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IN CONFIDENCE TO THE CLIENT

REPORT NO. MT-15/356

TESTING OF AN AFT TEMPORARY FENCE SYSTEM

CLIENT: AFT HIRE PTY LTD
21 HARVESTER AVENUE
SUNSHINE NORTH 3020
ATT: GRAHAM WHITE

DATE OF TESTING: MAY 19TH TO JUNE 2ND 2015

DATE OF REPORT: JUNE 3RD 2015

TEST SYNOPSIS:

Temporary fence panels along with a number of upright posts, braces and clamping fixtures were delivered to the MTS laboratory for testing. Upon arrival at the laboratory, the test items were inspected and the fence dimensions were recorded as follows:

Fence Panels: *2.4m wide x 1.6m high*
Vertical Frame: *Nominal 32mm OD CHS*
Horizontal Frame: *Nominal 32mm OD CHS*
Brace Material: *Nominal 32mm OD CHS*
CHS Wall Thickness: *2mm nominal*
Internal Wire: *Rectangular Pattern*
150 x 50 x 4mm diameter wire
Footing Blocks: *560mm x 222mm x 130mm x 33kg*
Brace Footing Plate: *100mm x 8mm steel plate*

FIG.1
AFT TEMPORARY FENCE PANELS

At the request of the client, tests were to be conducted to determine the performance attributes of individual and assembled fences in accordance with AS 4687-2007 TEMPORARY FENCING AND HOARDINGS.

The following tests were conducted in accordance with Section 4:

- Simulated Climbing Test
- Impact Test
- Foothold Aperture Test
- Infill Downward Test
- Wind Force Overturning Test

TEST PREPARATION:

Temporary fence panels were prepared for testing in both single panel and continuous panel configurations (see Fig.1). Continuous panel testing was conducted on a three panel assembly with the middle panel being the focus of testing. The temporary fencing was assembled using the supplied clamping fixtures and in accordance with the manufacturer's assembly guidelines.

SIMULATED CLIMBING TEST:

Simulated climbing tests were conducted on the three panel assembly by pulling the top rail of the fence panel vertically downward. A stiffened 400mm lever-arm attached to the centre of the fence panel was used to apply the load (see Fig.2). The downward force was continuously applied until an applied load of 65kg had been achieved. This test load was maintained for a period of three (3) minutes.

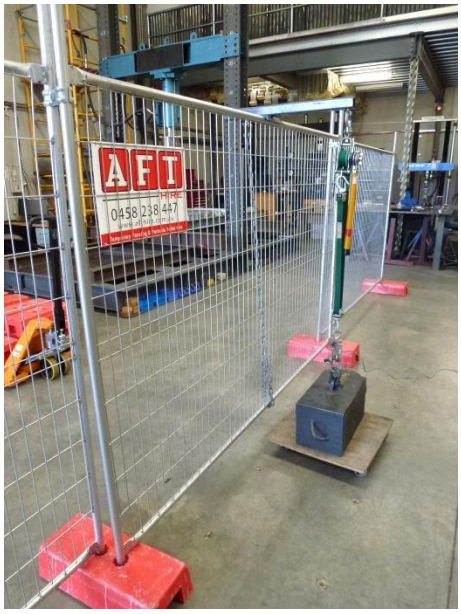

FIG.2
SIMULATED CLIMBING TEST

IMPACT TEST:

Impact testing was conducted by swinging a pendulum mass into the mesh infill of a braced, single fence panel (see Fig.3). Four test locations, as described in Fig.2 of AS 4687-2007 were selected and tests were conducted at an impact energy level of 150 joules. A visual inspection for damage to the fence panels, mesh infill, and infill/post connection points was conducted after each impact.

FOOTHOLD TEST:

(a) Aperture Width

Aperture width testing was conducted by attempting to pass a 76mm x 76mm test block through a mesh aperture. Measurement of a single mesh aperture was also conducted to determine that the opening was less than the specified dimensional limit of 75mm.

(b) Infill Downward Load Test

To test that the infill mesh had sufficient stiffness to resist an attempt to climb the fence, a downward load of 100kg was applied at one of the rectangular shaped openings (see Fig.4). This load was maintained for 60 seconds at which point the downward deflection of the infill material was recorded.

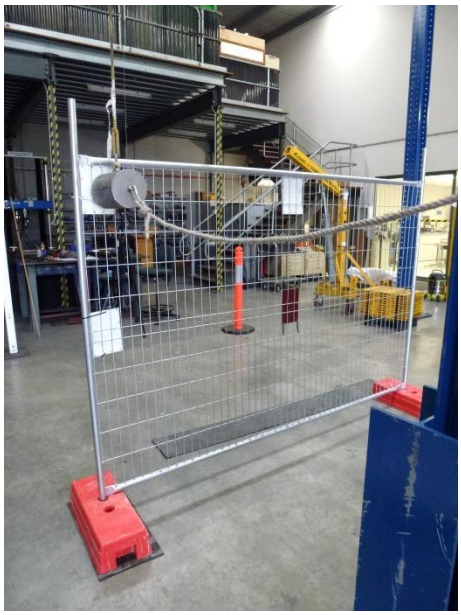

FIG.3
IMPACT TEST

SIMULATED WIND LOAD TEST:

Wind load testing was conducted by applying a lateral overturning load horizontally to the middle of a single fence panel with one back brace (see Fig.5). The test load was steadily increased until disconnection of the fence panels and posts was observed, rendering the fence unstable. At this point the applied test load was maintained and the peak test load recorded. Wind load testing was conducted with braced and unbraced panels.

TEST OBSERVATIONS:

SIMULATED CLIMBING

The fence panels were visually inspected for signs of deformation and failure after completion of the test. No visible sign of permanent deformation or structural failure was observed in the panel or mesh upon completion of testing. The fence panel successfully supported a 65kg test load without overturning.

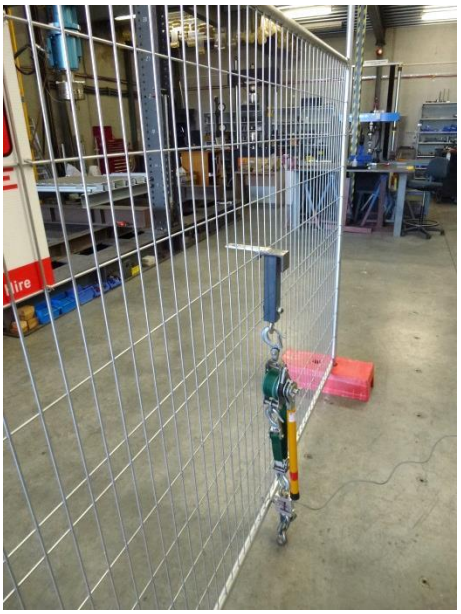

FIG.4
INFILL DOWNWARD TEST

IMPACT TESTING

A single fence panel assembled without back braces revealed the following observations after an impact collision of 150 joules was applied:

- No penetration of the mesh.
- No failure between the mesh and post/rail connections.
- No visible sign of cracking.
- The fence overturned when impacted at position #3.
- Maximum dynamic deflection recorded was **242mm** which is less than the specified 300mm.

A single fence panel assembled as above with the addition of a single, interlocking back brace revealed the following observations after an impact collision of 150 joules was applied:

- No penetration of the mesh.
- No failure between the mesh and post/rail connections.
- No visible sign of cracking.
- No overturning due to impact.

FOOTHOLD APERTURE TESTS

(a) Aperture Width

The infill aperture horizontal width was measured to be **46m** which is less than the specified maximum of 75mm. A test block measuring 76mm x 76mm could not be passed through the rectangular shaped mesh infill.

(b) Infill Downward Load Test

Infill downward load test resulted in a deflection of **11mm** which is less than the specified permissible maximum of 35mm. Upon removal of the test load, the infill rebounded to its original position and no signs of residual deformation were evident.

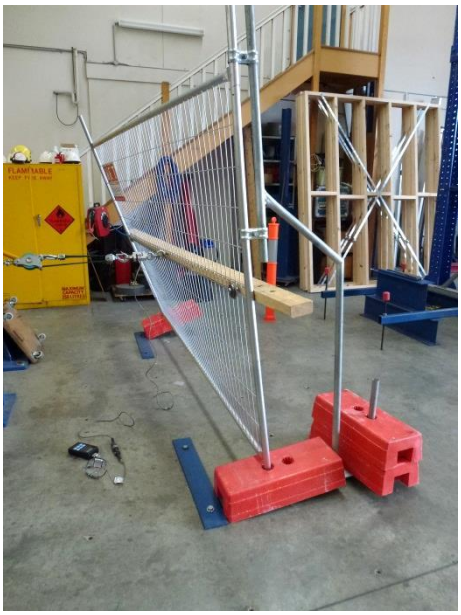

FIG.5
SIMULATED WIND LOAD TEST

SIMULATED WIND LOAD TESTING

Simulated wind load testing was conducted in accordance with Clause 4.5 on various temporary fence panel erection scenarios including:

1. Panels with concrete filled plastic coated footings.
2. Panels with single back braces fitted with single and multiple stacked concrete footings.

In each case the tested panels resisted the simulated wind loads without failure of the fence's structural frame work or infill material.

The peak test load was recorded when the footing blocks lifted from the floor and the fence underwent significant angular rotation of the upright posts (see Fig.5).

Upon release of the test load the fence panel, the bracing members, clamps and footings were observed to be intact and free from severe deleterious damage. The tipping force was recorded as the peak force and is presented along with the calculated equivalent wind speed for each test in Appendix A.

SUMMARY:

Unbraced Panels

The test results confirm that an unbraced, AFT temporary fence panel, as described and reported herein, meets the minimum requirements as specified in Section 4 of AS 4687-2007 TEMPORARY FENCING AND HOARDINGS for:

- Simulated Climbing Test
- Infill Aperture Width Test
- Infill Downward Load Test

A single, unbraced panel with concrete filled, plastic covered footings overturned upon an impact collision of 150 joules.

Braced Panels

The impact test results confirm that an AFT temporary fence panel with concrete filled plastic covered footings and one (1) interlocking back brace with one (1) footing meets the impact test requirements as specified in Section 4 of AS 4687-2007 TEMPORARY FENCING AND HOARDINGS.

The wind test results confirm that an uncovered AFT temporary fence panel with concrete filled plastic covered footings and one (1) interlocking back brace and a single footing meets the minimum wind speed requirement for Regions A to C as specified in Section 4 of AS 4687-2007 TEMPORARY FENCING AND HOARDINGS.

The wind test results confirm that two (2) uncovered AFT temporary fence panels with concrete filled plastic covered footings, one (1) interlocking back brace and a single footing meets the minimum wind speed requirement for Regions A & B as specified in Section 4 of AS 4687-2007 TEMPORARY FENCING AND HOARDINGS.

The wind test results confirm that one (1) 50% shade cloth covered AFT temporary fence panel with concrete filled plastic covered footings, one (1) interlocking back brace and four (4) footings per brace, meets the minimum wind speed requirement for Region A as specified in Section 4 of AS 4687-2007 TEMPORARY FENCING AND HOARDINGS.

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 is specific to the temporary fence panels described herein, in their state at the time of testing. It should not be taken as a statement that all similar temporary fence panel assemblies or components of temporary fence panel assemblies in all states of repair, would also perform in a similar manner to items described herein.
3) MTS shall take no responsibility for the procurement and authenticity of the temporary fencing as described herein.
4) MTS shall take no responsibility for the onsite installation procedures used for the temporary fencing described herein.
5) It remains the responsibility of the client to ensure that the temporary fence panels tested are representative of the entire product batch.
6) The test results reported herein are specific to the fences systems performance where the system uses interlocking braces which provide positive connection to the foot blocks. MTS shall take no responsibility for the onsite installation and performance of AFT fences where the system is erected other than as specifically described herein.
7) Wind speed calculations based on AS/NZS 1170.2 2002 with an importance level of 1, terrain category of 2 and topographic multiplier of 1.
8) MTS shall take no responsibility for the performance of temporary fencing as described herein where back braces used with footings are not an interlocking type or capable of securing the footing to the back brace.

ROD WILKIE
TEST ENGINEER
AUTHORISED SIGNATORY

APPENDIX A

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Single Panel	Welded Wire Mesh 150mm x 50mm x 4mm	Outward	None	None	0.20	**15**	A
		"	1	1	0.49	**23**	C
		"		2	0.68	**27**	D
		"		3	0.90	**31**	D
		"		4	1.10	**34**	D
		Inward	None	None	0.20	**15**	A
		"	1	1	0.42	**21**	C
		"		2	0.44	**22**	C
		"		3	0.48	**23**	C
		"		4	0.51	**23**	C

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Single Panel	Welded Wire Mesh 150mm x 50mm x 4mm, 50% Block Shadecloth Covered	Outward	None	None	0.20	**9**	-
		"	1	1	0.49	**14**	-
		"		2	0.68	**17**	A
		"		3	0.90	**20**	B
		"		4	1.10	**22**	B
		Inward	None	None	0.20	**9**	-
		"	1	1	0.42	**13**	-
		"		2	0.44	**14**	-
		"		3	0.48	**14**	-
		"		4	0.51	**15**	A

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Single Panel	Welded Wire Mesh 150mm x 50mm x 4mm, 70% Block Shadecloth Covered	Outward	None	None	0.20	**8**	-
		"	1	1	0.49	**13**	-
		"		2	0.68	**16**	A
		"		3	0.90	**18**	B
		"		4	1.10	**20**	B
		Inward	None	None	0.20	**8**	-
		"	1	1	0.42	**12**	-
		"		2	0.44	**13**	-
		"		3	0.48	**13**	-
		"		4	0.51	**14**	-

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Single Panel	Welded Wire Mesh 150mm x 50mm x 4mm, 90% Block Shadecloth Covered	Outward	None	None	0.20	**8**	-
		"	1	1	0.49	**13**	-
		"		2	0.68	**15**	A
		"		3	0.90	**17**	A
		"		4	1.10	**19**	B
		Inward	None	None	0.20	**8**	-
		"	1	1	0.42	**12**	-
		"		2	0.44	**12**	-
		"		3	0.48	**13**	-
		"		4	0.51	**13**	-

TABLE A1.
WIND LOAD TEST DATA FOR SINGLE PANEL ASSEMBLIES

APPENDIX A

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Double Panel	Welded Wire Mesh 150mm x 50mm x 4mm	Outward	None	None	0.40	**15**	A
		"	0.5	1	0.69	**20**	B
		"		2	0.88	**22**	C
		"		3	1.10	**24**	D
		"		4	1.30	**27**	D
		Inward	None	None	0.40	**15**	A
		"	0.5	1	0.62	**18**	B
		"		2	0.64	**19**	B
		"		3	0.68	**19**	B
		"		4	0.71	**20**	B

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Double Panel	Welded Wire Mesh 150mm x 50mm x 4mm, 50% Block Shadecloth Covered	Outward	None	None	0.40	**10**	-
		"	0.5	1	0.69	**13**	-
		"		2	0.88	**14**	-
		"		3	1.10	**16**	A
		"		4	1.30	**17**	A
		Inward	None	None	0.40	**10**	-
		"	0.5	1	0.62	**12**	-
		"		2	0.64	**12**	-
		"		3	0.68	**12**	-
		"		4	0.71	**13**	-

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Double Panel	Welded Wire Mesh 150mm x 50mm x 4mm, 70% Block Shadecloth Covered	Outward	None	None	0.40	**9**	-
		"	0.5	1	0.69	**11**	-
		"		2	0.88	**13**	-
		"		3	1.10	**14**	-
		"		4	1.30	**16**	A
		Inward	None	None	0.40	**9**	-
		"	0.5	1	0.62	**11**	-
		"		2	0.64	**11**	-
		"		3	0.68	**11**	-
		"		4	0.71	**12**	-

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Double Panel	Welded Wire Mesh 150mm x 50mm x 4mm, 90% Block Shadecloth Covered	Outward	None	None	0.40	**8**	-
		"	0.5	1	0.69	**11**	-
		"		2	0.88	**12**	-
		"		3	1.10	**14**	-
		"		4	1.30	**15**	A
		Inward	None	None	0.40	**8**	-
		"	0.5	1	0.62	**10**	-
		"		2	0.64	**10**	-
		"		3	0.68	**11**	-
		"		4	0.71	**10**	-

TABLE A2.
WIND LOAD TEST DATA FOR DOUBLE PANEL ASSEMBLIES

APPENDIX A

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Triple Panel	Welded Wire Mesh 150mm x 50mm x 4mm	Outward	None	None	0.60	**15**	A
		"	0.33	1	0.89	**18**	B
		"		2	1.08	**20**	B
		"		3	1.30	**22**	C
		"		4	1.50	**24**	D
		Inward	None	None	0.60	**15**	A
		"	0.33	1	0.82	**18**	B
		"		2	0.84	**18**	B
		"		3	0.88	**18**	B
		"		4	0.91	**18**	B

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Triple Panel	Welded Wire Mesh 150mm x 50m x 4mm, 50% Block Shadecloth Covered	Outward	None	None	0.60	**10**	-
		"	0.33	1	0.89	**12**	-
		"		2	1.08	**13**	-
		"		3	1.30	**14**	-
		"		4	1.50	**15**	A
		Inward	None	None	0.60	**10**	-
		"	0.33	1	0.82	**11**	-
		"		2	0.84	**11**	-
		"		3	0.88	**12**	-
		"		4	0.91	**12**	-

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Triple Panel	Welded Wire Mesh 150mm x 50mm x 4mm, 70% Block Shadecloth Covered	Outward	None	None	0.60	**9**	-
		"	0.33	1	0.89	**11**	-
		"		2	1.08	**12**	-
		"		3	1.30	**13**	-
		"		4	1.50	**14**	-
		Inward	None	None	0.60	**9**	-
		"	0.33	1	0.82	**10**	-
		"		2	0.84	**10**	-
		"		3	0.88	**11**	-
		"		4	0.91	**11**	-

Fence Type	Infill Type (mm)	Direction of Wind Loading	Bracing Condition (per panel)	Number of Blocks (per brace)	Test Load (kN)	Calculated Wind Speed Capacity (m/s)	Australian Wind Region
AFT Triple Panel	Welded Wire Mesh 150mm x 50mm x 4mm, 90% Block Shadecloth Covered	Outward	None	None	0.60	**8**	-
		"	0.33	1	0.89	**10**	-
		"		2	1.08	**11**	-
		"		3	1.30	**12**	-
		"		4	1.50	**13**	-
		Inward	None	None	0.60	**8**	-
		"	0.33	1	0.82	**10**	-
		"		2	0.84	**10**	-
		"		3	0.88	**10**	-
		"		4	0.91	**10**	-

TABLE A3.
WIND LOAD TEST DATA FOR TRIPLE PANEL ASSEMBLIES