

Canopy to safeguard people from falling

1 THE MATTER TO BE DETERMINED

- 1.1 The matter before the Authority is a doubt as to whether a horizontal safety canopy, in conjunction with a low vertical barrier, is an adequate safeguard against injury from falling from the roof deck of a house to the courtyard below. In the course of the determination, it was also questioned whether the canopy was of adequate durability.
- 1.2 The Authority takes the view that it is being asked to determine whether the combination of canopy and barrier complies with clauses B2 “Durability” and F4 “Safety from falling” of the building code (the First Schedule to the Building Regulations 1992), and if not whether it would be reasonable to grant a waiver of the clause concerned.
- 1.3 In making its determination the Authority has not considered any other aspects of the Building Act 1991 or of the building code.

2 THE PARTIES

- 2.1 The applicant was the owner of the house acting through a firm of architects. The other party was the territorial authority.

3 BACKGROUND

- 3.1 The house is architect-and-owner designed. Part of the roof deck has a parapet less than 1000 mm in height. To protect people from injury by falling, the applicant proposed to install a safety canopy beyond the parapet, and applied to the territorial authority for a building consent. The territorial authority refused to grant a building consent.

4 THE CANOPY AND THE PARAPET

- 4.1 Most of the deck is protected by barriers in excess of 1000 mm high complying with F4/AS1 of Approved Document F4, and therefore accepted as complying with clause F4 of the building code. However, part of the deck is protected by a parapet that varies in height from 560 to 870 mm to suit the appearance of the house.
- 4.2 The proposed canopy is at the same elevation as the deck, and extends 1.5 m beyond the edge of the deck along the length of the parapet. It is a horizontal framework of stainless steel tubes strung with a continuous stainless steel wire passing through cleats welded to the tubes at 100 mm spacings, with cleats on opposite tubes staggered so that the greatest distance between adjacent lengths of wire is 100 mm. Turnbuckles are incorporated for tensioning the wire.

5 CLAUSES B2 AND F4 OF THE BUILDING CODE AND F4/AS1 IN APPROVED DOCUMENT F4

5.1 The relevant provisions of clause B2 of the building code are:

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:
 - (iii) Failure of those building elements to comply with the building code would go undetected during both normal use and maintenance of the building
- (c) 5 years if:
 - (ii) Failure of those building elements to comply with the building code would be easily detected during normal use of the building.

5.2 The relevant provisions of clause F4 of the building code are:

Clause F4—SAFETY FROM FALLING

OBJECTIVE

F4.1 The objective of this provision is to safeguard people from injury caused by falling.

FUNCTIONAL REQUIREMENT

F4.2 Buildings shall be constructed to reduce the likelihood of accidental fall.

PERFORMANCE

F4.3.1 Where people could fall 1 metre or more from an opening in the external envelope or floor of a building, or from a sudden change of level within or associated with a building, a barrier shall be provided.

F4.3.2 Roofs with permanent access shall have barriers provided.

F4.3.4 Barriers shall:

- (a) Be continuous and extend for the full extent of the hazard,
- (b) Be of appropriate height,
- (c) Be constructed with adequate rigidity,
- (d) Be of adequate strength to withstand the foreseeable impact of people and, where appropriate, the static pressure of people pressing against them,
- (e) Be constructed to prevent people from falling through them, and
- (g) Restrict the passage of children under 6 years of age when provided to guard a change of level in areas likely to be frequented by them.

- 5.3 The acceptable solution F4/AS1 in Approved Document F4 provides in effect that a minimum barrier height of 1000 mm is acceptable for external decks. A barrier that will not allow the passage of a 100 mm sphere is acceptable in houses.

6 THE SUBMISSIONS

- 6.1 The applicant contended that the proposal complied with clause F4,.
- 6.2 The application for building consent was supported by a statement from a structural engineer that the canopy would support the loads specified in NZS 4203 for roofs with no access for pedestrian traffic, which allows for a small overall live load and a point load that is appropriate for a person walking on the roof.
- 6.3 The territorial authority did not consider that the proposal complied with clause F4 and declined to grant a waiver.
- 6.4 The Authority obtained a report on the proposal from an architect with a special interest in safety barriers. That report was to the effect that:
- (a) The combination of canopy and parapet would not “reduce the likelihood of accidental fall” (clause F4.2) but would “safeguard people from injury caused by falling” (clause F4.1) because the height of fall is limited.
 - (b) The proposal complied with clause F4.3.4(a) in that it was located outside every part of the parapet that was less than 1000 m high.
 - (c) “Taken as an entity the parapet is of appropriate height for the width of the canopy.”
 - (d) The proposal complies with clauses F4.3.4(c) and (d) in that it is of adequate rigidity and strength to withstand the loads resulting from people falling over the parapet on to the canopy.
 - (e) The proposal complies with clauses F4.3.4(e) because the maximum gap of 100 mm between wires will prevent people, including children, from falling through the canopy.
 - (f) The proposal complies with clauses F4.3.4 (f) in that the parapet will “restrict” the entry of children under 6, although it will not prevent all of them from climbing over it.

“Although a person or child may be able to fall or climb over the parapet, my opinion is that the presence of the canopy addresses the primary concern of safeguarding people from injury arising out of any fall or passage over the parapet.”

- 6.5 The Authority copied that report to the parties. The applicant agreed with it. The territorial authority raised the questions of durability (how will the tensioned wires be maintained?) and whether people would be injured falling onto the wires.

7 DISCUSSION

7.1 Durability

7.1.1 The Authority considers that at least two questions arise in respect of durability:

- (a) Can “normal maintenance” be safely assumed to include regular re-tensioning of the wire if necessary?
- (b) Would failure of the canopy to comply with the building code be easily detected? Failure might result, for example, from damage to the wire at one or more of the small-radius turns around the cleats.

7.1.2 The Authority has no evidence in respect of those questions. The only engineering analysis of which the Authority is aware relates to structural strength, not to durability.

7.1.3 However, because the question of durability was raised in the course of the determination, the Authority regards it as secondary and considers that it is a matter that may properly be referred back to the parties for resolution.

7.2 Safety from falling

7.2.1 The Authority generally accepts the architect’s report outlined in 6.4 above.

7.2.2 Clause F4 requires a safety barrier where people “could fall 1 metre or more from . . . a sudden change of level”. In this case, the change of level is at the outer edge of the canopy, not at the edge of the deck. The real question is whether people are likely to be near the outer edge of the canopy. In that respect, the Authority considers it important that the canopy would be difficult to walk across.

7.2.3 As regards adults, the parapet clearly defines the edge of the deck and prevents people from inadvertently walking on to the canopy. The parapet is not so low as to create any danger of tripping, but it is not high enough to be a sufficient safeguard against falling over it, but that fall would not be of 1 metre or more. Whether a fall onto the canopy would be likely to result in injury, for example by twisting a wrist or cutting a hand on the wire, is not a question that arises in relation to clause F4, which is not concerned with the landing surface but only with the height of fall.

7.2.4 As regards children, the Authority considers that the parapet can be climbed by children over 2 years of age. However, the Authority also considers that children who did climb over the barrier would be unlikely to crawl across the canopy and then fall over the edge.

7.2.5 Accordingly, the Authority concludes that the proposal complies with clause F4 of the building code.

8 THE AUTHORITY'S DECISION

8.1 In accordance with section 20 of the Building Act, the Authority hereby determines that:

- (a) The proposal complies with clause F4 of the building code.
- (b) The proposal has not been shown to comply with clause B2 of the building code.

Signed for and on behalf of the Building Industry Authority on this 14th day of March 2001

W A Porteous
Chief Executive