Determination No 2000/3

Brick veneer cladding on a new house

1 THE MATTERS TO BE DETERMINED

1.1 The matters before the Authority arise out of a dispute about the issuing by a territorial authority of a code compliance certificate in respect of a new house. The dispute centres on whether or not the concrete masonry ("brick") veneer cladding complied with the building code (the First Schedule to the Building Regulations 1992) in respect of clauses B1 Structure, B2 Durability, and E2 External moisture.

1.2 The applicant specifically asserted that the cladding was non-complying in the following respects:

- Width of cavity.
- Spacing of wall ties.
- Control joints.
- Irregular and inadequate mortar jointing.
- Incorrect fixing and placement of the moisture barrier.
- Width of brick piers.

1.3 In making its decision, the Authority has not considered whether the building complied with any other provisions of the building code.

2 THE PARTIES

2.1 The applicant was the owner acting through a firm of building consultants. The only other party was the territorial authority acting through a firm of solicitors.

3 THE BUILDING AND THE SEQUENCE OF EVENTS

3.1 The building is a detached house of conventional light timber frame construction. The external walls are clad with brick veneer over building paper.

3.2 The building was originally erected under a building consent issued in May 1994. The territorial authority issued a code compliance certificate in July 1994.

3.3 The owner was dissatisfied with various aspects of the building, including the brick veneer, and the matter went to arbitration between the owner and the builder in 1996.

3.4 By July 1998 the veneer had been completely removed and replaced.

3.5 In July 1998 the owner's consultants wrote to the territorial authority alleging that the owner had incurred costs attributable to the territorial authority's negligence and seeking compensation.

3.6 After further correspondence, the applicant applied for a determination in May 1999.

3.7 Authority staff responded that the matters submitted for determination did not appear to come within section 18 of the Act because the "particular building work" concerned no longer existed. However, the applicant confirmed that it wished the Authority to process the application.

3.8 Submissions by the parties were received in November 1999. Submissions included correspondence between the parties, internal territorial authority memoranda, and photographs of the house with the original veneer in place and after it had been removed. The parties also submitted three technical reports, which are discussed in 4 below.

3.9 In February 2000, the Authority referred the parties' submissions to a consulting engineer with experience in concrete and masonry construction. The engineer's report was received in March 2000 and copied to the parties. The territorial authority advised that it had no comments to make on the report. In May 2000 the applicant submitted the comments discussed in 4.7 below.

3.10 The processing of the application has been outlined above because it took considerably longer than the Authority would normally consider acceptable. However, whether or not the veneer complied with the building code, it no longer existed so that the delay did not affect health, safety, or the progress of construction.

4 TECHNICAL REPORTS

4.1 The parties gave the Authority three inspection reports, each of which had been obtained well before the application for a determination. The Authority itself obtained a report from an independent consulting engineer, and the applicant commented on that report.

4.2 The territorial authority submitted a report from a building consultant, which had apparently been prepared for the purposes of the arbitration between the builder and the applicant. The consultant inspected the house in December 1996, and the report included comments to the effect that:

(a) The veneer was well laid with plumb corners, neatly finished at door and window openings, true to line with uniform mortar spacings.

(b) There were unsightly mortar repairs along a zigzag crack running down six courses and on some individual bricks, which could be easily remedied.

(c) There was some efflorescence and some colour differences that would decrease with time and were "not sufficiently glaringly obvious [to] impact negatively on the value of the property".

(d) The "brick piers" were not piers at all, but "completely orthodox" veneers on short lengths of wall.

4.3 The applicant submitted a report from another building consultant. That consultant inspected the house in November and December 1997, and the report included comments to the effect that:

(a) Cavity widths varied from 15 to 55 mm. The 15 mm was at the top of the walls where bricks had been laid on their flat to give a veneer thickness of 90 mm as compared with 75 mm elsewhere. Mortar droppings intruded into the cavity, and in some places touched the building paper.

(b) On the basis of a Building Research Association of New Zealand ("BRANZ") bulletin, cavity ties should have been at "600 mm horizontally and 400 to 450 mm vertically". However:

(i) "The horizontal cavity ties measured at the sill on the south and west sides were at approximately 1m apart."

(ii) "The cavity ties to the North face, bottom of bedroom 3 window, there was a tie visible at the right hand bottom corner with no other ties visible in the width of the window at sill height. The next row of ties were approximately, 460 mm down from the sill."

In one place "the area of veneer was cracked and appeared to move when thumped by hand".

The report concluded: "In those areas that were opened up at the windows, the ties do not comply, which places a serious question mark on the balance of ties in unseen areas."

(c) There were no obvious movement control joints.

(d) Horizontal mortar joints varied from 4 to 12 mm and vertical joints from 3.5 to 15 mm, whereas NZS 4210 specified not less than 7 mm and not more than 20 mm with a tolerance of ± 3 mm.

(e) On one wall, "the building paper laps in behind the damp proof course from the floor slab".

(f) "As the work does not comply to the standards or is aesthetically acceptable, the only repair that can be recommended . . . is that the existing brickwork be removed and the veneer rebuilt."

4.4 The applicant also submitted a report from a bricklayer appointed by the complaints committee of the local Masonry Trades Association. The bricklayer inspected the house in November 1997, and the report included comments to the effect that:

(a) Cavities were measured at 15 to 35 mm when there should have been a 40 mm minimum cavity. Mortar "should not extend beyond the back face of the brick more than 5 mm [but in places] the mortar is virtually closing the cavity off. . . . Two top rows of bricks have been laid on their side . . . and have reduced the wall cavity to undersize."

(b) Many joints measured 3 to 4 mm wide when they should have been between 7 and 20 mm.

(c) Two "brick walls" (presumably the "brick piers" referred to in the application) were less than 390 mm wide "which is . . . under width".

(d) "The workmanship of the job is not of a Tradesman standard and should be taken down and rebuilt to a Tradesman's standard."

4.5 The consulting engineer's report obtained by the Authority made comments to the effect that:

(a) A minimum cavity width is necessary for ventilation and to prevent external moisture contact with the inner side of the cavity. A minimum of 40 mm has been accepted practice for many years, although there is no definitive evidence to substantiate that figure. Tolerances for timber construction may cause that cavity to vary by ± 10 mm. "Hence it is my opinion that a cavity nominal 40 mm could in practice be 30 or 50 mm" without breach of clause E2 of the building code.

The engineer was also of the opinion that a 15 mm cavity at the top of the wall, where the veneer was protected by the eaves/soffit overhang, would not cause a breach of clause E2.

As to mortar droppings, the engineer said:

> The principal concept of cavity wall construction is that the external leaf acts as a rain shield and no devices across the cavity are permitted to transmit water to the inner leaf. Wall ties have to pass a special test to ensure that they do not allow such water movement. If mortar droppings close the cavity then there is some risk of transferring the moisture.
>
> Substantial droppings within the cavity could lead to breaches of [clause E2 of the building code].
>
> The cavity could have been cleared without wholesale demolition of the veneer by removing selected bricks from the bottom course, clearing the cavity, and replacing the bricks.

(b) As to wall ties, the building consent drawings indicated a wall tie spacing of 600 mm horizontally and 300 mm vertically, so that each tie supported a face area of 0.18 m^2 of veneer. Recent studies indicated that the area supported could be increased to 0.24 m^2. If the 0.24 m^2 was exceeded then the veneer would be likely to fail in earthquake and would not comply with clause B1 of the building code.

(c) Control joints are provided to prevent the creation of random cracks as concrete masonry shrinks after laying. Control joints in veneers are not required to be sealed. The width of crack in a control joint is likely to be the same as the width of the random crack that would form if there were no control joint. "Whether it is a random crack or controlled crack it will not breach [clause B1 or clause E2 of the building code]".

(d) Varying thicknesses of mortar joints would not cause a breach of clauses B1 or E2 of the building code provided the horizontal joints were of sufficient thickness to bed and cover the wall ties. In the engineer's opinion, the photographs appeared to show that the horizontal joints were of sufficient thickness.

(e) Incorrect lapping of the building paper will not of itself amount to non-compliance with clause E2 of the building code. However, if fault in the exterior barrier, such as mortar droppings, causes external moisture to come into contact with the building paper, then incorrect lapping will increase the likelihood of external moisture entering the building.

4.6 The engineer observed that workmanship clauses in New Zealand Standard correspond to European bricklaying practice, where walls are generally loadbearing. Those practices establish a visual aesthetic appearance, but for non-loadbearing veneer the practices may not be essential to compliance with the building code.

4.7 The applicant commented on the engineer's report to the effect that the building contract and the building consent had required compliance with the versions of NZS 3604 and NZS 4210 current in 1994. Technical reports established that the cladding did not comply with those Standards. "The requirements of the New Zealand Standards cannot be brushed aside, these standards form an integral part of out Building Code and should be adhered to." The applicant also disagreed about the relationship between European practices and the New Zealand Standards for masonry, commenting that New Zealand Standards "are written with specific performances based upon seismic stability, the type of materials used, and our extremes of weather". See 5.1.2 below.

5 DISCUSSION

5.1 Compliance with the building code

5.1.1 The Authority recognises the applicant's concerns about compliance with the building contract and the building consent. However, a building contract will cover many matters that are not covered by the building code, and the building consent details only one way of complying with the building code. The Authority takes the view that the matters it may determine are limited by the relevant words of section 18 of the Building Act:

> **18. Matters before Authority—**An application to the Authority under section 17 of this Act shall be limited to whether or not, or to what extent, particular building work or proposed building work (including any actual or proposed demolition) complies with all of the provisions, or with any particular provision, of the building code . . .

5.1.2 The Authority considers the applicant's comments reported in 4.7 above to be misconceived. New Zealand Standards, although highly regarded, do not "form an integral part of" the building code. A New Zealand Standard cited in the Approved Documents may be used to establish compliance with specific provisions of the building code, but it can never be the only means of establishing such compliance.

5.1.3 The building code is concerned with the performance of buildings. It is not concerned with considerations such as trade practice, value-for-money, or aesthetic appearance, important though such considerations may be to owners and builders.

5.1.4 Non-compliance with the building contract is a civil matter between the parties to that contract. Non-compliance with the building consent may well be an offence under section 80(1)(a) of the Building Act, and as such is a matter for the Courts.

5.1.5 As to compliance with the building code, the Authority considers that it is required to use the most up-to-date information available to it, even when that information was not available at the time the work was done, as with the 0.24 m^2 of veneer mentioned in 4.5(b) above.

5.1.6 On that basis, the Authority concludes that the parties' submissions and the independent engineer's report indicate that the visual appearance and general workmanship of the cladding might not have been of the quality usually expected, but that actual breaches of the building code would arise only if:

(a) Mortar droppings bridged the cavity to a significant extent; or

(b) Wall ties were at spacings such that individual ties supported more than 0.24 m^2 of brickwork.

5.1.7 Having identified potential breaches of the building code, the Authority would usually request additional inspections. That is not possible in this case, because the cladding had been removed more than a year before the matter was referred to the Authority for determination.

5.1.8 As to mortar droppings, one of the reports submitted by the applicant mentions that mortar droppings bridged the cavity, but does not detail the extent of such bridges. If they were few and far between, then it seems likely that ventilation in the cavity would ensure that any moisture reaching the building paper would evaporate before it did any damage. On the other hand, if the bridges were many and close together then the building would not have complied with clauses B2 and E2 of the building code. Although the veneer apparently remained in place for four years, the applicant did not mention any problems with dampness. Thus the evidence available to the Authority is insufficient to decide whether or not the mortar droppings were such that the cladding did not comply with the building code.

5.1.9 Even if the cladding did not comply with the building code, the Authority accepts the independent engineer's opinion that it could have been brought to compliance without the veneer being completely removed and replaced.

5.1.10 As to wall ties, the evidence consisted of:

(a) The technical report described in 4.3 above.

(b) Photographs taken after the veneer had been removed. One photograph clearly shows regularly spaced ties on each stud at a vertical spacing of 400 mm to give an area supported of 0.24 m^2. Another appears to show ties at varying spacings such that some of the ties support an area significantly greater than 0.24 m^2. Unfortunately, it is not clear whether any veneer ties had been removed at the same time as the veneer was removed.

5.1.11 Clearly, the ties were not spaced at 600 mm horizontally and 300 mm vertically shown in the plans and specifications submitted for building consent, and possibly not at the 600 mm horizontally and 400 to 450 mm vertically recommended by the BRANZ bulletin. However, that does not necessarily mean that the cladding did not comply with clause B1 of the building code, as to which the Authority accepts the independent consulting engineer's advice that a tie supporting 0.24 m^2 of veneer complies with clause B1. The Authority notes that tie spacings may be increased around openings in the veneer so long as the area supported by each tie does not exceed the allowable maximum.

5.1.12 The technical report mentioned in 5.1.9(a) refers to tie spacings around windows but does not identify the areas supported by those ties. The photographs appear to show ties supporting more than 0.24 m^2, but it is possible that adjacent ties were removed when the veneer was removed. The Authority concludes that it has not been given, and cannot now obtain, the evidence necessary to decide whether the 0.24 m^2 was in fact exceeded. In other words, the Authority has not been given the necessary evidence to enable it to determine, on the balance of probabilities, whether or not the tie spacings were such that the cladding complied with clause B1 of the building code.

5.2 Jurisdiction

5.2.1 As mentioned in 3.7 above, doubts were raised about whether the Authority has jurisdiction to determine the matters raised by the applicant. One such doubt arose from the view that determinations should necessarily be limited to the purposes and principles of the Building Act as set out in its section 6. The application for this determination appears to have been for the purposes of a claim in negligence against the territorial authority.

5.2.2 However, the Authority takes the view that it does not need to decide whether or not it has jurisdiction to determine whether the cladding complied with the building code. That is because the Authority cannot make a determination in the absence of the necessary evidence. The necessary evidence is not available in this case.

6 CONCLUSION

6.1 The application and supporting submissions appear to be concerned with questions of compliance with the building contract in general and the relevant New Zealand Standards in particular. The Authority, on the other hand, is concerned only with questions of compliance with the building code.

6.2 The Authority is unable to determine whether or not the brick veneer cladding complied with the building code before it was removed.

Signed for and on behalf of the Building Industry Authority on this 18th day of August 2000

W A Porteous
Chief Executive