



A simulated bushfire regulatory information report

Test standard: [Clauses 14 and 22 of AS 1530.8.1:2018](#)

Test sponsor: [Forest and Wood Products Australia Ltd.](#)

Specimen: [MGP10 Radiata Pine subfloor system with mineral wool insulation](#)

Bushfire attack level (BAL) exposure: [29 kW/m²](#) Crib class: [AA](#)

Job number: [FRT210172](#)

Test date: [23 August 2021](#) Revision: [RIR1.0](#)

Warringtonfire: accredited for compliance with ISO/IEC 17025 – Testing



Quality management

Revision	Date	Information about the report			
RIR1.0	31 August 2021	Description	Initial issue		
			Prepared by	Reviewed by	Authorised by
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		Signature			

Executive summary

This report documents the findings of a simulated bushfire attack – radiant heat and small flaming sources test on elements of construction for buildings undertaken on 23 August 2021 in accordance with clauses 14 and 22 of AS 1530.8.1:2018.

Warringtonfire performed the test at the request of Forest and Wood Products Australia Ltd.

Table 1 provides details of the test assembly, and Table 2 provides a summary of the test specimen. A summary of the results is provided in Table 3.

Table 1 Test assembly

Item	Detail	
Wall system	Width	3000 mm
	Height	3000 mm
	Thickness	106 mm
Sub-floor system	Width	1800 mm
	Height	1500 mm
	Depth	750 mm

Table 2 Test specimen

Item	Detail
Test specimen	750 mm deep 90 × 35 MGP10 Radiata Pine joists spaced at 450 mm centres over two 1800 mm wide 90 × 35 MGP10 Radiata Pine bearers sistered together. - R1.7 mineral wool insulation friction fitted between the joists and supported using 70 mm high × 45 mm wide CSR Bradford™ Optimo™ plastic saddles. 1800 mm wide × 750 mm deep × 19 mm thick yellow tongue particleboard flooring was installed over the top of the joists using 8g × 50 mm long coarse thread needle point screws.

Table 3 Test results

Performance criteria		Time to failure (min.)	Position of failure
Formation of through-gaps greater than 3 mm		No failure	-
Sustained flaming for 10 s on the non-fire side		No failure	-
Flaming on the fire-exposed side at the end of the 60 minute test period		No failure	-
Radiant heat flux 365 mm from the non-fire side exceeding 15 kW/m ²		Not applicable	-
Mean and maximum temperature rises greater than 140 K and 180 K		No failure	-
Radiant heat flux 250 mm from the specimen, greater than 3 kW/m ² between 20 min and 60 min		No failure	-
Mean and maximum temperature of internal faces exceeding 250 °C and 300 °C respectively between 20 min and 60 min after commencement of test		Not applicable	-
Crib class	Type AA	Peak heat flux	29 kW/m ²
Test result		BAL— AA29	

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1. Introduction

This report documents the findings of a simulated bushfire attack – radiant heat and small flaming sources test on elements of construction for buildings undertaken on 23 August 2021 in accordance with clauses 14 and 22 of AS 1530.8.1:2018.

Warringtonfire performed the test at the request of the test sponsor listed in Table 4.

Table 4 Test sponsor details

Test sponsor	Address
Forest and Wood Products Australia Ltd.	Level 11, 10-16 Queen Street Melbourne Vic 3000 Australia

2. Test specimen

2.1 Schedule of components

Table 5 describes the test specimen and lists the schedule of components. These were provided by the test sponsor and surveyed by Warringtonfire.

All measurements were done by Warringtonfire – unless indicated otherwise.

Detailed drawings of the test specimen are provided in Appendix A.

Table 5 Schedule of components

Item	Description
Sub-floor	
1.	Item name
	Subfloor framing
	Material
	MGP10 Radiata Pine
	Size
	Two 90 mm high × 35 mm deep × 1800 mm wide bearers (sistered together) 90 mm high × 35 mm wide × 750 mm deep joists
2.	Density
	500 kg/m ³
	Moisture content
	Bearers: 8.5% Joists: 8.5%
	Fixings
	3.06 × 75 mm long bright smooth shank framing nails.
3.	Item name
	Timber stumps
	Material
	F27 KD mixed hardwood
	Size
	90 mm deep × 70 mm wide × 1300 mm high
4.	Density
	918.5 kg/m ³
	Moisture content
	15.8%
	Fixings
	3.06 × 75 mm long bright smooth shank framing nails.
5.	Item name
	Flooring
	Material
	19 mm yellow tongue particleboard
6.	Size
	1800 mm wide × 800 mm deep × 19 mm thick (nominal cut to suit)
	Density
	650 kg/m ³ (nominal)
7.	Item name
	Mineral wool Insulation
	Description
	R1.7 mineral wool insulation
8.	Size
	1160 mm long × 420 mm wide × 60 mm thick (cut to suit joists)
9.	Density
	80 kg/m ³

Item	Description	
5.	Item name	Ant cap
	Material	Galvanised mild steel
	Size	100 mm wide × 100 mm deep × 0.75 mm thick (nominal)
6.	Item name	Screws
	Description	8g × 50 mm long countersunk, rib head, coarse thread, needle point screws.
7.	Item name	Insulation support saddles
	Description	Plastic support saddle
	Size	70 mm high × 45 mm wide × 1.0 mm thick (nominal)
Sub-floor	Overall size	1800 mm wide × 1500 mm high × 750 mm deep
	Installation	• Six timber stumps (item 1) were cut to a length of 1300 mm long. They were located below the four corners of the bearers with an additional stump located mid-width of the front and rear bearers. • A single ant cap (item 5) was placed on the top of each stump. • 90 × 70 timber bearers were created by sistering two 90 × 35 MGP10 (item 1) together using 3.06 × 75 mm long bright smooth shank framing nails. Two 90 × 70 bearers were cut to a length of 1800 mm long and located on top of the ant caps (item 5) above the stumps. • Five timber joists (item 1) were spaced at 450 mm centres and secured to the top of the timber bearers using 75 mm long framing nails. The nails were shot at an angle through the sides of the joist into the bearers with a nail located either side of each joist. • Three insulation saddles (item 7) were installed along each joist and were located 50 mm from either end of the joist and one at the centre. The saddles were secured to the joists using a single screw (item 6) located at the centre of the saddle. • The insulation (item 4) was then cut to 750 mm lengths and friction fitted between the joists. The insulation was further resting on the feet of the insulation saddles (item 7) at the bottom of the joists. • The yellow tongue particleboard flooring (item 3) was cut to 750 mm deep × 1800 mm long and installed over the top of the joists using the screws (item 6). Screws were located 25 mm from the ends of the joists and then at 175 mm centres. • The upper portion of the subfloor was baffled using a ceramic fibre blanket to shield the upper surface of the sub floor from radiant heat as per the requirements outlined in AS 1530.8.1:2018 under clause 22.2.2.
Wall system		
8.	Item name	Framing
	Product name	90 × 45 MGP10 Radiata pine
	Density	489 kg/m ³ (measured)
	Location	Located around the perimeter of the specimen and the wall system. Noggings were located at nominal 1000 mm centres to the sides of the specimen. Jack studs were located at nominal 300 mm centres above and below the specimen.
	Fixings	Assembled using 3.06 × 75 mm long bright smooth shank framing nails.
9.	Item name	Unexposed cladding
	Product name	10 mm thick standard plasterboard
	Density	566 kg/m ³ (measured)
	Location	Fixed directly to the timber framing on the unexposed face of the specimen.

Item	Description	
	Fixings	6g × 32 mm bugle head plasterboard screws at approximately 300 mm centres through the timber framing.
10.	Item name	Exposed cladding
	Product name	6 mm thick CSR Cemintel® fibre cement board
	Density	1625 kg/m ³ (nominal)
	Location	Fixed directly to the timber framing on the exposed face of the specimen.
	fixings	6g × 32 mm bugle head plasterboard screws at approximately 200 mm centres through the timber framing.
11.	Item name	Eaves sheet lining
	Product name	4.5 mm thick CSR Cemintel® fibre cement board
	Density	1625 kg/m ³ (nominal)
	Location	Fixed directly to the timber framing along the eaves on the exposed side.
	fixings	6g × 32 mm bugle head plasterboard screws at approximately 200 mm centres through the timber framing.
12.	Item name	Ground floor lining
	Product name	13 mm thick GYPROCK® Fyrchek™ plasterboard
	Density	833 kg/m ³ (nominal)
	Location	Fixed directly to the timber framing below the subfloor stumps
	Fixing	6g × 32 mm bugle head plasterboard screws at approximately 200 mm centres through the timber framing.
13.	Item name	Ground floor lining
	Product name	6 mm thick CSR Cemintel® fibre cement board
	Density	1625 kg/m ³ (nominal)
	Location	Above the plasterboard (item 12) and fixed through to the timber framing at the base of the wall.
	Fixing	6g × 32 mm bugle head plasterboard screws at approximately 200 mm centres through to the timber framing.
Wall system	Overall size	3000 mm wide × 3000 mm high × 106 mm thick
	Installation	- Two 90 × 45 timber stud frames (item 8) with the central frame offset 750 mm back. - The timber framing was assembled using 3.06 × 75 mm long bright smooth shank framing nails. - The exposed side of the timber framing (item 8) was clad using 6 mm thick fibre cement board (item 10). - A 250 mm high eave detail lined with 4.5 mm thick fibre cement (item 11) and a 250 mm high non-combustible ground floor detail were also incorporated into the specimen using the ground floor linings (items 12 and 13). - The unexposed side of the timber framing was lined with 10 mm thick regular plasterboard (item 9).

2.2 Installation details

Table 6 lists the installation details for the test specimen.

Table 6 Installation details

Item	Detail
Start date for construction of separating element	16 August 2021
Sub-floor constructed on	16 August 2021
Separating element constructed by	Representatives of Warringtonfire Melbourne.
Sub-floor constructed by	Representatives of Warringtonfire
Sub-floor installed into the separating element by	Representatives of Warringtonfire Melbourne.
Symmetry	Asymmetrical due to: - The upper face of the deck was shielded from the radiant heat source. - The exposed side of the wall being clad with 6 mm thick fibre cement and the unexposed side lined with 10 mm thick regular plasterboard. It was confirmed that the system was exposed to heat from the side that would normally face the outside of the building.

3. Test procedure

Table 7 details the test procedure for this simulated bushfire test.

Table 7 Test procedure

Item	Detail						
Statement of compliance	The test was performed in accordance with the requirements of clauses 14 and 22 of AS 1530.8.1:2018 for an external construction.						
Variations	The heat flux gauge positioned centrally and 250 mm in front of the specimen malfunctioned between the period of 20 minutes and, 21 minutes and 23 seconds. Given the lack of flaming of the specimen and the significantly low heat flux measured immediately after 21 minutes, it is unlikely that the missing data would invalidate the results.						
Pre-test conditioning	The construction and installation of the test specimen was completed on 20 August 2021. The test specimen was subjected to normal laboratory temperatures and conditions between the completion of construction of the test specimen and the start of the test.						
Sampling / specimen selection	The laboratory was not involved in sampling or selecting the test specimen for the simulated bushfire test. The results obtained during the test only apply to the test samples as received and tested by Warringtonfire.						
Ambient laboratory temperature	<table> <tr> <td>Start of the test</td><td>18 °C</td></tr> <tr> <td>Minimum temperature</td><td>18 °C</td></tr> <tr> <td>Maximum temperature</td><td>22 °C</td></tr> </table>	Start of the test	18 °C	Minimum temperature	18 °C	Maximum temperature	22 °C
Start of the test	18 °C						
Minimum temperature	18 °C						
Maximum temperature	22 °C						
Test duration	The test was stopped after 60 minutes in accordance with the procedures in AS 1530.8.1:2018.						
Instrumentation and equipment	The instrumentation was provided in accordance with AS 1530.8.1:2018 as follows: The unexposed side specimen temperatures were measured by Type K thermocouples with wire diameters less than 0.5 mm soldered						

Item	Detail
	to 12 mm diameter × 0.2 mm thick copper discs covered by 30 mm × 30 mm × 2.0 mm thick inorganic insulating pads. • Radiant heat flux measurements to determine the irradiance received and transmitted from the exposed face of the specimen were taken using Medtherm heat flux gauges. • The irradiance received at the front of the subfloor system was measured by a heat flux meter for the radiant exposure portion of this test. • During the test a second heat flux gauge were centrally located next to the subfloor at a distance of 250 mm from the exposed side of the specimen during the 20 to 60 minutes periods of the test. • A Ø3 mm gap gauge was available during the test to assess the performance of the specimen under the criteria of integrity. • A pilot ignition source was available to assess any areas of the specimen producing significant quantities of volatiles. • The crib was conditioned for at least 24 hours in a conditioning oven and removed 1 hour before the start of the test. • The crib was weighed to confirm that it was within the 0.152 ± 0.03 kg mass required by the standard. The crib was lit over a 2 minute period – 20 seconds on the upper 0.10 m × 0.10 m face. 20 seconds on each of the 0.54 m × 0.10 m faces, and a further 20 seconds on the upper 0.10 m × 0.10 m face – using an oxyacetylene torch with Type 551 size 8 × 10 heating tip.

4. Test measurements and results

Table 8 summarises the results the specimen achieved against the performance criteria listed in clauses 14 and 22 of AS 1530.8.1:2018.

Photographs of the specimen are included in Appendix C.

Table 8 Test results

Performance criteria		Time to failure (min.)	Position of failure
Formation of through-gaps greater than 3 mm		No failure	-
Sustained flaming for 10 s on the non-fire side		No failure	-
Flaming on the fire-exposed side at the end of the 60 minute test period		No failure	-
Radiant heat flux 365 mm from the non-fire side exceeding 15 kW/m ²		Not applicable	-
Mean and maximum temperature rises greater than 140 K and 180 K		No failure	-
Radiant heat flux 250 mm from the specimen, greater than 3 kW/m ² between 20 min and 60 min		No failure	-
Mean and maximum temperature of internal faces exceeding 250 °C and 300 °C respectively between 20 min and 60 min after commencement of test		Not applicable	-
Crib class	Type AA	Peak heat flux	29 kW/m ²
Test result		BAL— AA29	

5. Application of test results

5.1 Test limitations

The results of these fire tests may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all fire conditions.

These results only relate to the behaviour of the specimen of the element of construction under the particular conditions of the test. They are not intended to be the sole criteria for assessing the potential fire performance of the element in use, and they do not necessarily reflect the actual behaviour in fires.

5.2 Variations from the tested specimen

This report details methods of construction, the test conditions and the results obtained when the specific element of construction described here was tested following the procedure outlined in AS 1530.8.1:2018. Any significant variation with respect to size, construction details, loads, stresses, edge or end conditions, other than that allowed under the field of direct application in the relevant test method, is not covered by this report.

It is recommended that any proposed variation to the tested configuration – other than as permitted under the field of direct application specified in Appendix B – should be referred to the test sponsor. They should then obtain appropriate documentary evidence of compliance from Warringtonfire or another accredited testing authority.

5.3 Uncertainty of measurements

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy for the result.

Appendix A Drawings of test assembly

The leaders in the drawings represent the items listed in section 2.1.

All measurements are in millimetres unless otherwise indicated.

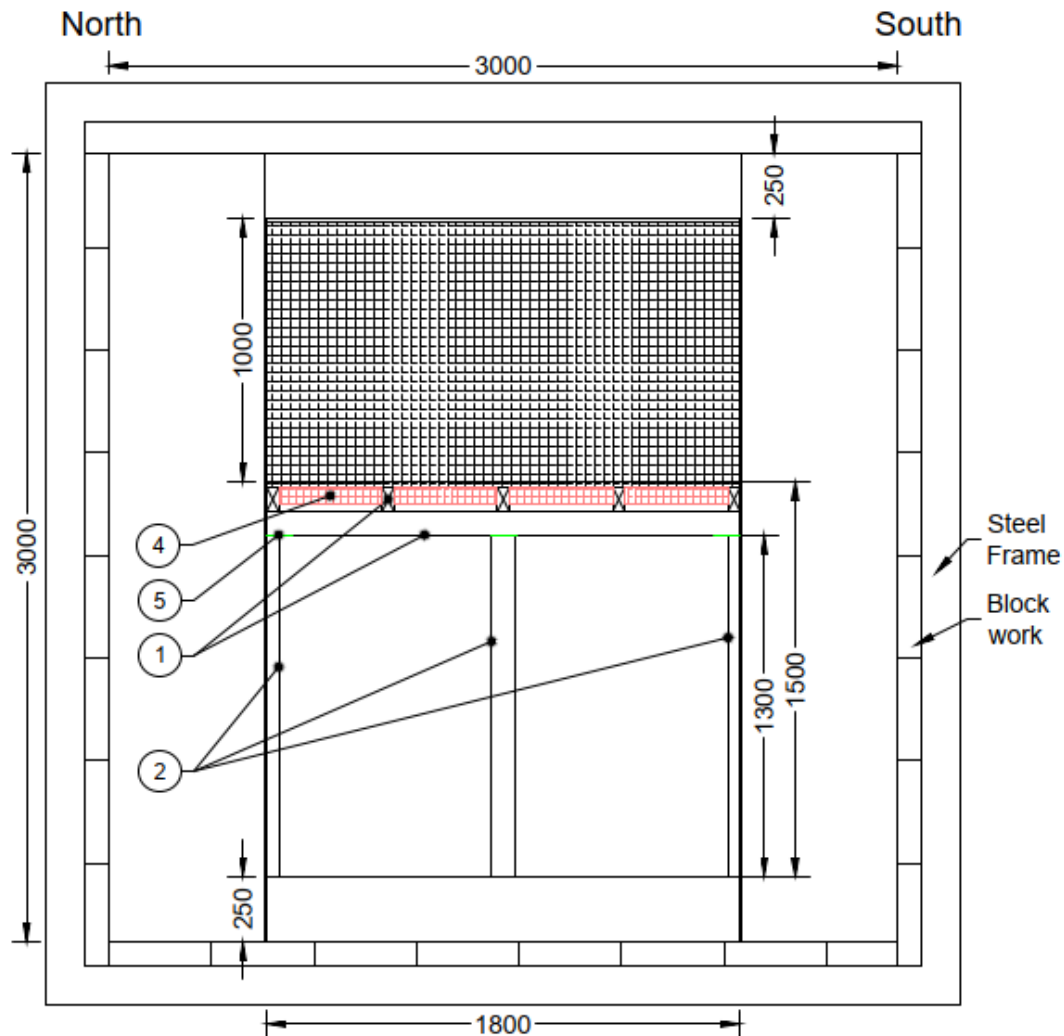


Figure 1 Elevation of the specimen

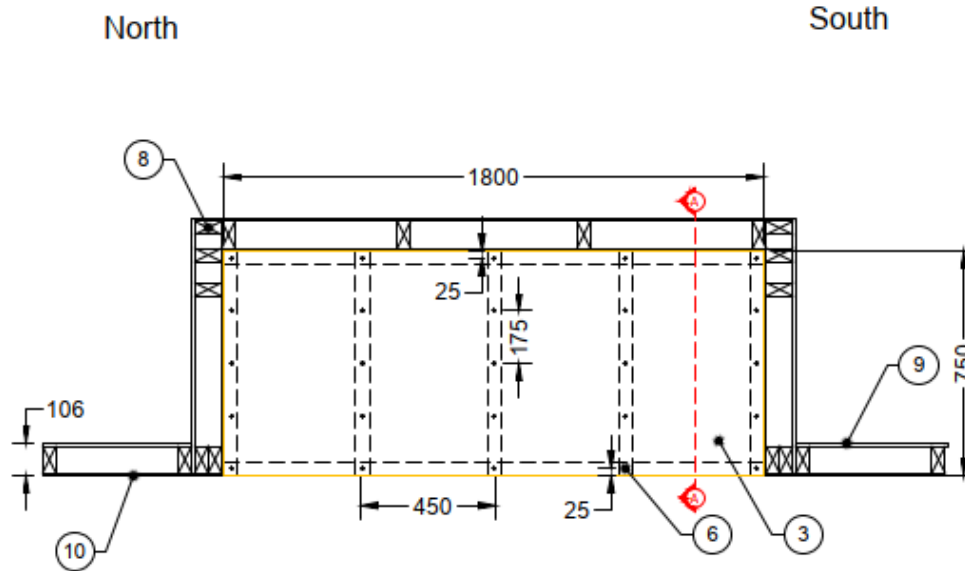


Figure 2 Horizontal cross-section through the specimen

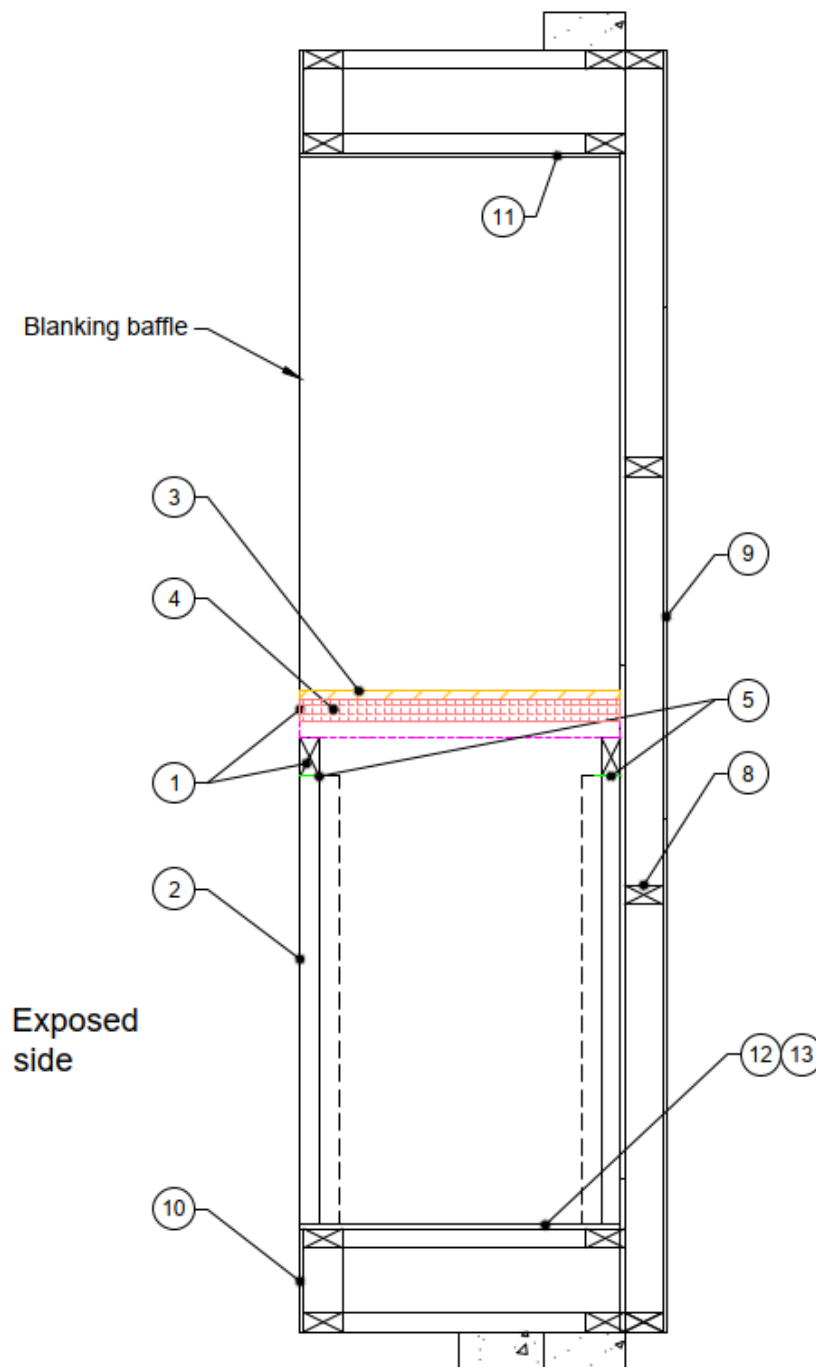


Figure 3 Vertical cross-section through the specimen

Appendix B Direct field of application

Note: The text, figures and tables in this appendix have been taken from AS 1530.8.1:2018.

The results of the fire test contained in the test report are directly applicable, without reference to the testing authority for a technical opinion, to similar constructions where one or more of the following changes have been made provided no individual component is removed or reduced:

- Increase in thickness of solid flooring material.
- Increase in cross-section of bearers and joists.
- Increase in the size of the deck.
- Variations to the height of the assembly above ground level.

Appendix C Photographs



Figure 4 Unexposed face of the specimen before the start of the test



Figure 5 Exposed face of the specimen before the start of the test



Figure 6 Unexposed face of the specimen at the end of the test



Figure 7 Exposed face of the specimen at the end of the test

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