manufacturer’s guarantee against rotting, warping, splitting and cracking due to environmental factors, provided it is installed and used according to the manufacturer’s recommendations.
- 2.5 The product literature from the manufacturer quotes CSIRO⁵ tests that show the product is resistant to termite attack. The product can therefore be considered borer

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

⁴ New Zealand Standard NZS 3604:2011 Timber-framed buildings

⁵ Commonwealth Scientific and Industrial Research Organisation

resistant. The literature also states that '[the] decking products have a high degree of UV stability with a modern, multi-functional UV stabilisation system', and that the product is unaffected by salt air.

3. Background

3.1 The authority issued building consent (no 77673) for the house on 8 November 2007 under the Act. At some time during construction the applicant opted to use the composite decking; it appears that no amendment to the consent was sought at that time.

3.2 The building work was completed and the authority carried out a final inspection on 24 June 2008. The authority's inspection record notes 'Demonstrate the compliance of the [composite decking] product with B2 of the Building Code for durability of 15 years'.

3.3 On 13 November 2008 the authority wrote to the applicant to confirm that it did not consider the deck to be 'a main route to the main entrance' and reiterated its requirement for information that demonstrated compliance of the composite decking with a durability period of 15 years. The applicant subsequently made the first application for a determination on the matter.

3.4 On 22 March 2010 the Ministry issued the first determination confirming the authority's decision, and concluding that:

- the decking is required to be durable for not less than 15 years
- the composite decking is generally comparable to wood in strength and meets the requirements of Clause B1 Structure of the Building Code
- information included in the consent application was not sufficient for the authority to be satisfied on reasonable grounds that the building work would comply with Clause B2 Durability of the Building Code

3.5 Paragraph 6.2 of the first determination noted:

Neither the manufacturer nor the supplier has been able to supply the [Ministry] with sufficient information about the product's durability under ultraviolet weathering, or with evidence of product in-service performance relevant to the New Zealand environment for me to form a view that the decking would comply with Clause B2.

3.6 Paragraph 6.3 of the first determination noted that a proposed test methodology to assess the durability of the composite decking (with respect to degradation from exposure to UV) had been outlined to the Ministry, and that:

[s]ubject to clarification that the test standard quoted ... (ASTM G155 (2005)) is an appropriate method for the particular material, it would appear that the successful conclusion of these tests would provide sufficient grounds for the authority to form a view as to compliance with B2.

3.7 The accelerated weathering testing

3.7.1 The manufacturer of the composite decking engaged BRANZ⁶ to undertake an accelerated weathering test to examine colour stability and flexural strength retention of the composite decking. A report dated 15 August 2011 was provided to the manufacturer which recorded the results for 7000 hours of 'accelerated exposure' on

⁶ Building Research Association of New Zealand

the test samples for colour, elasticity, and rupture. The report concluded that ‘the results of the mechanical testing ... suggest that samples retained the majority of their flexural properties after artificial aging’, and that ‘the results obtained are as expected and in broad agreement with results obtained for similar materials.’

3.8 The refusal

- 3.8.1 In an email to the manufacturer on 6 January 2012 the authority noted that the BRANZ test was of a sample and was not an appraisal. The authority maintained the view that it could not be satisfied as to the compliance with the required 15 year durability period.
- 3.8.2 The authority also noted that if the building consent was amended to remove the deck from the building work a code compliance certificate could be considered provided there were no other matters outstanding. The authority confirmed that the consent could also be amended in respect of the durability periods starting from the date of substantial completion, being 24 June 2008.
- 3.8.3 However, the authority also noted that ‘even if the deck were to be removed from the building consent [the authority] would be obliged to take some form of action [in regard to] its non-compliance’ and that this would take the form of a notice to fix requiring that the deck be brought into compliance.

4. The submissions

- 4.1 The applicant forwarded copies of
- the accelerated weathering test report
 - various correspondence from the supplier and the authority
 - correspondence from the Ministry pre-dating and in respect of the first determination.
- 4.2 The authority acknowledged the application for determination in an undated letter and submitted that it maintained the view that the testing, as opposed to an appraisal, was insufficient to establish durability.
- 4.3 The Ministry sought further information from the applicant as to the size of strips of composite decking installed, some construction detail, and the use and acceptance by other authorities of the same composite decking. The Ministry also sought to clarify the equivalence of the 7000 hours of accelerated weathering with years of outdoor service.
- 4.4 The supplier responded to the Ministry in a letter dated 29 June 2012, noting that the testing carried out was identical to that which would be done for an appraisal for outdoor use and that the composite decking samples were more durable under testing than ‘samples of treated pine and kwila decking boards’. The supplier also provided an appraisal for a similar wood/plastic composite product, stating that the testing carried out was the same but that the appraisal included aspects of import logistics systems, and noting that the appraised product is considered to meet the performance requirements in respect of durability.
- 4.5 The supplier sought a statement of opinion from BRANZ as to the durability of the composite decking based on the test results. On 23 August 2012 the supplier forwarded an email dated 2 September 2011 from BRANZ to the manufacturer,

which included an outline of appraisals done by BRANZ and that noted ‘the UV/Weathering Accelerated testing that we have completed is the testing that is done to satisfy BRANZ Appraisal B2 Durability Criteria’.

4.6 A draft determination was issued to the parties for comment on 16 October 2012.

4.7 The supplier accepted the draft determination on the applicant’s behalf without further comment in an email response on 17 October 2012. The builder also responded without comment on the draft in an email on 23 October 2012.

4.8 The authority responded by email on 29 October 2012 accepting the draft subject to the following comments:

- The authority took ‘all factors’ into account when making its decision, including the height of the deck.
- The decking is required to comply with the Building Code regardless of its height, or whether it was work that was except from the need for a building consent. The Ministry was consulted on the appropriate durability requirements, being 15 years.
- The as built deck did not comply with the consent as required by section 94(1)(a) of the Act.

4.9 I have amended the determination as I consider appropriate.

5. The expert’s report

5.1 As described in paragraph 1.6, I engaged the services of an expert, who is a member of the New Zealand Institute of Building Surveyors, to assist me. The expert examined the house on 14 September 2012 and produced a report dated 16 September 2012. A copy of the report was forwarded to the parties on 19 September 2012.

5.2 The expert carried out an assessment of the current state of the decking in terms of its installation and the in-service performance of the composite decking material, noting that the deck is well constructed and largely compliant with the manufacturer’s instructions. The expert observed that the decking was ‘in very good condition after four years of harsh exposure to the elements’ and noted minor changes in respect of the shape of the deck in plan and the location of the steps to the deck.

5.3 The expert made the following observations (in summary):

- No excessive flexing of the composite decking between joists was evident.
- No increase in thickness, cupping, or twisting of the decking was evident.
- Fading was consistent across the deck.
- Swelling was evident in width of some decking at cut ends.
- There was slight swelling/popping of plank surface around some fixings.
- Some swelling in width and discolouration of one decking member was observed below a planter.
- There was localised splitting in the 139mm wide decking.
- Isolated slight cracking was observed in the ends of cut decking.

- 5.4 The expert concluded that the minor swelling, popping and cracking observed are not compromising the deck's performance, and that the material was performing similarly to that expected of Kwila or other hardwood decking and better than expected of Pinus Radiata.

6. Discussion

- 6.1 As mentioned in paragraph 3.7, an accelerated weathering test was carried out on samples of the composite decking by BRANZ. The results of those tests indicate that the samples performed adequately in terms of strength after 7000 hours of accelerated weathering to ASTM G155 (refer paragraph 3.6). I note the reference made in the email from BRANZ to the manufacturer that the accelerated weathering test that was carried out 'is the testing that is done to satisfy BRANZ Appraisal B2 Durability Criteria' (refer paragraph 4.5). I take this to mean that the successful outcome of the ASTM test is equivalent to 15 years outdoor service.
- 6.2 I note that the testing was not part of a full product appraisal. An appraisal would interpret the results from the same test and provide an opinion as to durability, but with the additional examination of quality assurance, manufacturing and installation methodology.
- 6.3 In the absence of this latter information the expert was engaged to undertake an examination of the deck in question to assess its installation and performance in use. The expert found that, with very minor exceptions, the composite decking had been installed in accordance with the manufacturer's instructions, and was also performing as well and better than Pinus Radiata for the period since the decking was installed (approximately 5 years).
- 6.4 The agent has referred to a current BRANZ appraisal for a similar product (refer paragraph 4.4). I note that while there may be similarities between the appraised product and the composite decking there may also be significant differences. The appraisal would take account of the quality assurance in manufacturing and the installation, which would inform an opinion as to performance of a product including its durability, as noted above.
- 6.5 In my view, taking into account the building work no longer complied with the consent and the information that the authority had received at the time in regards the durability of the composite decking, the authority was correct in its decision to refuse to issue the code compliance certificate based on its concerns as to the durability of the composite decking. However, I am of the view, given the information before me and taking account of the expert's observations that the composite decking as installed complies with the required 15 year durability period described in Clause B2.3.1.
- 6.6 I note that the composite decking is readily observable in normal use; any defects will be easily detected and any defective material easily replaced. I also note the deck is situated in the order of 800mm above the surrounding ground, and the consequences of failure would be less than if the decking was located at a height where injury could occur.
- 6.7 I emphasise that each determination is conducted on a case by case basis. The fact that the composite decking may be considered code-compliant in one circumstance does not mean that it will automatically be code-compliant in another circumstance.

6.8 The variation between the deck as described in the approved consent and as-built (changes to the plan layout and the use of the composite decking) should be formalised as an amendment to the consent to the satisfaction of the authority.

7. The decision

7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the composite decking material installed to the subject deck complies with Clause B2 of the Building Code insofar as it relates to Clause B1, and accordingly I reverse the decision of the authority to refuse to issue the code compliance certificate.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 6 November 2012.

John Gardiner
Manager Determinations