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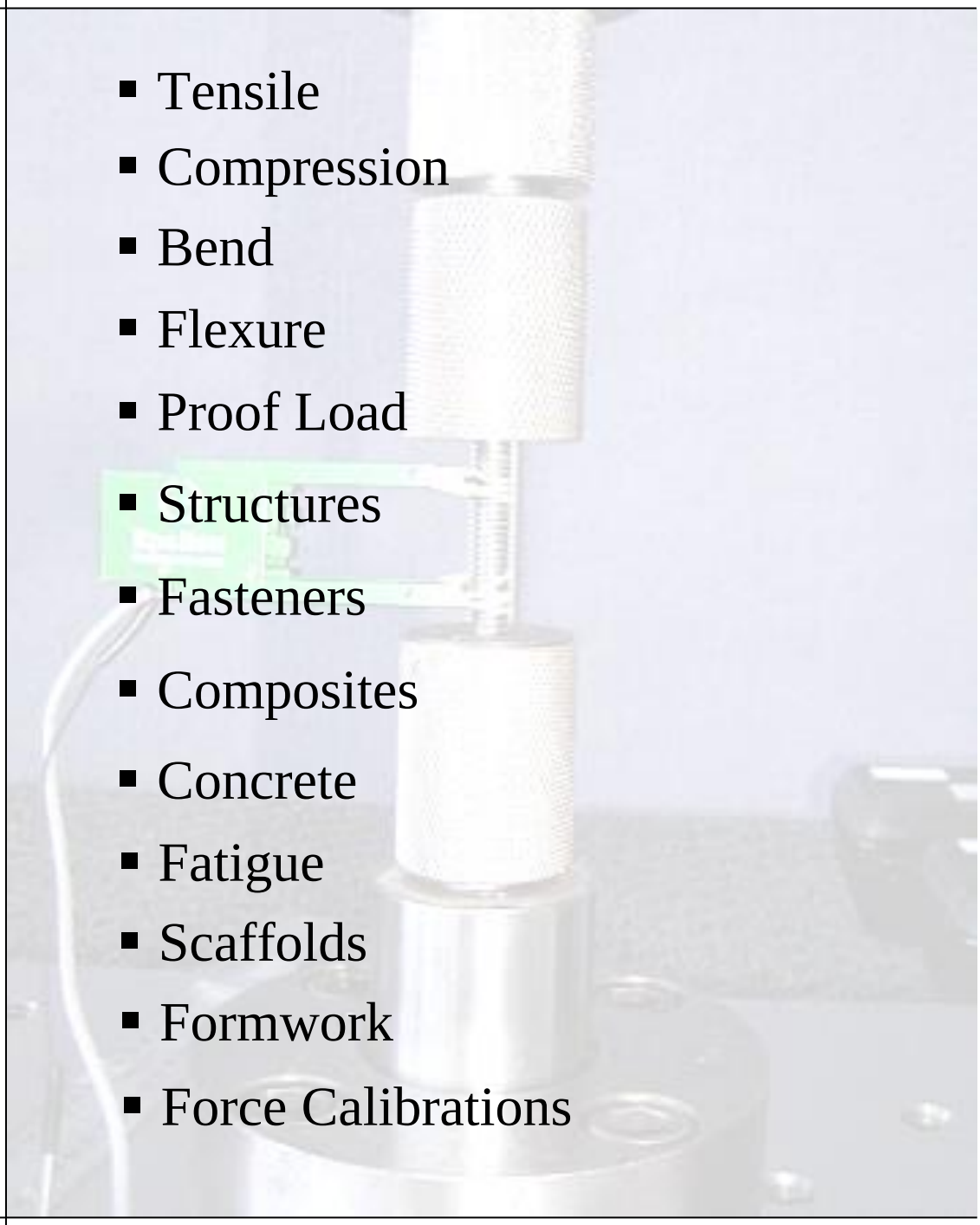

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IN CONFIDENCE TO THE CLIENT

REPORT NO: MT-15/203

TESTING OF A "SAFETY BASE" TEMPORARY RAILING SYSTEM

CLIENT: **BLACK SAND INVESTMENTS PTY LTD**
ATTENTION: PAUL LYNCH
13 RENNISON STREET
PARKDALE VIC 3195

DATE OF TESTING: MARCH 23RD – APRIL 22ND 2015

DATE OF REPORT: APRIL 22ND 2015

TEST SYNOPSIS:

A 'Safety Base' temporary post (see Fig.1) and railing system used as temporary edge protection for the safety of personnel working on elevated areas including suspended concrete slabs, balconies, lift-wells and walkways on commercial and domestic construction sites was tested by Melbourne Testing Services (MTS). All testing was conducted with the edge protection assembly constructed from 90mm x 90mm x 1.0m high posts using a pair of 45mm x 90mm F7 structural pine timbers, spaced at 2.1m centres. The railings were from 45mm x 90mm F7 structural pine timber and were attached to timber posts using four (4) x 14G x 75mm fasteners for each rail. The toe-board was from 19mm form-ply and was fitted into the side slots of the Safety Base and fixed with two (2) x 12G x 50mm fasteners. Testing was conducted to simulate installation into both concrete and plywood substrates. The bottom flange of the Safety Base was fastened to a concrete test floor using four (4) x 10mm masonry fasteners to simulate concrete installation. In the case of the plywood tests, the bottom flange of the Safety Base was fastened through 19mm form-ply to two off cuts of 45mm x 90mm x 300mm long F7 structural pine backing timber with four (4) x 10mm diameter coach screws. Upon completing the post load test with the coach screws, the Safety Base was then secured with M10 x 45mm long bolts, washer and nuts, installed through the 19mm form-ply flooring and was re-tested for all load bearing tests.

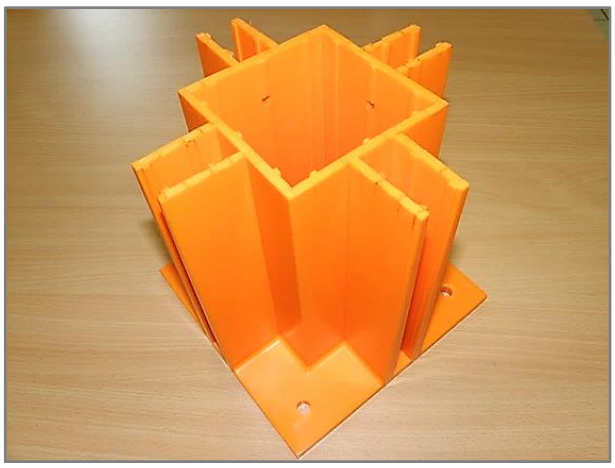

FIG. 1
SAFETY BASE TEST ITEM

TEST REQUIREMENTS:

At the request of the client, load testing was to be conducted to determine if the edge protection railing assembly could withstand test loads as required by AS/NZS 4994.1:2009 TEMPORARY EDGE PROTECTION PART 1 GENERAL REQUIREMENTS. All testing was conducted by Alex Plyshko, Test Engineer, at the Melbourne Testing Services Laboratory at an ambient temperature of 20°±3°C on a specially constructed test assembly and in accordance with the client's specific instructions.

Calibrated instruments and equipment used for the testing are listed as follows:

MTS-2273	*Force measuring load cell*
MTS-8610	*Load cell read-out device*
MTS-1006	*Deflection measuring device*

TEST COMPONENT DETAILS:

Nominal dimensions of components used in the guardrail construction are provided as follows:

- Post: Two 45mm x 90mm F7 pinus-radiata timber x 1000mm long nailed together
- Top rails 45mm x 90mm F7 pinus-radiata timber x 2100mm long
- Mid rails 45mm x 90mm F7 pinus-radiata timber x 2100mm long
- Toe-board: 19mm x 200mm form-ply x 1980mm long
- Fixings: 4 off 10mm x 60mm Powers Bluetip *(safety base concrete anchors)*
  4 off 3mm x 12mm x 38mm Washers *(safety base concrete anchors)*
  4 off 10mm x 75mm Hex-Head Coach Screws *(safety base timber floor anchors)*
  4 off M10 x 45mm bolts/nuts with *(safety base timber floor anchors)*
  4 off 3mm x 10mm x 38mm Washers *(safety base timber floor anchors)*
  8 off 14G x 75mm Timber Hex Head Screws *(rails to post fixture)*
  2 off 12G x 50mm Timber Hex Head Screws *(toe-board to safety base fixture)*

TEST DATA:

Concrete installation

Top of End Post Test in (Location 1, App A)

Static Inward Test to 735N (350N x 2.1m rails)
Max deflection δ = 58mm < δ_{max} 101mm **PASS**

Static Outward Test to 735N (350N x 2.1m rails)
Max deflection δ = 63mm < δ_{max} 101mm **PASS**

Static Outward Test to 1200N
Distortion of the bottom flange and washes observed.
No sign of structural failure observed **PASS**

Plywood and backing timber installation with Coach Screws

Top of End Post Test (Location 1, App A)

Static Inward Test to 735N (350N x 2.1m rails)
Max deflection δ = 57mm < δ_{max} 101mm **PASS**

Static Outward Test to 735N (350N x 2.1m rails)
Max deflection δ = 62mm < δ_{max} 101mm **PASS**

Static Outward Test to 1200N
Distortion of the bottom flange and washes observed.
No sign of structural failure observed **PASS**

Plywood installation with M10 bolts and nuts

Top of End Post Test (Location 1, App A)

Static Inward Test to 735N (350N x 2.1m rails)
Max deflection δ = 58mm < δ_{max} 101mm **PASS**

Static Outward Test to 735N (350N x 2.1m rails)
Max deflection δ = 60mm < δ_{max} 101mm **PASS**

Static Outward Test to 1200N

Distortion of the bottom flange and washes observed.
No sign of structural failure observed **PASS**

Top Rail Test (Location 2, App B)

Static Inward Test to 600N

Max deflection δ = 10mm < δ_{max} 101mm **PASS**

Static Outward Test to 600N

Max deflection δ = 15mm < δ_{max} 101mm **PASS**

Static Downward Test to 600N

Max deflection δ = 5mm < δ_{max} 101mm **PASS**

Toe-board (Location 2, App B)

Static Outward Test to 600N

Max deflection δ = 77mm < δ_{max} 101mm **PASS**

TEST SUMMARY

When the 'Safety Base' was installed into concrete using 10mm concrete screw and washers, 19mm form-ply with backing timber using 10mm coach screws and washers and 19mm form-ply using M10 bolts, nuts and washers the deflections recorded for all of the inward, outward and downward tests were less than the maximum allowable limits as specified in AS/NZS 4994.1:2009. The end post was observed to have performed in an elastic manner whilst under static loading to 735N. When subjected to outward static loading to 1200N there was no structural damage observed in the end post or any of the post's components.

The top rail and toe-board were observed to have performed in an elastic manner whilst under static loading to 600N.

The 'Safety Base' temporary railing system when installed in concrete using 4 off 10mm x 60mm Powers Bluetip concrete screws and washers, in plywood with backing timber using 4 off 10mm x75mm coach screws and washers and in plywood using 4 off M10 x 45mm bolts, nuts and washers, constructed and tested as reported herein satisfies the requirements of AS/NZS 4994.1:2009, Section 4.

APPENDICES:

Photographs of the various test procedures are provided in Appendix A.

Notes:

1) Melbourne Testing Services Pty Ltd shall not be liable for loss, cost, damages or expenses incurred by the client or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Melbourne Testing Services Pty Ltd be liable for consequential damages including, but not limited to, lost profit, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested.
2) This report only indicates compliance of the temporary edge protection system in its state at the time of testing at the testing condition of a temperature of ≈20°C. It should not be taken as a statement that all similar temporary edge protection systems or components of edge protection systems in all states of repair at other condition, would also be found to comply.
3) The structural integrity and compliance of the temporary edge protection system is strictly limited to the conditions as used for testing with temperature of ≈20°C and whereby the performance attributes are specific to connections made with fasteners onto rigid floor. Where connections are made to materials or temperature other than as specifically described herein the performance of the system may differ. With this in mind, MTS shall take no responsibility for the performance and/or compliance of the temporary edge protection system where connection to materials other than those used in the tests and/or temperature conditions described herein apply.
4) It remains the responsibility of the client to ensure that the temporary edge protection system is representative of production batches.
5) This report only covers the structural integrity of the temporary edge protection system assembly in accordance with the specific requirements of AS/NZS 4994.1:2009 Section 4
6) MTS shall take no responsibility for the installation and usage of the temporary edge protection system as reported herein.
7) MTS shall take no responsibility for the interpretation or misinterpretation of the procedures outlined in AS/NZS 4994.1:2009 Section 4.

ROD WILKIE
AUTHORISED SIGNATORY

ALEX PLYSHKO
SENIOR CONSULTING ENGINEER

APPENDIX A

FIG. A1
POST IN CONCRETE INSTALLATION
OUTWARD 1200N LOAD TEST

FIG. A2
POST IN PLYWOOD WITH
BACKING TIMBER INSTALLATION
INWARD 600N LOAD TEST

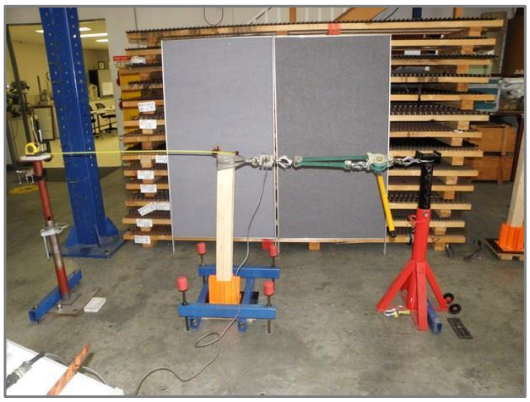

FIG. A3
POST IN PLYWOOD INSTALLATION
OUTWARD 600N LOAD TEST

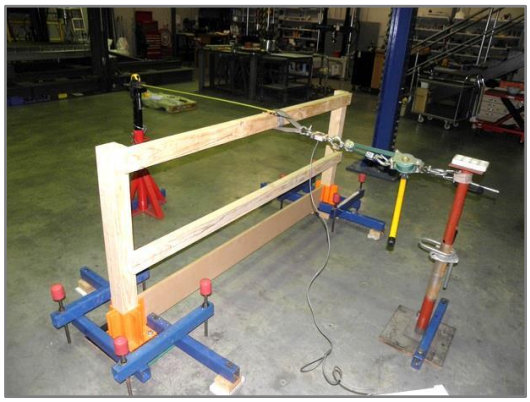

FIG. A4
TOP RAIL
INWARD LOAD TEST

FIG. A5
TOP RAIL
OUTWARD LOAD TEST

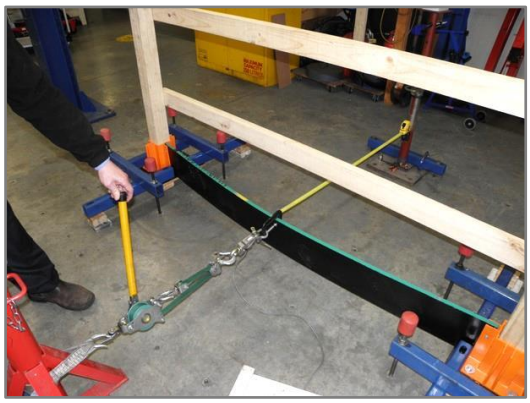

FIG. A6
TOE-BOARD
OUTWARD LOAD TEST