LOAD TESTING FOR

RHINO PROPS

FOR

RHINO PROPS AUSTRALIA PTY LTD

FEBURARY 2015

BY

BUILDING CONSTRUCTION TEST LABORATORY

1. Introduction

At the request of Mr. Steve Tonkin of Rhino Props Australia Pty Ltd, we attended during 7 to 8 February 2015 testing sessions for Rhino Props with a view to confirming their vertical working load capacity. Four sizes of props were tested, which were for general use for formworks and shoring in building construction. The tests were carried out at 6 Gatwood Close, Padstow, NSW. The test load and method of testing evolved from consideration of the Australian Standard AS 3610: 1995, Appendix A, and AS 3610 Supplement 2: 1996, Appendix CA.

2. Test Apparatus

The test was carried out using a test loading frames with Hydraulic system (30T), digital reading and load cells which has been calibrated by Precise Calibration Services (PCS), a NATA accredited organisation, and is valid for accuracy estimation until 23 October 2015.

Accessories include:
- loading bars and couplers,
- Lift truck,
- Rule, laser measures, and
- Levers

3. Specimen

Rhino Props drawing is shown in Attachment A. There are four sizes of Rhino props being tested. They are Number 0, Number 1, Number 2 and Number 3. The samples are with Rhino's identification labels. See Photo A. The range of height for the four sizes is set in Table 1 below.

<table>
<tr><th>Size</th><th>Closed Height (mm)</th><th>Full Open Height (mm)</th><th>Est. Weight (kg)</th><th>Other Measures mm</th></tr>
<tr><td>No.0</td><td>1070</td><td>1700</td><td>12</td><td rowspan="4">60X4 (outer)
46X3.2 (Inner)
150X150X6.5 (Plates)</td></tr>
<tr><td>No.1</td><td>1610</td><td>2690</td><td>16</td></tr>
<tr><td>No.2</td><td>1980</td><td>3320</td><td>19</td></tr>
<tr><td>No.3</td><td>2390</td><td>3590</td><td>22</td></tr>
</table>

Table 1: Specification of Rhino Props

Two samples were used for each size of the props, i.e. for testing either close, or full open performance status of the props.
We are advised that the props were designed by Rhino, and manufactured in India for commercial purpose in Australia.

4. Test Method

The props were supported between test frames, under Hydraulic cylinder and load cells,

with the specified eccentricities 20mm from the centre of the top plate and to the centre of the cylinder. See Photo B. The steel plate base of the props is sat on a shaped steel block with slope of 1:40. See Photo C.
To prevent lateral movement, two steel tubes are installed on scaffolding, which is a separate structure from the test frames, at mid level of the height of the props, and loosely guide the test prop in plumbing line from the hydraulic cylinder down.

Two laser distance estimators are attached on the test samples at mid height level. They are in right angle directions between each other, and are used to measure distortion occurred during testing.

Test load applied to the samples with a reasonable speed until they fail. It is considered that at this point the sample is unable to carry the applied load or has exhibited unacceptable deformation. See Photos D and E. The load data were recorded and then used for calculation of strength limit state load capacity, and convert to working load capacity.

5. Test, Results and Observations

The testing results and observations are set in Table 2 below.

Sample	Status	Test Force (KN)	Observation when Ultimate Load Applied
No. 0	Close	74.3	Unacceptable deformation at the location between top plate and inner tube. No collapse or separation of component was observed.
	Open To Max	40.9	Buckling at middle of inner tube. No collapse or separation of component was observed.
No. 1	Close	71.4	Unacceptable deformation at the location between top plate and inner tube, and the outer tube under the pin. No collapse or separation of component was observed.
	Open To Max	31.6	Buckling at middle of inner tube. No collapse or separation of component was observed.
No. 2	Close	58.6	Unacceptable deformation at the location between top plate and inner tube, and the outer tube under the pin. No collapse or separation of component was observed.
	Open To Max	22.1	Buckling at middle of inner tube. No collapse or separation of component was observed.
No. 3	Close	56.6	Unacceptable deformation at the location between top plate and inner tube, and the outer tube under the pin. No collapse or

			separation of component was observed.
	Open To Max	18.2	Buckling at middle of inner tube. No collapse or separation of component was observed.

Table 2: Testing Results and Observations

6. Working Load Capacity Conversion

The test method selected is destructive testing to Appendix A, AS3610-1995. Sample size is one.
Based on Table A1 and A2, and A.4.4.3 of AS 3610:1995, we select value of modification factor as 0.15. Further, we select value of sampling factor as 1.9.

The strength limit state load capacity can be obtained from the equation *Ru = X (test data) / 1.9.*
Based on Table 4.5.1 of the same standard, the working load capacity may be converted as:
*L = 0.8 * Ru = 0.8 * test data / 1.9.*

Using the test data in Table 2 and the equations above, the working load capacity for Rhino props is converted in Table 3.

Sample	Status	Modification Factor	Sampling Factor	Working Load Capacity (KN)
No. 0	Close	0.15	1.9	31.3
No. 0	Open To Max	0.15	1.9	17.2
No. 1	Close	0.15	1.9	30.1
No. 1	Open To Max	0.15	1.9	13.3
No. 2	Close	0.15	1.9	24.7
No. 2	Open To Max	0.15	1.9	9.3
No. 3	Close	0.15	1.9	23.8
No. 3	Open To Max	0.15	1.9	7.7

Table 3: Working Load Capacity of AZL Props

An indicative chart for relationship between the Rhino props' heights and samples working load capacities is plotted in Table 4 below. The four lines from left to right are: Size 0, 1, 2, and 3.

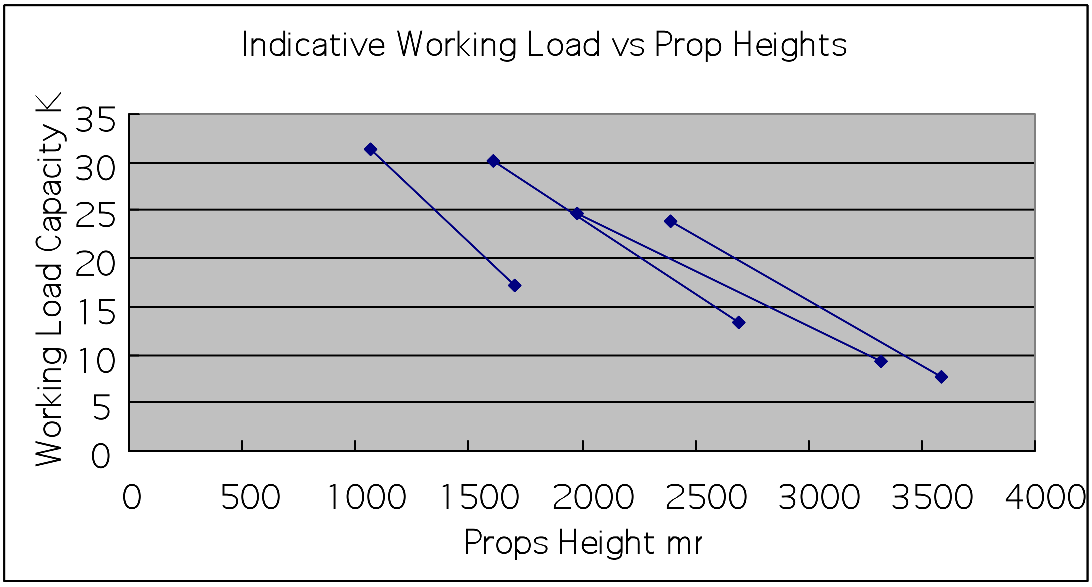


Table 4: Indicative Relationship: Samples Prop Height vs Working Load Capacity

4. Conclusion

Based on the results of single sample, destructive test method as specified in AS 3610: 1995, the working load capacities for Rhino props are estimated through testing by this laboratory as specified in Table 3 of this report.

The limitation of the small sampling in this test indicates that the results may not represent working load capacity for all prop products in the 4 sizes. More reliable information in regards the capacity should be obtained from tests with a reasonable large sampling process.

The test is supervised by

Dr. Lida Song
B.E., M.E. PhD (Civil Eng), M.I.E. Aust. C.P.Eng (659737), NPER, RPEQ (14348)

Signature:

Technician:
Linye Zhai (B. Scien)

Signature:

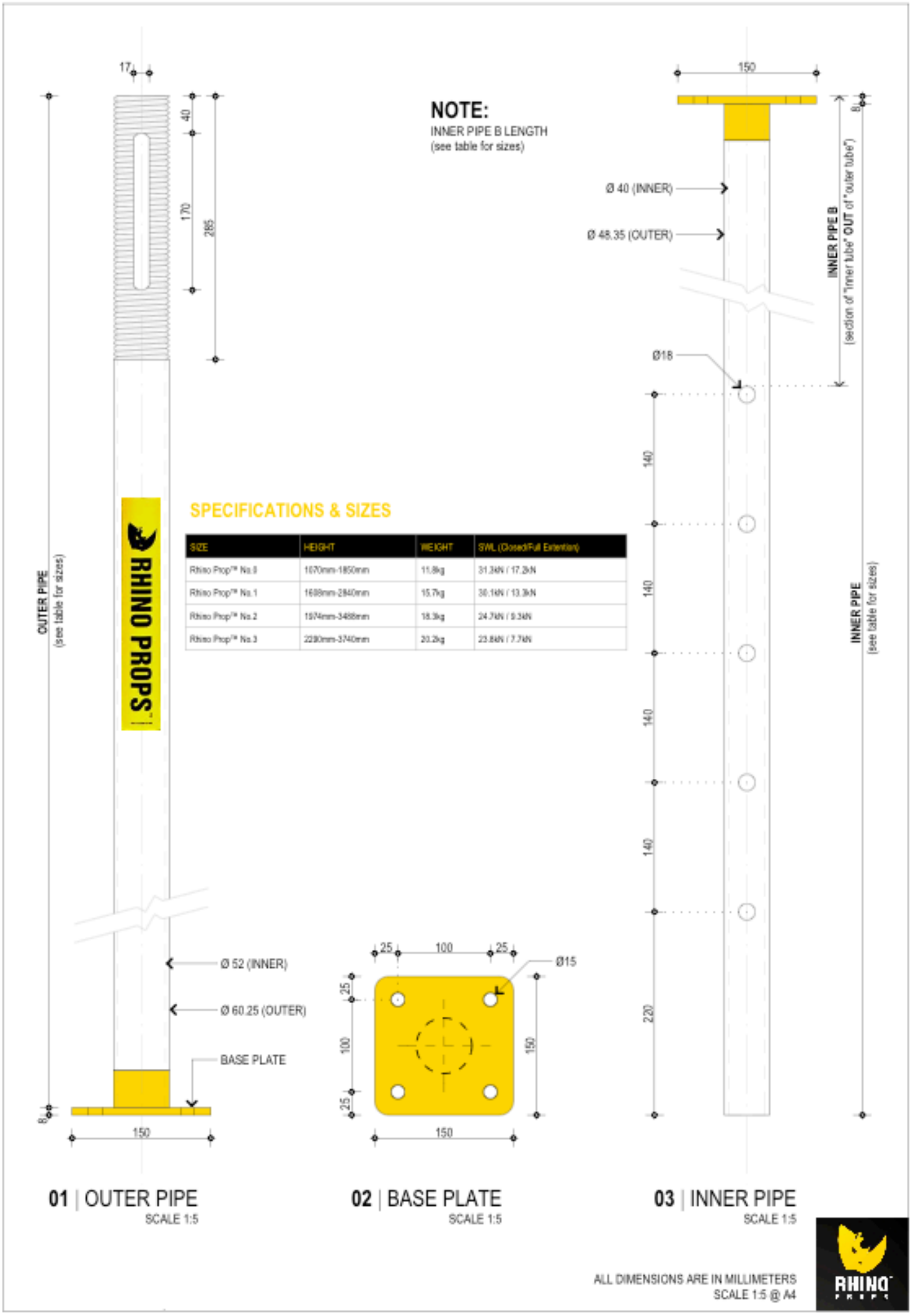
Photo A: Test Samples

Photo B: Test Setup

Photo C: Base Setup at Slope Plate

Photo D: Sample Under Test Load

Photo E: Test Sample under Test Load



SPECIFICATIONS & SIZES

SIZE	HEIGHT	WEIGHT	SWL (Closed/Full Extention)
Rhino Prop™ No.0	1070mm-1850mm	11.8kg	31.3kN / 17.2kN
Rhino Prop™ No.1	1608mm-2840mm	15.7kg	30.1kN / 13.3kN
Rhino Prop™ No.2	1974mm-3488mm	18.3kg	24.7kN / 9.3kN
Rhino Prop™ No.3	2280mm-3740mm	20.2kg	23.8kN / 7.7kN

Attachment A: Rhino Props