



TEST REPORT

Full scale bushfire deck test of Naxan decking boards in accordance with AS 1530.8.1-2007

EWFA Report No:

39104000.2

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Test Date:

25 March 2016

DOCUMENT REVISION STATUS

| Date Issued | Issue No | Description |
|-------------|------------|-------------------------|
| 26/05/2016 | 39104000.1 | Initial Issue |
| 28/05/2016 | 39104000.2 | Typographical amendment |

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1 CONSTRUCTION DETAILS

TEST ASSEMBLY

The test assembly comprised a nominal 1800mm wide x 750mm deep x 450mm high deck that was set within a 1800mm wide x 250mm deep recess formed within a nominal 3000mm x 3000mm wall system which met the minimum requirements as specified by AS3959 for the specified exposure level.

TEST SPECIMENS

The deck consisted of Naxan decking boards that were 140mm wide x 25mm thick, that were installed parallel to the wall system with no spacing between each board. The boards were secured to joists with 6g x 35mm screws. The front fascia of the specimen consisted of 1-off decking board horizontally installed in the vertical plane.

The wall system met the minimum deemed to satisfy requirements of AS3959 for the prescribed exposure level and consisted of a timber framed wall system of 90 x 45mm studs clad with 13mm fire rated plasterboard and 6mm thick square edge fibre-cement board to the exposed side and 10mm standard plasterboard to the unexposed side.

The full description of the specimen is provided in Figures A1.1 to A1.4 and the 'Schedule of Components' in Section 2.

ASSEMBLY AND INSTALLATION METHODS

The wall system was constructed by EWFA representatives on the 25th March 2016. The deck specimen was constructed by EWFA representative on the 25th March 2016.

ORIENTATION

The test assembly was asymmetric and the external face with the assembled deck system was exposed to the radiant heat source. The front face of the deck was exposed to a radiant panel at an initial irradiance level of 40 kW/m².

2 SCHEDULE OF COMPONENTS

| Item | Description | |
|--|---------------------|---|
| 1 | Name | Naxan decking board Made of Resysta |
| | Material | Fibre Polymer Composite The boards incorporated rectangular hollow grooves (running full length) of 23mm x 16mm size at 28mm centres along the width of the boards. The boards also incorporated 11mm x 11mm end grooves. |
| | Size | 140mm wide x 25mm thick |
| | Installation | Positioned on the top side of the joists parallel to the wall system. There was a no gap of between boards. The 1 st board was cut to 50mm width so that 1 st joint was under the crib. One full width board was used as fascia and positioned such that the top of the board was in line with decking surface. |
| | Fixing | The decking boards were secured with 2-off screws (and dowels) every joist (Item 2 & 3). |
| 2 | Name | Screws |
| | Size | 6g x 25mm Bugle head, fine thread, needle point stainless steel screw |
| | Installation | 2-off screws were used to secure the decking board (Item 1) at each joist, located 25mm from each edge of the board. Top wall of the decking board was pre drilled with 12mm drill before screw fixing the bottom wall of board to joist, the holes in the top wall were then plugged with dowels. |
| 3 | Name | Naxan Dowel Made of Resysta |
| | Material | Fibre Polymer Composite |
| | Size | Ø12mm |
| | Installation | Installed into the pre drilled holed in the top wall of the deck boards. |
| External Wall (As per AS3959-2009 Clause 8.4.1) | | |
| 4 | Name | Fibre-cement board |
| | Size | 6mm thick |
| | Density | 1468kg/m ³ (Measured) |
| | Installation | Fixed to the exposed side of the wall on top of Item 4 at nominal 200mm centres with 6g x 40mm long needle point screws. |
| 5 | Name | Fire rated Plasterboard |
| | Size | 13mm thick |
| | Density | 847 kg/m ³ (measured) |
| | Installation | Fixed to the exposed side of the wall directly to the wall framing at nominal 400mm centres with 32mm long 6g needle point screws. |
| 6 | Name | Standard Plasterboard |
| | Size | 10mm thick |
| | Density | 691 kg/m ³ (measured) |
| | Installation | Fixed to the unexposed side of the wall at nominal 400mm centres with 32mm long 6g needle point screws. |
| 7 | Name | Eaves sheet lining |

| Item | Description | |
|------|-------------------------|--|
| | Material | 6mm thick cement sheet |
| | Density | 1468 kg/m ³ (measured) |
| | Location | Nominal 250mm width of cement sheet was located into the top of the recess formed in the wall system approximately 1800mm long and secured to the eaves framing with two screws at each support location. |
| 8 | Name | Sub-floor of deck |
| | Material | Kwila (Merbau); Botanical Name: Intsia bijuga |
| | Size | 90mm x 42mm |
| | Density | 728 kg/m ³ |
| | Moisture Content | Average of 7.0% for the joists Average of 7.0% for the bearers |
| | Fixings | 2-off 3mm diameter x 75mm long nails on each joist to the bearer |
| | Installation | 6-off 750mm long lengths to form the joists that were located perpendicular to the wall, at nominal 400mm centres. 2-off 1800mm lengths to form the bearers were located parallel to the wall; the bearers were located at the front and back edge of the specimen. |
| 9 | Name | Wall framing |
| | Material | 90mm x 45mm MGP10 timber |
| | Density | 540 kg/m ³ (measured) |
| | Installation | Assembled using 3 inch gun nails |

3 TEST PROCEDURE

STATEMENT OF COMPLIANCE

The test was performed in accordance with the requirements of AS 1530.8.1-2007 Section 21.

VARIATIONS TO TEST METHOD

None

PRE-TEST CONDITIONING

The construction of the specimen was finished on the 25th march 2016. During the construction period, the test specimen was subject to normal laboratory temperatures and relative humidity conditions.

CONDITIONING OF TIMBER COMPONENTS

The timber components of the specimen and specimen supporting construction were within the limits of AS 1530.8.1-2007.

AMBIENT TEMPERATURE

The ambient temperature at the start of the test was 25°C and did not vary significantly during the test.

TEST DURATION

The test was terminated at 60 minutes in accordance with the procedure of AS 1530.8.1-2007.

INSTRUMENTATION AND EQUIPMENT

The instrumentation was provided in accordance with AS 1530.8.1-2007 as detailed below:

The radiation received at the front of the deck system was measured by a heat flux meter for the radiant exposure portion of this test. A second heat flux meter was placed in the centre of the wall to provide additional information. The heat flux meter positions are shown on Figure A4.1 in Appendix 4.

The internal specimen temperatures were measured by Type K thermocouples with wire diameters less than 0.5 mm diameter soldered to 12 mm diameter x 0.2 mm thick copper discs covered by 30 mm x 30 mm x 2.0 mm inorganic insulating pads. The thermocouples' positions are shown on Figure A4.2 in Appendix 4.

A pilot ignition source was available to assess any areas of the specimen producing significant quantities of volatiles.

A 3±0.1mm gap gauge was available during the test to assess the performance under the criteria for integrity.

Crib was conditioned for at least 24 hours in a conditioning oven and removed 1 hour prior to the commencement of the test. Crib was weighed to confirm that it was within the 0.25±0.05kg mass required by the standard. The crib was lit over a 3 minute period; 30 seconds per exposed side with an additional 30 seconds of overall coverage using an acetylene torch with a Type 551 Size 8 x 10 tip.

4 TEST MEASUREMENTS

RADIATION DATA

Radiation data is provided in A 5.1 in Appendix 5.

SPECIMEN TEMPERATURES

Specimen temperature data is provided in A 5.2 in Appendix 5.

OBSERVATIONS

A table that includes observations of the significant behaviour of the specimen and details of the occurrence of the various performance criteria specified in AS 1530.8.1- 2007 is provided in Appendix 2. Photographs of the specimen are included in Appendix 6.

5 TEST RESULTS

The specimens listed below achieved the following performance when tested in accordance with AS 1530.8.1- 2007.

| 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 | - |
| Extent of flaming exceeding 500mm limits on decking boards | | No Failure | - |
| Flaming on the fire-exposed side at the end of the 60 minute test period. | | No Failure | - |
| Radiant heat flux 365mm from the non-fire side exceeding 15 kW m ⁻² | | Not applicable | - |
| Mean and maximum temperature rises greater than 140K and 180K | | Not applicable | - |
| Radiant heat flux 250 mm from the specimen, greater than 3 kW m ⁻² between 20 min and 60 min | | Not applicable | - |
| Mean and maximum temperature of internal faces exceeding 250°C and 300 °C respectively between 20 min and 60 min after commencement of test | | No Failure | - |
| Crib class | A | Peak heat flux | 40 kW m⁻² |
| Test Result | | BAL A40 | |

6 APPLICATION OF TEST RESULTS

TEST LIMITATIONS

The results of this fire test may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions. The results only relate to the behaviour of the specimen of the element of the 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 nor do they necessarily reflect the actual behaviour in fires.

VARIATIONS FROM THE TESTED SPECIMENS

This report details the methods of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the general procedure outlined in AS1530.8.1. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than those allowed under the field of direct application in the relevant test method, is not addressed 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 3 should be referred to the test sponsor in the first instance to obtain appropriate documentary evidence of compliance from Exova Warringtonfire Aus Pty Ltd or another Registered Testing Authority.

UNCERTAINTY OF MEASUREMENT

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 of the result.

APPENDIX 1 DRAWINGS OF TEST ASSEMBLY

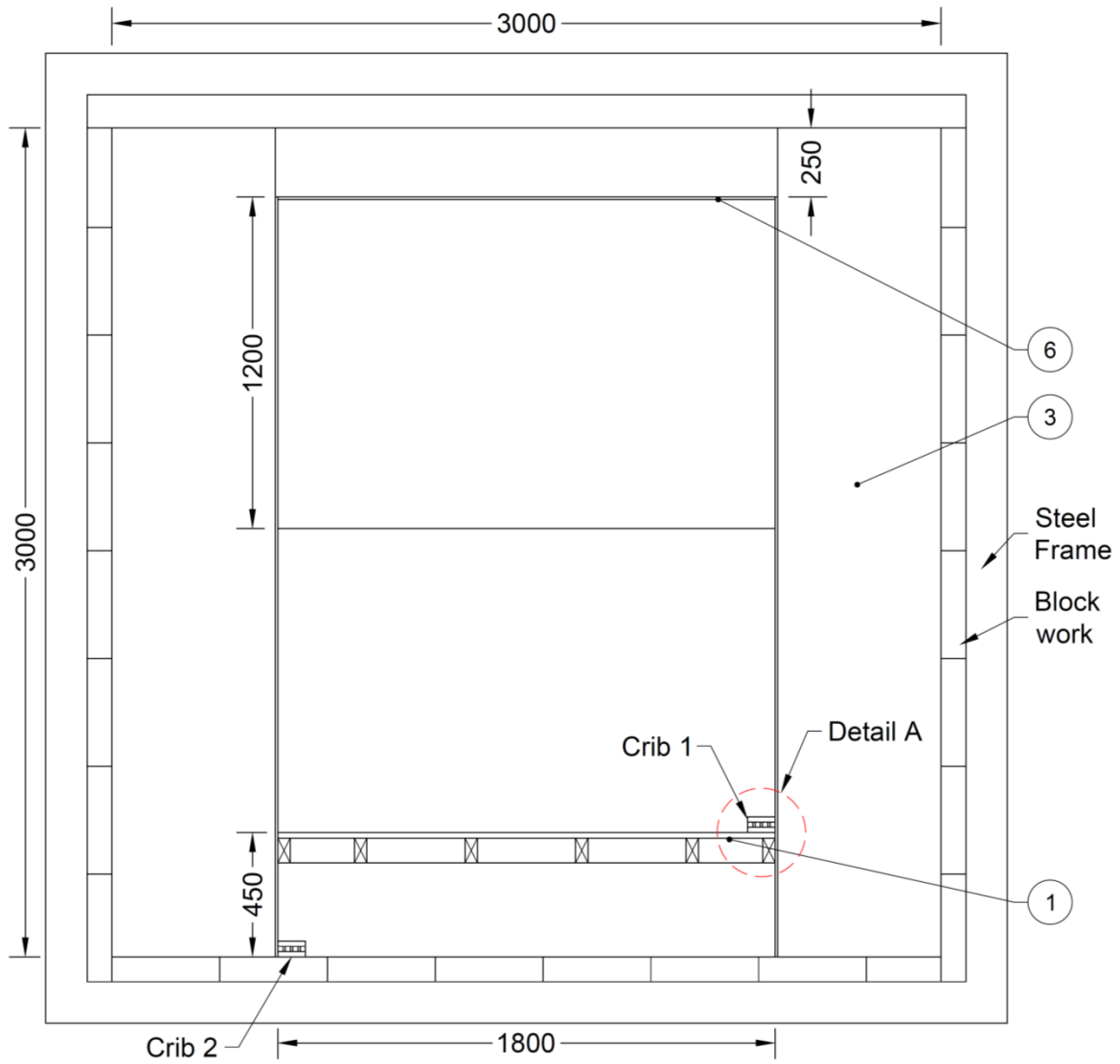


Figure A1.1: Exposed side elevation of test specimen

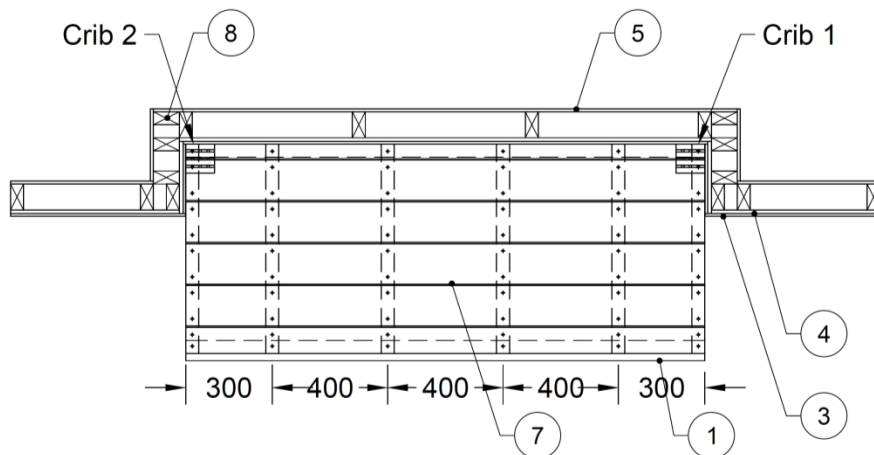


Figure A1.2: Horizontal section through test specimen

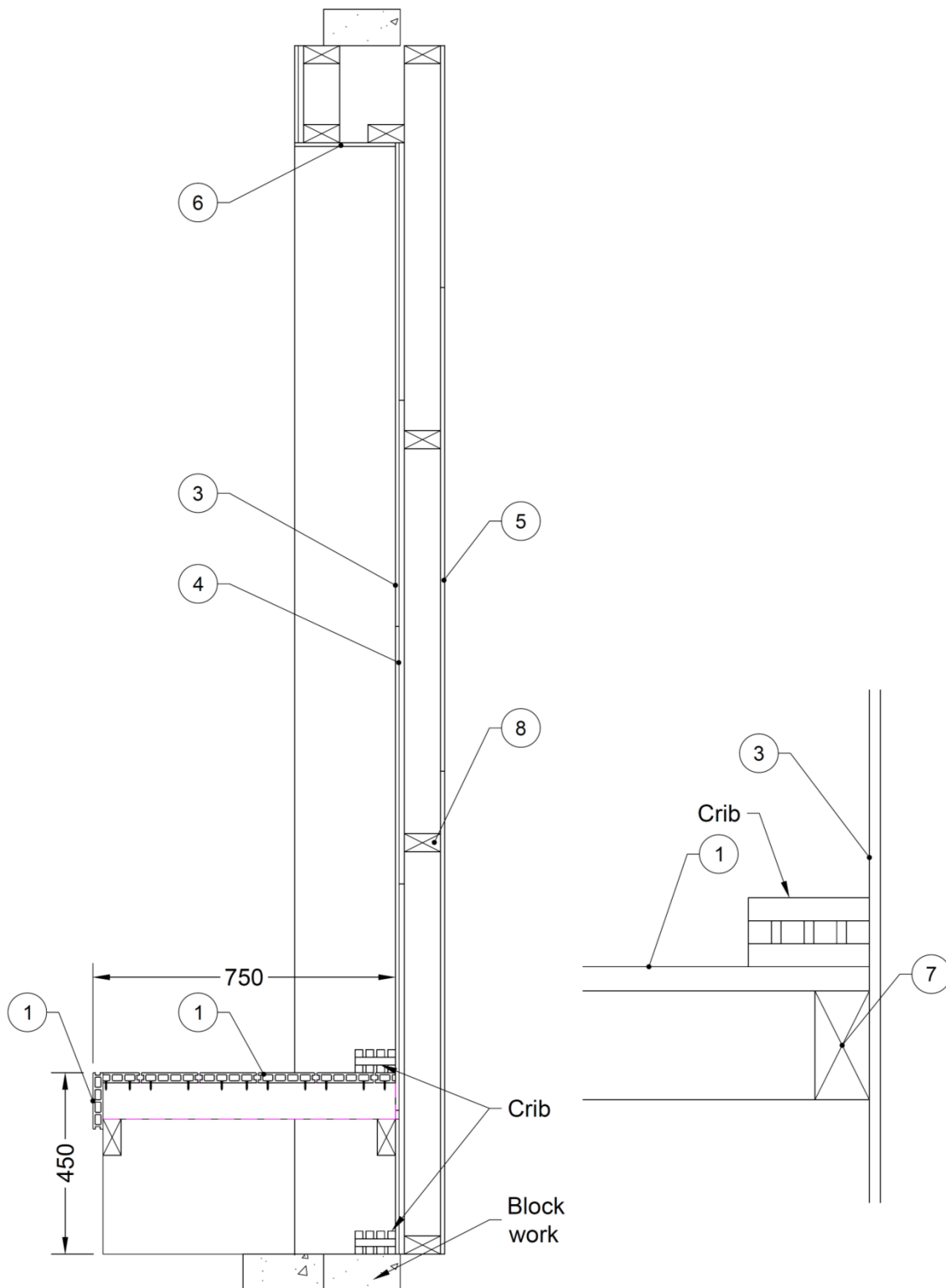


Figure A1.3: Vertical cross section through test specimen

APPENDIX 2 TEST OBSERVATIONS

The following include observations of the significant behaviour of the specimen.

| Time | | Observation |
|------|-----|--|
| min | sec | |
| 0 | 00 | The bushfire test was commenced and the ambient air temperature was approximately 25°C. The ignited cribs were positioned in the south corner of the wall above deck and one below decking in the north corner. |
| 0 | 10 | The shielding doors were opened and the specimen was exposed to the radiant heat profile for BAL 40 as specified in AS1530.8.1- 2007. |
| 0 | 55 | Smoke emissions from deck fascia had become evident. |
| 3 | 00 | Smoke emissions have reduced. |
| 5 | 30 | Bottom crib smouldering, no flames evident. |
| 6 | 45 | Top crib smouldering, no flames evident. |
| 10 | 00 | The shielding doors on the furnace were closed and exposure to the radiant heat profile for BAL 40 ceased. Monitoring of the specimen to the criteria specified in AS1530.8.1-2007 continued. |
| 60 | 00 | The bushfire test was stopped in accordance with the procedures of AS 1530.8.1-2007 |

APPENDIX 3 DIRECT FIELD OF APPLICATION

A 3.1 GENERAL

AS 1530.8.1-2007 states that 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:

- a) Increase in thickness of solid decking material.
- b) Increase in cross-section of bearers and joists.
- c) Increase in the size of the deck.

APPENDIX 4 INSTRUMENTATION POSITIONS

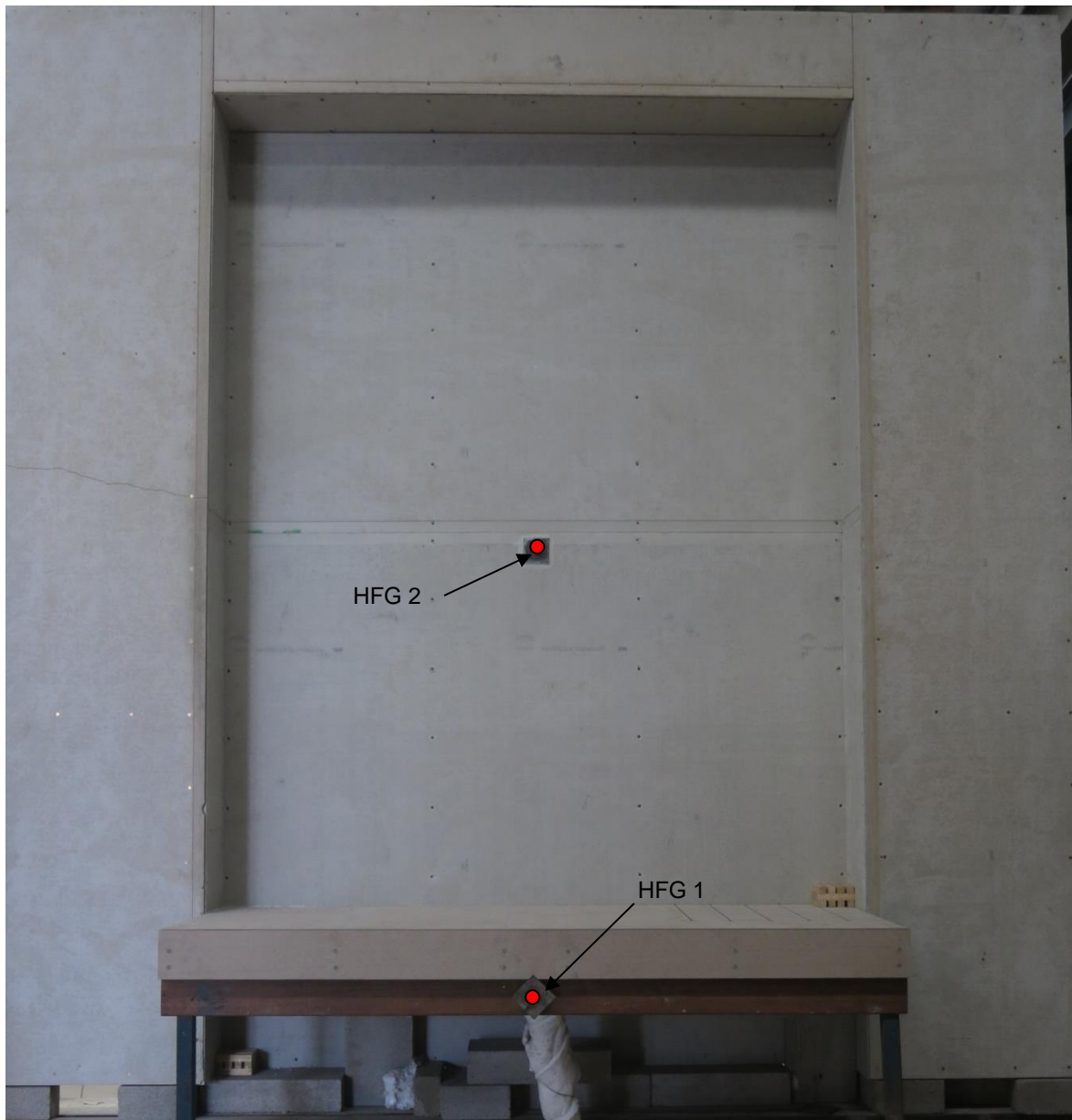


Figure A4.1: Heat Flux Gauge locations on exposed side
HFG 1 centrally located across the deck, nominal 50mm below the bottom of the deck.
HFG 2 located at the centre of the wall.

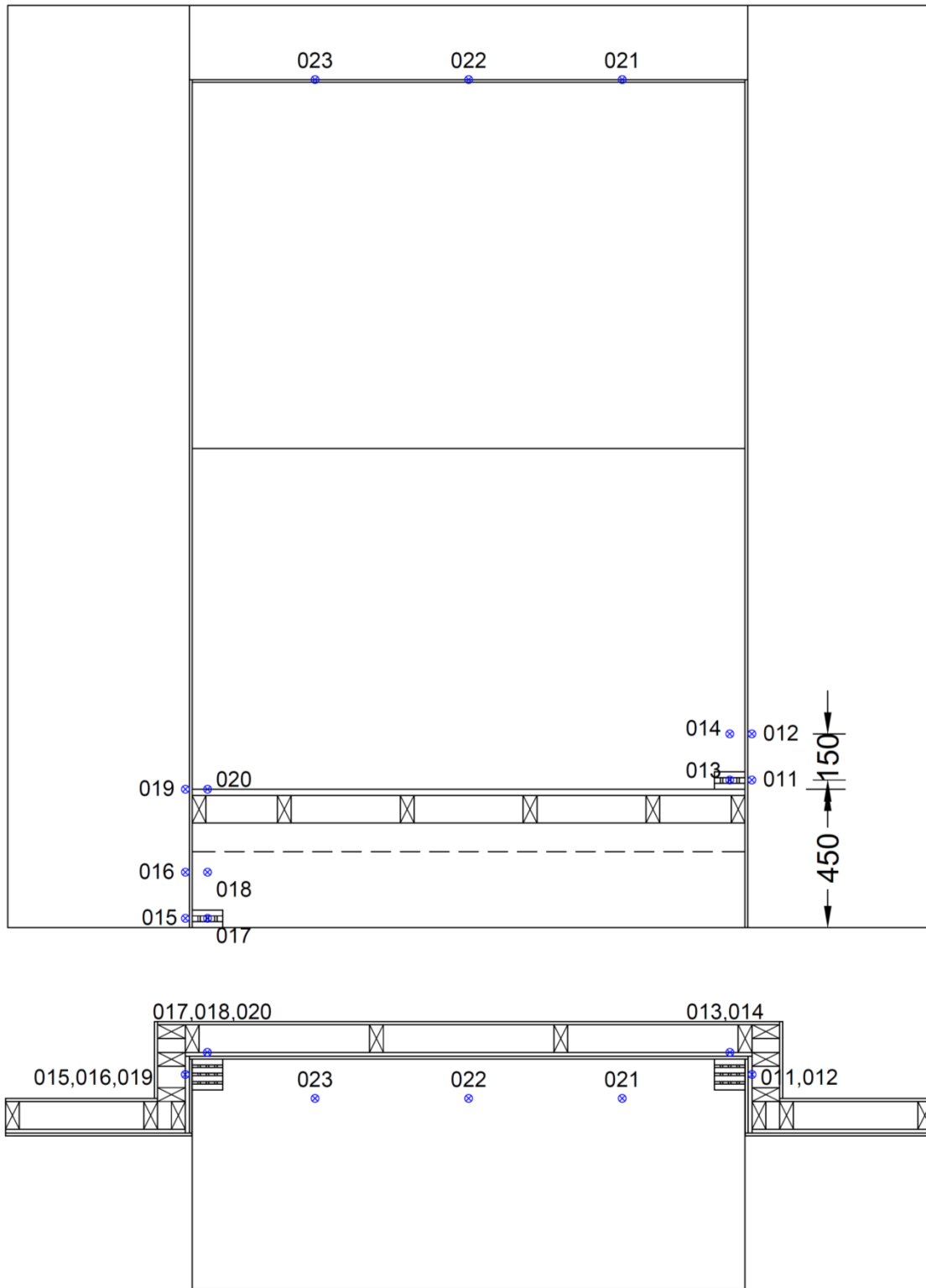


Figure A4.2: Thermocouple locations

APPENDIX 5 TEST DATA

A 5.1 HEAT FLUX RECEIVED

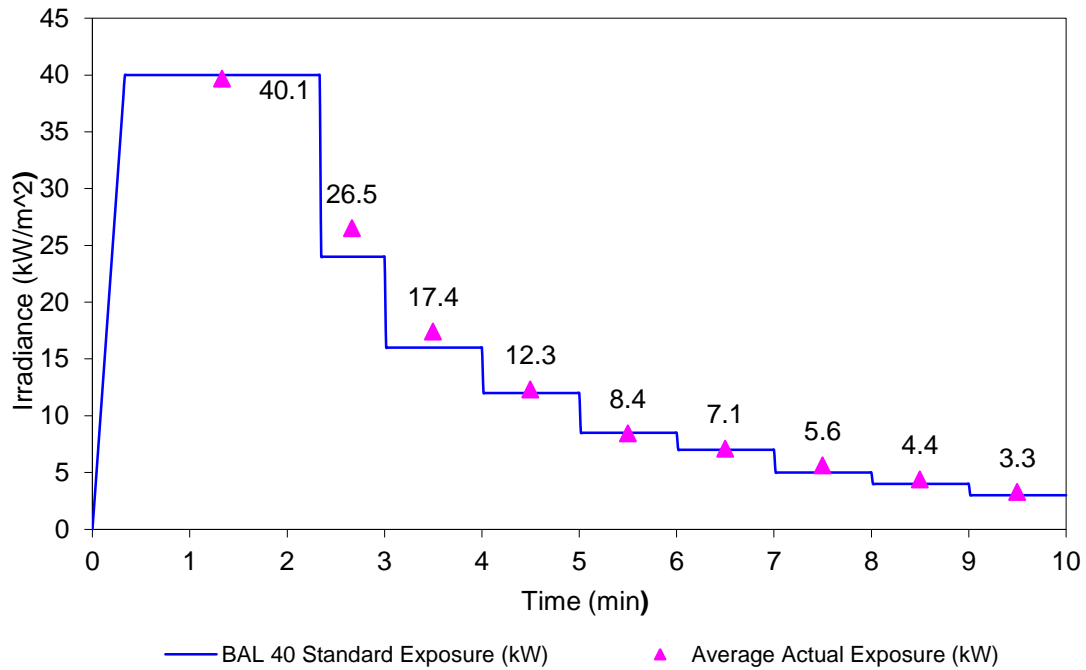


Figure A5.1: Irradiance levels received at the front of the decking system

A 5.2 SPECIMEN TEMPERATURES

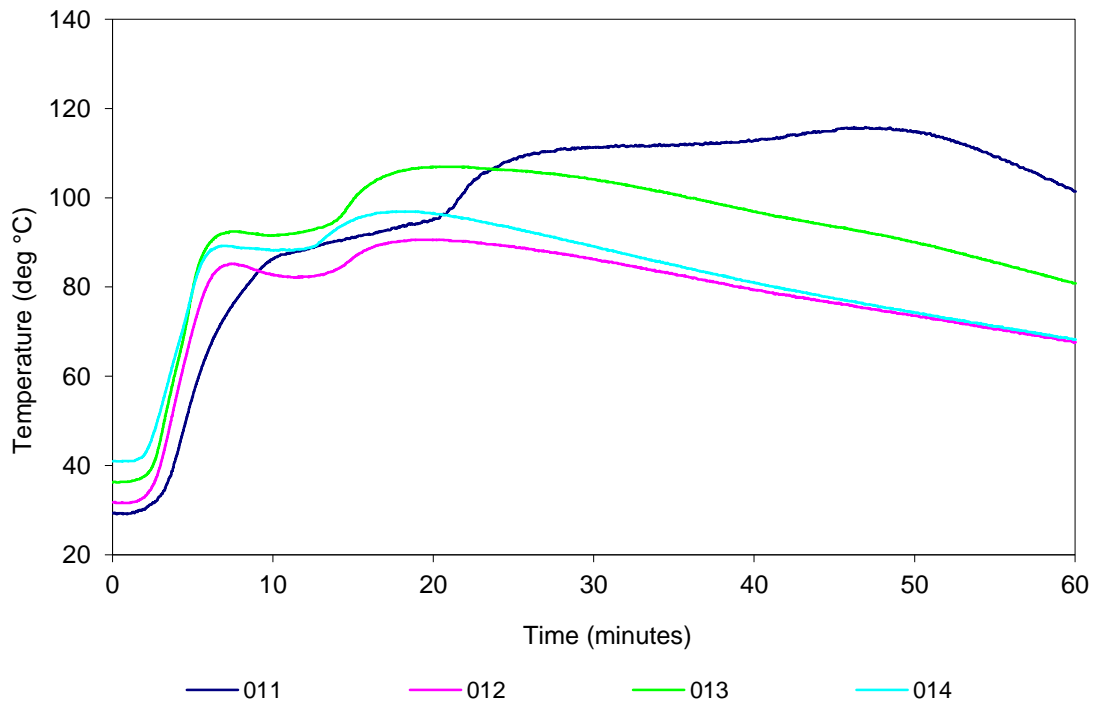


Figure A5.2: Top Crib Specimen temperatures. Temperatures vs. time
Thermocouples located where the crib was positioned on the deck

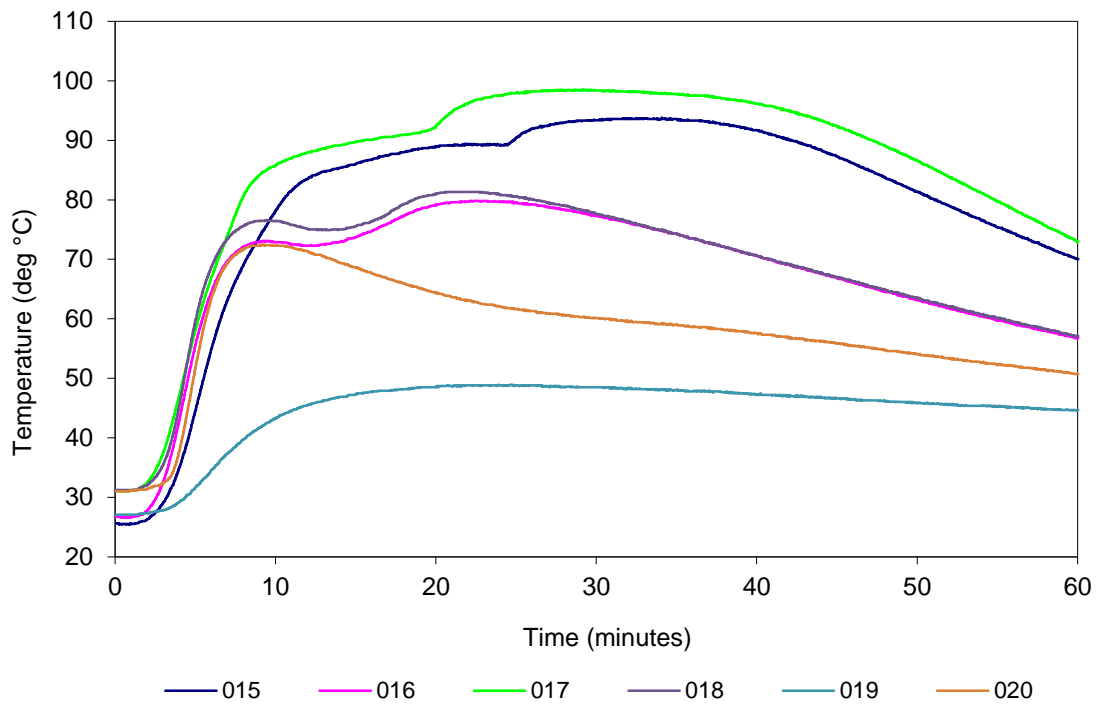


Figure A5.3: Bottom Crib Specimen temperatures. Temperatures vs. time
Thermocouples located where the crib was positioned under the deck

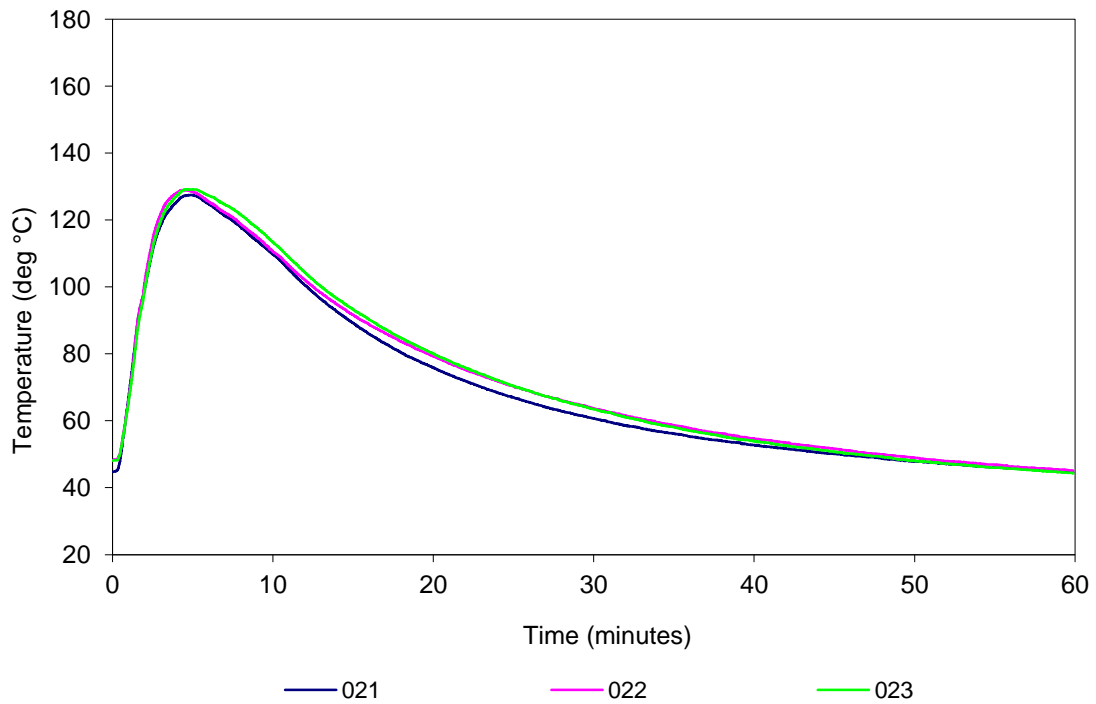


Figure A5.4: Eaves temperatures. Temperatures vs. time

APPENDIX 6 PHOTOGRAPHS

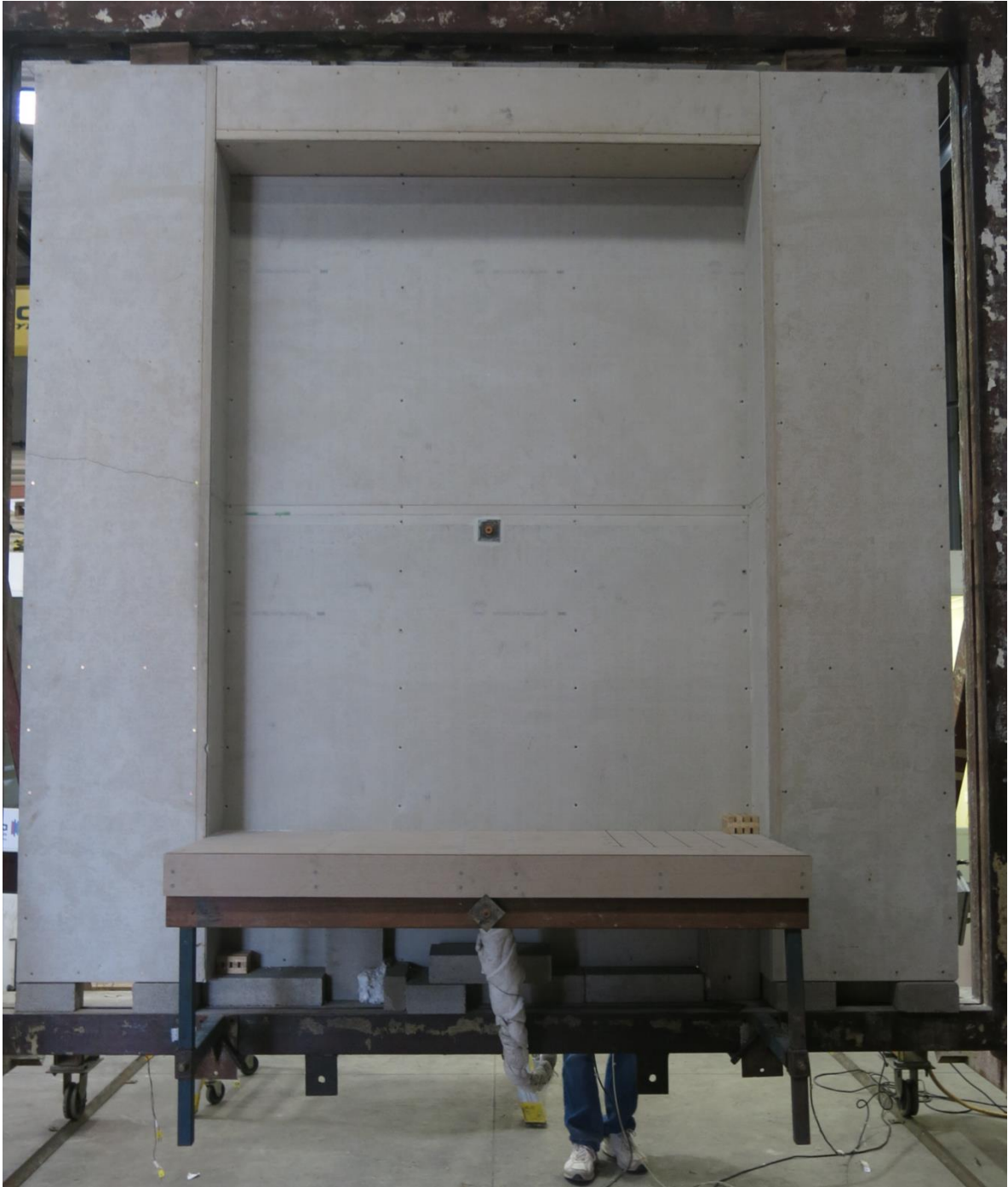


Figure A6.1: Exposed face of specimen before commencement of the test



Figure A6.2: Exposed face of specimen at the end of the test.