



Client: All Safework Pty Ltd
Attention: Tim Mildren
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Testing of Metal Fascia Pole Roof Edge Protection System

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1 INTRODUCTION

ALS Industrial was contracted by All Safework Pty Ltd to witness testing of their Metal Fascia Pole roof edge protection system. The system was to be tested to determine its conformance to the requirements of AS/NZS 4994.1:2009 *Temporary edge protection Part 1: General requirements*, Appendices A, B and C.

The tests on the system were conducted at ATF Services' Yatala yard at 142 Sandy Creek Road, Yatala. The testing was witnessed by ALS Principal Mechanical Engineer, Pat Cusack, on Friday, 26 September 2014.

Testing was restricted to outward and inward static loading of a middle post and the top rail and outward impact of a post and/or rail.

2 CONCLUSIONS

2.1 Metal Fascia Pole System

The components of the Metal Fascia Pole System were able to sustain the following tests specified in AS/NZS 4994.1:2009, without exceeding the specified deflection limits, becoming detached or suffering structural failure:

1. Appendix A; Horizontal outward static loads (600 N) applied to a centre post,
2. Appendix A; Horizontal outward static loads (1200 N) applied to a centre post,
3. Appendix B; Horizontal outward static loads applied to a top rail; and
4. Appendix C; Dynamic outward impact applied to a centre post.



3 PROCEDURE

3.1 All Safework Metal Fascia Pole System Description

The Metal Fascia Pole System components are shown in Figure 1 to Figure 4.

Each upright of the Metal Fascia Pole System consists of a Fascia Clamp Assembly whose inner end is clamped to the metal fascia and whose outer end is fitted to an EP Guardrail Post Support, the outer end of which clamps onto a vertical pole which rests on an adjustable Screw Jack at ground level (see Figure 2).

The EP Guardrail Post Support is fitted with a 3-Rail EP Guardrail Post to support three horizontal steel pipe guardrails (see Figure 3 and Figure 4).

The square section Guardrail post was inserted into the Support and the tubular guardrails were clamped using adjustable toggled hooks built into the 3-Rail EP Guardrail Posts.

The System was mounted to a stud frame steel building in the Yatala yard. The frame was considered to be representative of the structures to which the system would be mounted in service.

The system was tested with the posts mounted at a centre distance of 2.3 m.

3.2 Equipment and Procedures

The edge protection system and its components were tested to the requirements of Appendices A, B, C of AS/NZS 4994.1:2009. The tests performed on the components are listed below:

- (a) Static Testing of Middle Posts (Appendix A);
- (b) Static Testing of a Top Rails (Appendix B);
- (c) Dynamic Testing of Posts (Appendix C); and
- (d) Dynamic Testing of Top Rails supported by two posts (Appendix C).

The static tests required a means of applying and monitoring static test loads. An S-type load cell with a digital read-out was used to monitor the applied test loads during the tests. The load cell calibration was confirmed using certified test weights prior to testing. The load cell and digital read-out are pictured in Figure 5.

The dynamic tests required the use of a steel pendulum. A pendulum was constructed with 20 mm thick rubber on a face with nominal dimensions of 300 x 300 mm, as per the requirements of the standard. The pendulum was weighed using the load cell and digital readout and found to be 71 kg. This exceeds the 60 kg mass required by the standard.

The pendulum was suspended from a pin, allowing it to rotate freely without excessive friction. The pin was attached to a purpose built frame attached to the tynes of a forklift to ensure it remained independent of the test structure. The pendulum is shown in Figure 4.

The acceptance criteria specific to each of the tests performed on the two edge protection systems are stated in the following paragraphs.



3.3 Acceptance Criteria

3.3.1 Static Testing of Posts (Appendix A of AS/NZS 4994.1:2009)

The standard gives the following acceptance criteria for the static testing of end posts:

- a) Under a proof load of 600 N, inwards or outwards, the deflection shall not reach 101 mm.
- b) Under the maximum test load of 1200 N, the post and any part of the supporting structure shall not suffer structural failure.

3.3.2 Static Testing of a Top Rails (Appendix B of AS/NZS 4994.1:2009)

The standard gives the following acceptance criteria for the static testing of top guardrails:

- a) The resultant deflection of the top rail under the test load, shall not reach 101 mm measured between supports.
- b) The component tested shall not suffer structural failure.

3.3.3 Dynamic Testing of Posts (Appendix C of AS/NZS 4994.1:2009)

The standard gives the following acceptance criteria for the dynamic testing of posts:

- a) Under test, the deflection of the top of the post, when tested alone, shall not reach 401 mm, measured horizontally outward.
- b) No Component of the tested assembly shall become detached.
- c) No part of the tested assembly shall suffer structural failure.

3.3.4 Dynamic Testing of Top Rails (Appendix C of AS/NZS 4994.1:2009)

The standard gives the following acceptance criteria for the dynamic testing of top rails:

- a) Under test, the deflection of the top rail, shall not reach 401 mm, measured horizontally outward.
- b) No Component of the tested assembly shall become detached.
- c) No part of the tested assembly shall suffer structural failure.

3.4 Specifications

AS 4994.1:2009 "Temporary Edge Protection, Part 1: General Requirements"



4 RESULTS

The results for the test conducted on the All Worksafe Metal Fascia Pole roof edge protection system are summarised in Table 1.

The deflection limits applicable to each test are given in the table.

Table 1: Results for testing the Metal Fascia Pole System

APPENDIX	Test Description	Deflection Limits [mm]	Metal Fascia Pole System	
			Deflection [mm]	Pass/Fail
A	Post; Static; Horizontal outward 600 N	101	95	Pass
	Post; Static; Horizontal outward 1200 N	No structural failure	NA	Pass
B	Post; Static; Horizontal inward 600 N	101	90	Pass
C	Post; Impact; Horizontal outward	401	55	Pass
	Top Rail; Impact; Horizontal Outward	401	60	Pass

The components tested were able to sustain the specified test loads without exceeding the specified deflection limits, becoming detached or suffering structural failure.

5 FIGURES

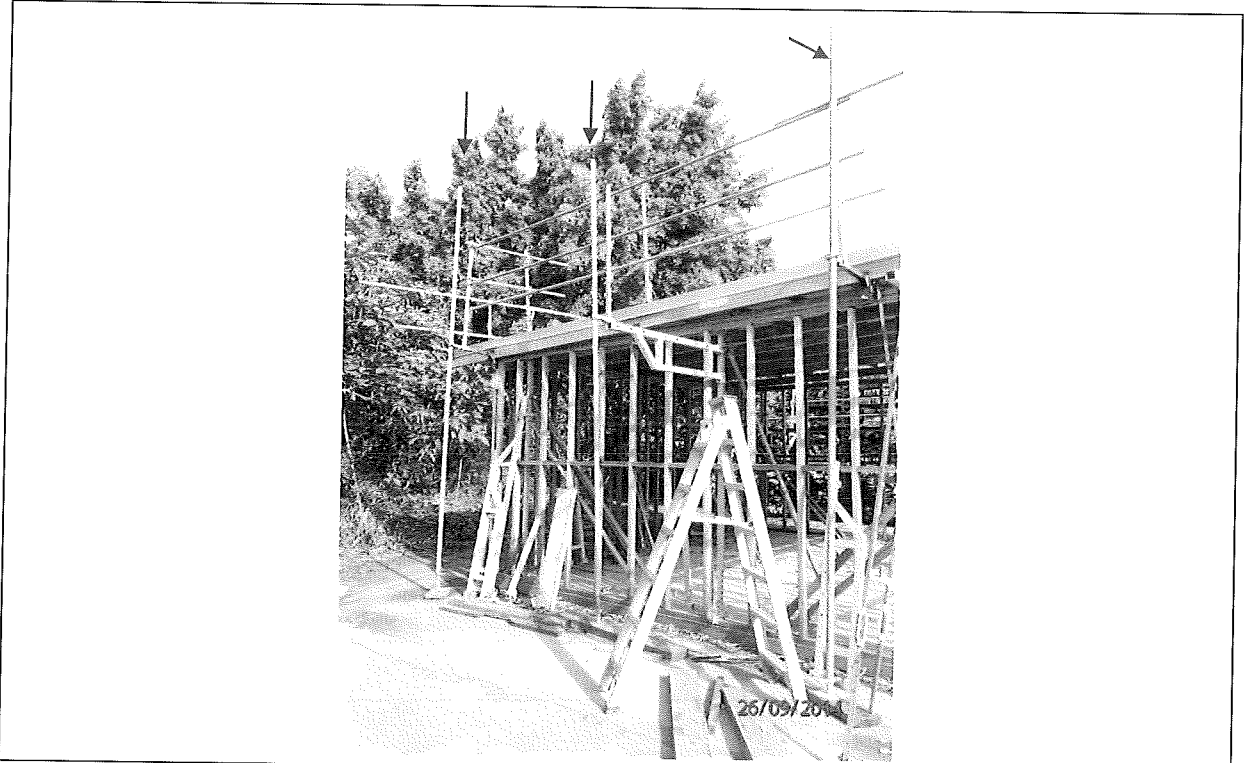


Figure 1 Metal Fascia Pole System
The three posts of the Metal Fascia Pole System (arrowed) at the Yatala test site.



Figure 2 Metal Fascia Connection to Pole
Detail of the Metal Fascia Bracket attachment to the fascia and pole.



Figure 3 Deflection reference for Metal Fascia Bracket System Tests
3-Rail EP posts and rails. The reference for deflection is a removable post (arrowed) secured to the roof structure. The middle post to be tested is 'circled'.



Figure 4 Fascia Bracket System with Pendulum in position
Pendulum in position before impact testing.



Figure 5 Load Cell and display
Load cell used to apply and measure static forces.