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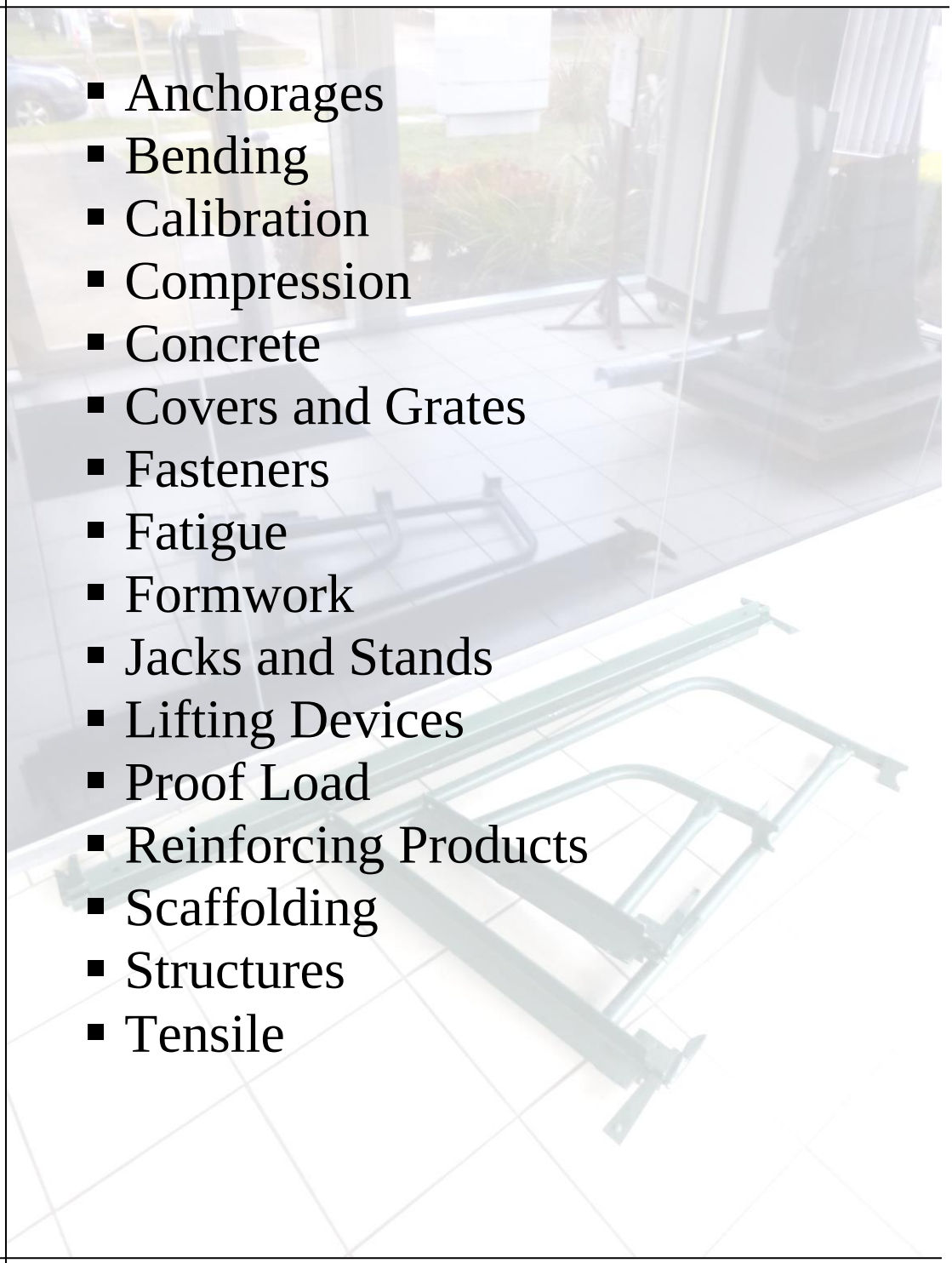

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IN CONFIDENCE TO THE CLIENT

REPORT NO: MT-13/037-C

TESTING OF CORONET LOAD BEARING SCAFFOLD COMPONENTS

CLIENT: CORONET SCAFFOLD GROUP SUZHOU CO., LTD
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DATE OF TEST: JUNE 5TH – JUNE 12TH 2013

DATE OF REPORT: JUNE 17th 2013

TEST SYNOPSIS:

A consignment of Coronet load bearing scaffold components were delivered to the MTS laboratory for load testing (see Fig.1). At the request of the client, the test items were to be tested in accordance with AS/NZS 1576.3:1995 - APPENDIX C in conjunction with AS/NZS 1576.1:2010 SCAFFOLDING PART 1: GENERAL REQUIREMENTS, to determine the compliance of each load bearing component with the aforementioned standards.

Furthermore, at the request of the client, load testing was to be performed on the scaffolding standard's V-Pressings to ascertain the mechanical strength of the connection.

In addition to the aforesaid testing, material property testing was to be performed on samples procured from the load bearing components in order to ascertain the compliance of the test items material properties with AS/NZS 1576.1: 2010.

FIG.1
LOAD BEARING COMPONENTS

DIMENSIONAL ATTRIBUTES:

Prior to testing, the dimensional attributes and identification details of each test item were recorded as follows:

1.2m Transom:

Mass: *9.6kg (nom.)*

Angle Iron: *50mm x 50mm x 5mm thickness (nom.)*

Identification Markings: *'CORONET0912'*

1.8m Transom:

Mass: *16.0kg (nom.)*

Angle Iron: *50mm x 50mm x 5mm thickness (nom.)*

Identification Markings: *'CORONET0912'*

2.4m Transom:

Mass: *21.4kg (nom.)*

Angle Iron: *50mm x 50mm x 5mm thickness (nom.)*

Identification Markings: *'CORONET0912'*

Two Board Hop-up Bracket:

Mass: *6.0kg*

Angle Iron: *50mm x 50mm x 5mm thickness (nom.)*

Outside Diameter of Tubular Components: *33.5mm*

Wall Thickness of Tubular Components: *2.5mm*

Identification Markings: *'CORONET0912'*

Three Board Hop-up Bracket:

Mass: *10.2kg*

Angle Iron: *50mm x 50mm x 5mm thickness (nom.)*

Outside Diameter of Tubular Components: *33.5mm*

Wall Thickness of Tubular Components: *2.5mm*

Identification Markings: *'CORONET0912'*

FIG.2
3 BOARD HOP-UP TEST SETUP

TEST PROCEDURE:

Each load bearing component was subjected to factored static test loads calculated in accordance with AS/NZS 1576.3: Appendix C & AS/NZS 1576.1. The test load applied to each test item is presented in the load calculations section of the test report.

For each test item, the test force was applied to simulate the most adverse service condition:

Two (2) Board & Three (3) Board Hop-Up Brackets:

The calculated test load for each bracket was applied as a concentrated point load at the tie bar connection points (see Fig.2).

1.2m Transoms:

The test force was applied using a loading platen with a nominal width equal to that of a single Coronet platform plank (≈ 230mm). The test force was applied at the mid-span of the transom (see Fig.3).

1.8m & 2.4m Transoms:

The test force was applied using a simulated UDL, four point articulated loading arrangement (see Fig.4). The force was applied using loading platens with a nominal width of a scaffold plank (≈230mm) (see Fig.4).

FIG.3
1.2M TRANSOM TEST SETUP

For each test item, the test force was progressively applied and maintained for a period of 15 minutes. Throughout each test, calibrated laboratory laser displacement devices were utilized to record the live deflection and residual deflection of each test item.

Testing was conducted in an enclosed environment at the MTS laboratory by the test engineer Daniel Humfrey. Load testing was conducted between the 5th and 12th of June 2013 and was overseen by the authorised signatory Rod Wilkie.

TEST PREPARATION:

Prior to testing, the mass of each test item was recorded. All test items were weighed using a calibrated MTS balance. The mass of each component is provided in the dimensional attributes section of this test report. The mass of each component was used to calculate the dead load (G) for each test item.

FIG.4
2.4M TRANSOM TEST SETUP

CALCULATION OF TEST LOADS:

Test loads for each item were calculated in accordance with AS/NZS 1576.1 in conjunction with AS/NZS 1576.3 Appendix C. For each test item, the dead loads "G" were calculated assuming a nominal plank mass and a nominal toe board mass of 14.2kg.

A live load "Q" of 6.6kN, corresponding to a heavy duty scaffold, was adopted for the 1.2m, 1.8m & 2.4m transoms.

For the two board hop-up bracket and the three board hop-up bracket, a live load "Q" of 2.0kN, corresponding to a single concentrated load on a heavy duty scaffolding structure, was adopted.

Load Calculations (G & Q)

1.2m Transom Test
Dead Load G: 0.79kN
Live Load Q: 6.6kN
Calculated Test Load: ***14.8kN***

1.8m Transom Test
Dead Load G: 1.13kN
Live Load Q: 6.6kN
Calculated Test Load: ***15.5kN***

2.4m Transom Test
Dead Load G: 1.6kN
Live Load Q: 6.6kN
Calculated Test Load: ***16.4kN***

2 Board Hop-up Test
Dead Load G: 0.38kN
Live Load Q: 2.0kN
Calculated Test Load: ***4.8kN***

3 Board Hop-up Test
Dead Load G: 0.52kN
Live Load Q: 2.0kN
Calculated Test Load: ***5.0kN***

LOAD TEST OBSERVATIONS:

Test observations for the scaffold components are provided as follows:

#1 ***1.2m Transom:***

- Recorded deflection at peak test load: 19mm
- Residual deflection upon removal of the test load: 9mm
- No visible sign of failure observed either during or at the completion of testing.
- Post-test residual deformation was observed. However, the 1.2m transom was deemed structurally serviceable at the completion of testing.

The 1.2m transom passed the requirements for ULS load testing.

#2 ***1.8m Transom:***

- Recorded deflection at peak test load: 17mm
- Residual deflection upon removal of the test load: 2mm
- No visible sign of failure observed either during or at the completion of testing.
- Post-test residual deformation was observed. However, the 1.8m transom was deemed structurally serviceable at the completion of testing.

The 1.8m transom passed the requirements for ULS load testing.

#3 ***2.4m Transom:***

- Recorded deflection at peak test load: 30mm
- Residual deflection upon removal of the test load: 7mm
- No visible sign of failure observed either during or at the completion of testing.
- Post-test residual deformation was observed. However, the 2.4m transom was deemed structurally serviceable at the completion of testing.

The 2.4m transom passed the requirements for ULS load testing.

#4 ***Two Board Hop-up:***

- Recorded deflection at peak test load: 22mm
- Residual deflection upon removal of the test load: 4mm
- No visible sign of failure observed either during or at completion of testing.

The two board hop-up passed the requirements for ULS load testing.

#5 ***Three Board Hop-up:***

- Recorded deflection at peak test load: 47mm
- Residual deflection upon removal of the test load: 9mm
- No visible sign of failure observed either during or at completion of testing.

The three board hop-up passed the requirements for ULS load testing.

LOAD TESTING OF V-PRESSINGS:

The scaffold standard's V-pressings were load tested to ascertain the mechanical strength of the connection. The test force was applied at the outermost edge of the V-pressing in order to simulate the most adverse service condition (see Fig.5).

The test force was progressively applied until failure of the V-Pressing was visually evident. Throughout each test, calibrated laboratory displacement devices were utilized to record the displacement at the outermost edge of the V-Pressing.

FIG.5
V-PRESSING TEST SETUP

FIG.6
FAILURE OF V-PRESSING

TEST OBSERVATIONS:

A total of three (3) tests were performed in order to ascertain the mean strength of the welded connection. The mean strength of the scaffolding standard's V-pressing welded connection was **34.2kN ≈ 3489kg**.

In all three (3) tests, failure of the standard's V-pressing was characterized by vertical plain rupture of the welded connection (see Fig.6).

MATERIALS PROPERTIES TESTS:

Tensile tests for compliance of material properties were conducted on test pieces procured from the following scaffold items:

- 1.2m Transom Angle Iron
- Scaffold Standard Tube Wall
- Scaffold Brace Tube Wall
- Scaffold Ledger Tube Wall

Test data for the materials is provided in the following table.

				Minimum Specification Requirements				
Scaffold Test Item Description	Tensile Strength R_m (MPa)	Yield Stress $R_{p0.2}$ (MPa)	Tensile Elongation A (%)	Applicable Australian Standard (AS/NZS)	Tensile Strength R_m (MPa)	Yield Stress $R_{p0.2}$ (MPa)	Tensile Elongation A (%)	Test Comments
Transom Angle 50mm x 50mm x 5mm	447	327	29	3679.1	440	320	22	Complies
Brace Tube 48.3mm x 3.07mm	466	407	27	1163	320	250	18	Complies
Standard Tube 48.3mm x 3.78mm	465	404	23	1163	320	250	18	Complies
Ledger Tube 48.4mm x 3.07mm	465	392	29	1163	320	250	18	Complies

TABLE 1

COMMENTS:

As can be seen from Table 1 the tensile properties for the Coronet scaffold components comply with the requirements of the applicable Australian Standards and the requirements of AS/NZS 1576.

DIMENSIONAL PROPERTIES OF LOAD BEARING STANDARDS:

Tubular load bearing standards were measured for compliance with AS/NZS 1576.1 and AS/NZS 1576.3. Details are provided as follows:

- 48.3mm OD, 4.0mm Wall thickness

The dimensional attributes of Coronet scaffold standards meet the requirements of AS/NZS 1576.1 and AS/NZS 1576.3 where the tube wall thickness shall not be less than 4mm.

SUMMARY:

In all cases the tests conducted on load bearing scaffold components confirm that the components could support the applied loads for 15 minutes without failure. The 1.2m, 1.8m & 2.4m transoms; two (2) board & three (3) board hop-up brackets as reported herein were deemed to have passed the requirements for load testing in accordance with AS/NZS 1576.3-1995 Clause 4.2.3 and APPENDIX C.

Tensile properties of the Coronet scaffold Transom, Brace, Standards and Ledgers comply with the requirements of the applicable AS/NZS 3679.1 and AS/NZS 1163 as appropriate.

As described and reported herein, the load tests confirm that a Coronet standard's V-pressing has an Ultimate, Vertical Load Capacity of **34.2KN ≈ 3489KG**. MTS advises that this load is the destructive load capacity and it should not be taken to imply safe working load or working load limit. The data as presented for the V-pressing is deemed experimental and is not normally required for testing in accordance with AS/NZS 1576. With this in mind, engineers or designers intending to utilise the V-pressing load capacity should apply rigorous analysis and engineering diligence to ensure the appropriate capacity reduction factors are applied.

Notes:

1) Melbourne Testing Services (MTS) 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) It remains the responsibility of the client to ensure that the samples tested are representative of the entire product batch.
3) MTS shall take no responsibility for the procurement and authenticity of the test product as described herein.
4) This report is specific to the test items in their state at the time of testing. It should not be taken as a statement that all products in all states of repair, would also perform in the same manner.
5) MTS shall take no responsibility for the interpretation or misinterpretation of the procedures or calculation methods as provided herein or for the appropriateness or validity of the test procedures for the test items described and reported herein.
6) MTS shall take no responsibility for the installation procedures used for the test items as described herein.
7) This report only covers the structural integrity of the scaffold components as specifically required by AS/NZS 1576.3-1995 C4.2.3 and Appendix C.
8) MTS shall take no responsibility for the compliance of the scaffold components tested and reported herein where the requirements are not in accordance with AS/NZS 1576.3-1995 Clause 4.2.3 and Appendix C.

ROD WILKIE
AUTHORISED SIGNATORY

DANIEL HUMFREY
TEST ENGINEER