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Dynamic Load Testing of the “Harris Roof Guardrail Brackets” Temporary Roof Edge Protection System

Tested in accordance with:

AS/NZS 4994.1:2009 Temporary Edge Protection
Part 1: General Requirements

Client: Harris Roof Guardrail Brackets
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Harris Roof Guardrail Bracket System

Test 1A – fixing to roof framing

Test frame:	Simulated residential construction using 90x45 timber stud framing to NZS3604:2011, 90x45mm timber trusses fixed in a typical manner to the top plate and the bottom plate anchored to steel frame to simulate a typical concrete slab.
Guardrail fixing:	2/14gx75mm tek screws to top chord of truss spacing dependant on truss centres – general spacing of trusses at 900mm centres allow for a maximum spacing of 2700mm. In general use, the brackets would be fixed to every 2 nd or third truss, dependant on actual truss spacing to not exceed the 2700mm maximum design spacing.
Top & Mid Rails:	SG8 90x45 kiln dried Radiata Pine
Test criteria:	60kg pendulum released from a height of 1m from point of impact. Max. post deflection: 401mm measured horizontally Max. top rail deflection: 401mm measured horizontally

TEST RESULTS:

TEST 1A – DYNAMIC POST TEST

Load Applied:	60kg
Deflection:	200mm
Visual Damage recorded:	None
Guardrail detachment:	Remained fully fixed
Guardrail deformation:	None
Structural failure:	None

RESULT: Satisfactory

TEST 1A – DYNAMIC TOP RAIL TEST

Load Applied:	60kg
Deflection:	232mm
Visual Damage recorded:	None
Guardrail detachment:	Remained fully fixed
Guardrail deformation:	None
Structural failure:	None

RESULT: Satisfactory

Test Apparatus

- The test apparatus (Fig.1&2) consisted of a 60kg pendulum weight hung from a forklift mounted frame to allow the apparatus to be positioned in the appropriate positions required by the test procedures outlined in AS/NZS 4994.1 2009 Appendix C.
- The pendulum weight is comprised of a 300x300mm steel block with a 15mm rubber facing extended over the surface of the impact face in accordance with the standard. The pendulum was weighed on calibrated scales to verify the 60kg weight was met.
- A datum was established above the ridgeline of the test frame roof to position the pendulum prior to release at a minimum height of 1m above the impact point (centre of gravity).
- A sliding pipe was set against the test component to measure horizontal deflection – the apparatus was mounted on the forklift and was independent of the guardrail and test frame. The pipe was marked when in position, marked after the test, then measured with a metric steel tape.

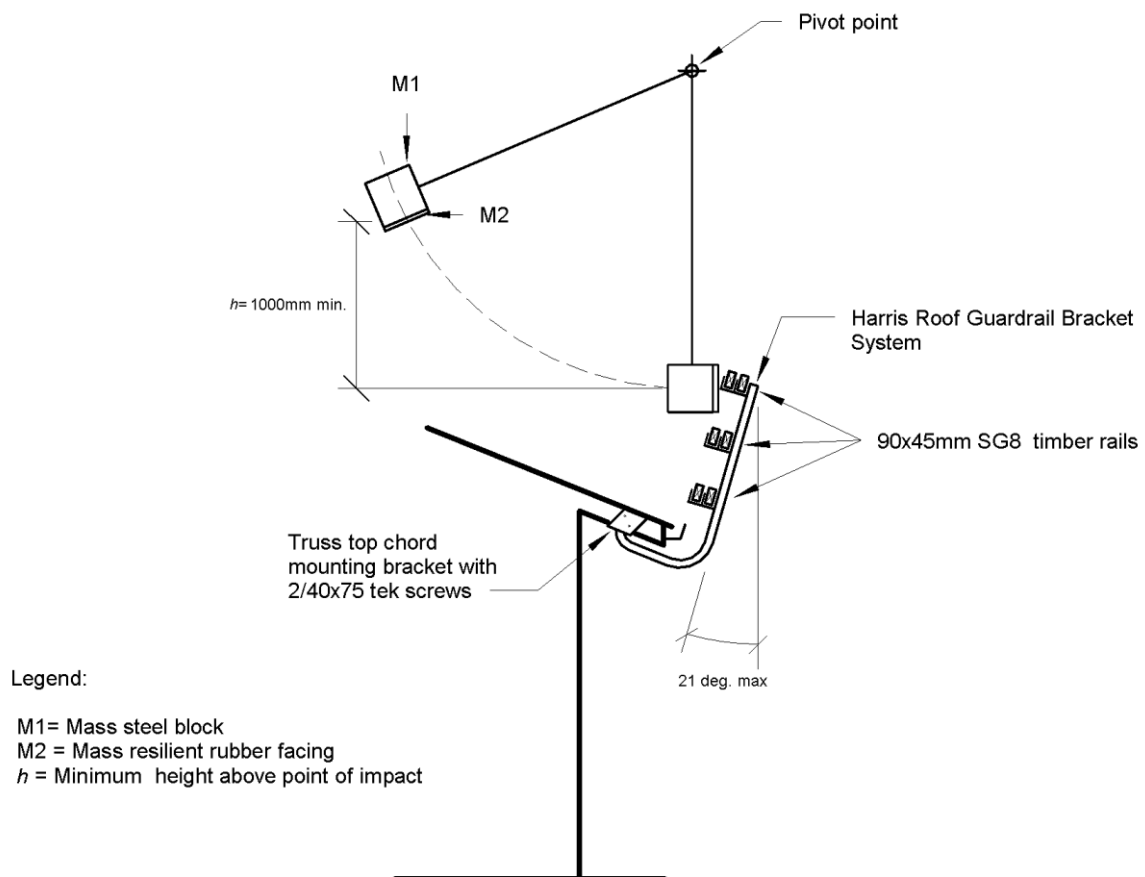


Fig1. Test configuration



Fig.2 Test apparatus

Harris Roof Guardrail Brackets

Frame Bracket:

The test bracket consists of a “J” shaped frame bracket (fig.3) fabricated from single length of 25mm nominal bore medium wall steel pipe with an outside diameter of 35mm, with the folded plate steel bracket welded to the base of the guardrail post, allowing the bracket to be hung off the top chord of a roofing truss (fig.4). The completed bracket assembly is hot dip galvanised for corrosion resistance.

The bracket is positioned to prevent a fall between the guard rail and the roof edge and then screwed to the top chord by two 14gx75mm tek screws through two predrilled holes.

The guardrail has been fabricated with a negative angle to the vertical to allow the guardrail, when positioned on the roofing truss, to be within the maximum 20° degrees from the vertical as required by the Standard.



Fig.3 Harris Guardrail post bracket



Fig.4 Roof truss bracket at the base of the guardrail

Guardrail Assembly

The horizontal rails are dropped into cup shaped receivers welded to the guardrail post. These are sized to accommodate two 90x45mm framing timber back to back to allow for joins in the horizontal rail (fig.5).

The horizontal rail is screwed to the guardrail with 1/14gx75 tek screws through the outer cup.



Fig.5 Guardrail Receiver cups

Conclusion:

The framing bracket, fixing method, post and rail assembly comply with the dynamic load test requirements of AS/NZS 4994.1:2009 Temporary Edge Protection Part 1: General Requirements