



TEST REPORT

ST1046

LOAD TEST ON BATTEN AND CRADLE FLOOR

CLIENT

Batten and Cradle
Level 1,
20-22 Gundry Street
New Zealand

PROJECT NUMBER:

ST1046

ISSUE DATE:

8 October 2014

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OBJECTIVE

To carry out concentrated load tests on the Batten and Cradle flooring system using James Hardie 19mm Scyon Secura flooring sheets. Loading was in accordance with AS/NZS 1170.1 "Structural design actions. Part 1: Permanent, imposed and other actions". Reference values for floor loads are set out in Table 3.1.

LIMITATION

The results reported here relate only to the item/s tested.

TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.



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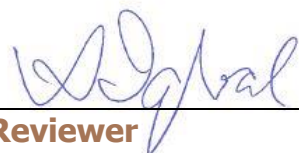
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DOCUMENT REVISION STATUS

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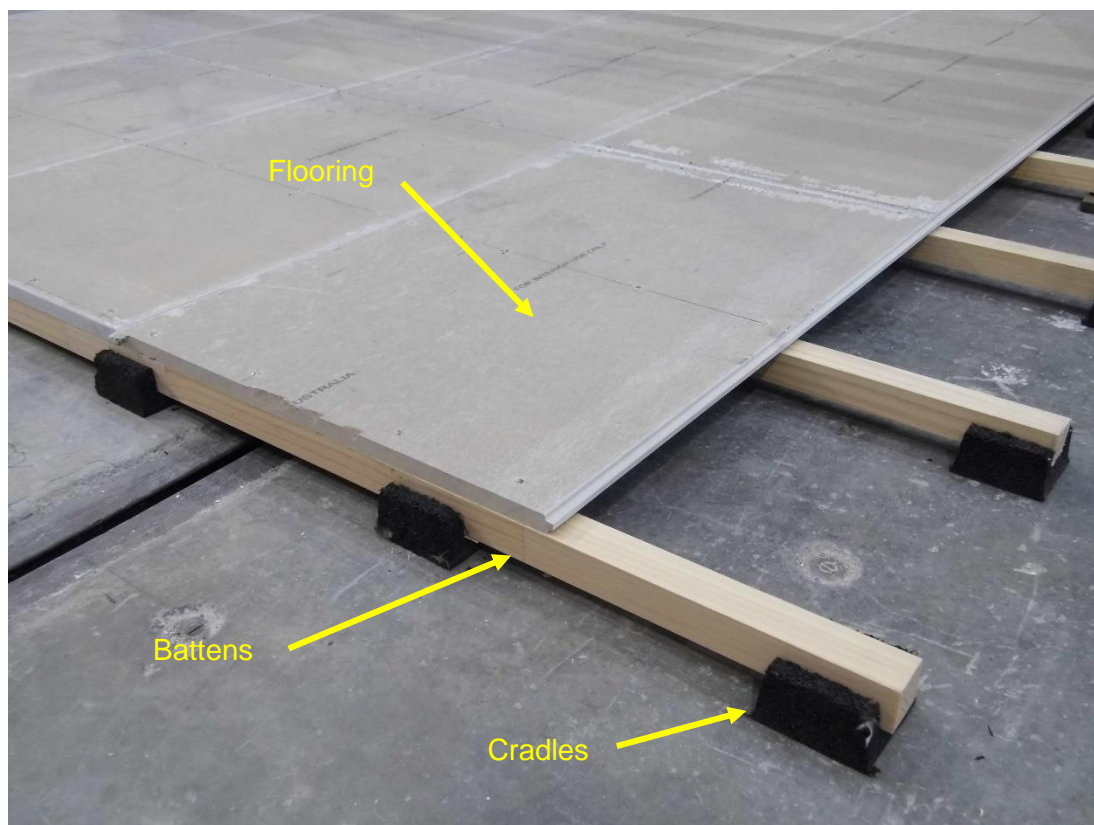
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1. DESCRIPTION OF SPECIMEN

1.1 Product description

The Batten and Cradle flooring system is a proprietary flooring system utilising recycled rubber cradles laid on a concrete floor slab. Timber battens are placed in the cradles and flooring sheets are fixed to the battens to provide a substrate for various finishes. The flooring system combined with the base slab has favourable acoustic properties, and is intended for use in situations requiring acoustic separation. Photograph 1 shows the main features of the system.



Photograph 1. Main features of Batten and Cradle Floor System

1.2 Specimen construction

A 3.6 m x 2.4 m section of the flooring system was constructed by the client on the floor of the BRANZ Structural Laboratory. Details are shown in Figure 1.

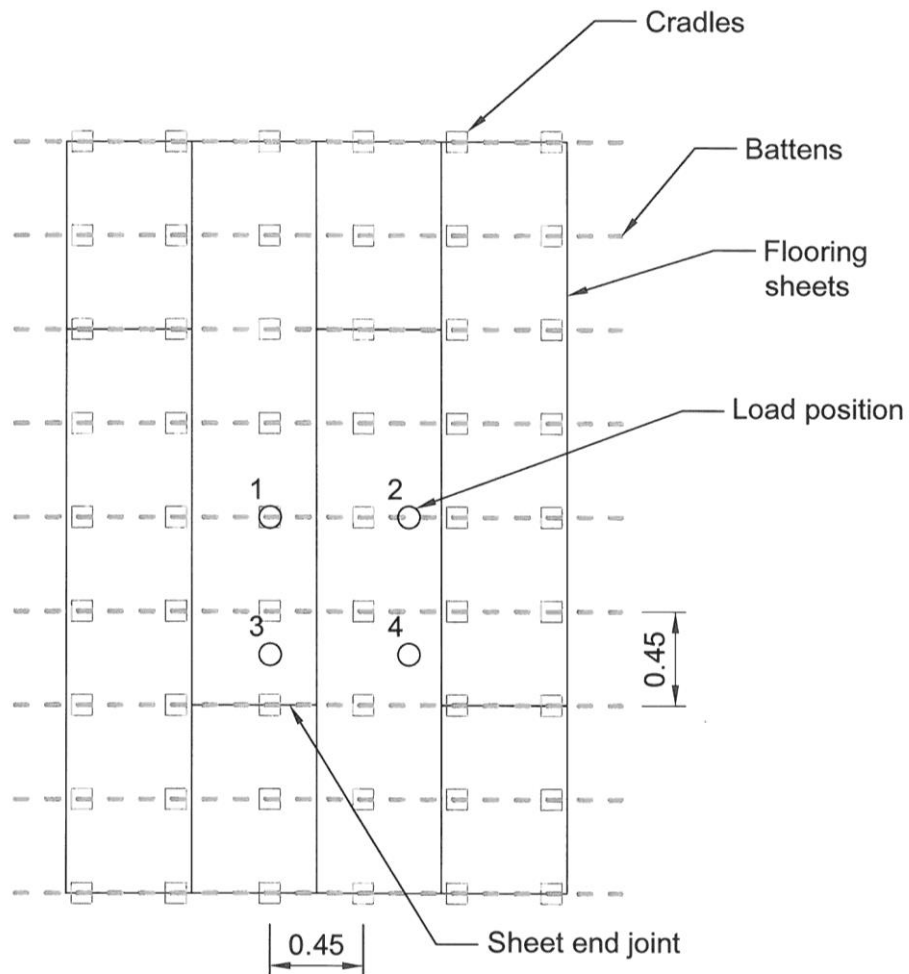


Figure 1 Test specimen set up

Battens were finger jointed Radiata Pine 42 x 42 mm and were not attached to the cradles which were laid directly on the concrete floor. Flooring was James Hardie Scyon Secura sheets, 19 mm thick and 600 mm wide, with long edges machined into a tongue and groove profile. They were cut to length as required to form an offset pattern, and fixed to the battens with 8g screws. Screw spacing was 50 mm from the long edges and 167 mm centres along the batten. The specimen ready for testing is shown in Photograph 2.



Photograph 2. Specimen ready for test

2. DESCRIPTION OF TEST

2.1 Date and location

The test was conducted on 7th October 2014 at BRANZ Limited laboratories, Judgeford, New Zealand in presence of the client.

2.2 Test set-up

The specimen was set up on the lab floor as described above. A loading gantry was constructed over it and bolted to the lab floor. A hand pumped hydraulic jack was installed on the loading beam together with a 10 kN load cell and a 100 mm diameter loading applicator. AS/NZS 1170.1 states that the concentrated load should be applied over an area of not greater than 0.01 m², which equates to a diameter of 113 mm. The locations of the load application were:

1. Over batten and cradle
2. Over batten between cradles
3. Between battens on cradle lines adjacent sheet butt joint
4. Between battens and cradles.

The locations are shown in Figure 1.



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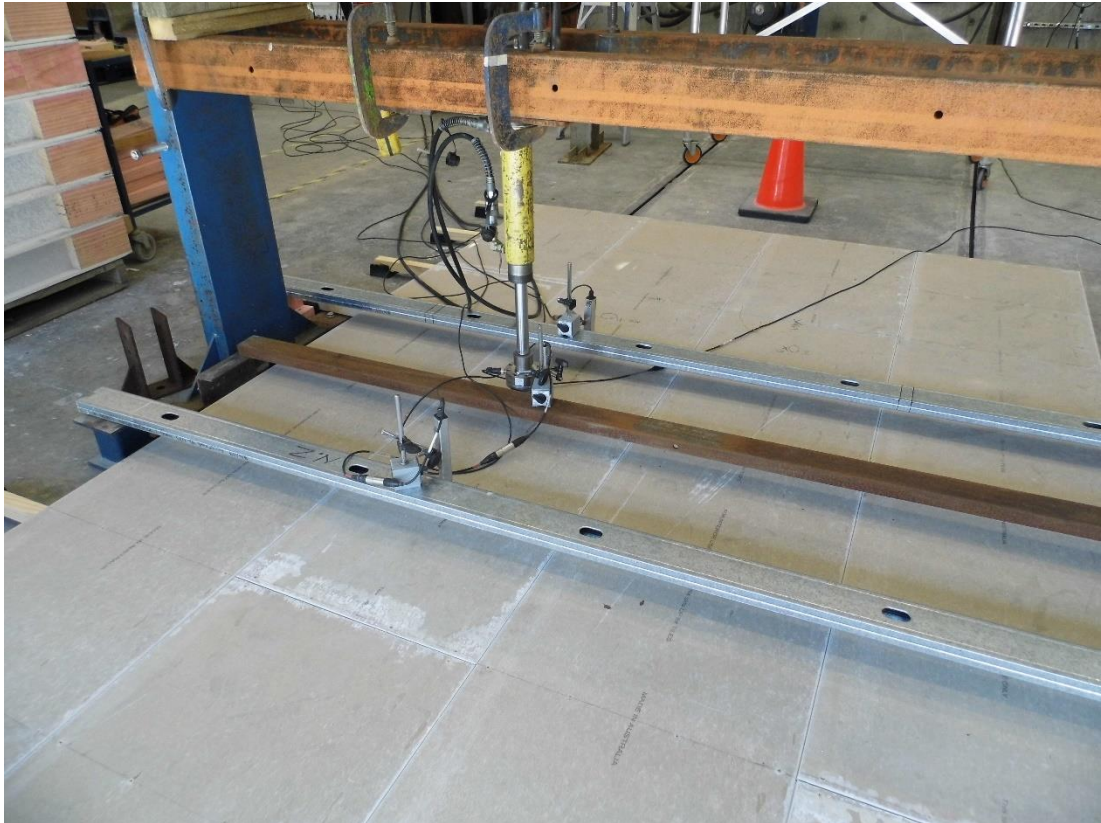
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Beams supporting deflection gauges were placed across the specimen at the load point and over adjacent battens. The test set up is shown in Photograph 3.



Photograph 3. Test set up

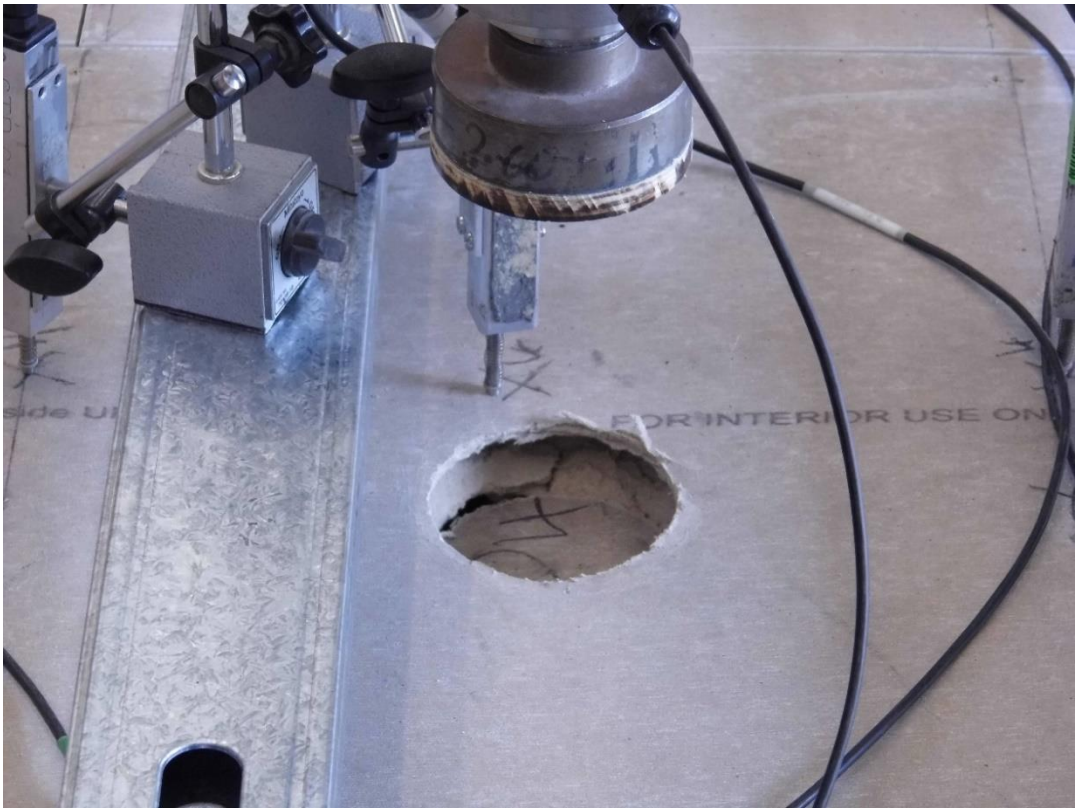
2.3 Test procedure

Load was applied by hand pumped jack gradually increasing up to the 10 kN limit of the load cell. Continuous readings of load and deflection were recorded for analysis.

3. OBSERVATIONS AND RESULTS

Dishing of the flooring around the load application point could quite clearly be seen, and at greater deflections, the joints between the flooring sheets were clearly distorted. Deflections were largely recovered on removal of load, indicating that no inelastic action or permanent effects had occurred. At the end of Test 4 the load applicator punched through the flooring sheet, as shown in Photograph 4. This happened at a load of 10 kN, well above the AS/NZS 1170.1 loading criteria. For “General Office” occupancy the concentrated load criteria is 2.7 kN, and for “Shop floor or retail” occupancy it is 3.6 kN.

Plots of load/deflection as recorded are presented in Figures 2 to 5, and a summary is shown in Table 1. Note that “absolute deflection” is the deflection measured relative to the concrete laboratory floor, and “relative deflection” is the deflection of the load point relative to the flooring sheets over the adjacent battens.



Photograph 4. Punch failure in Test 4

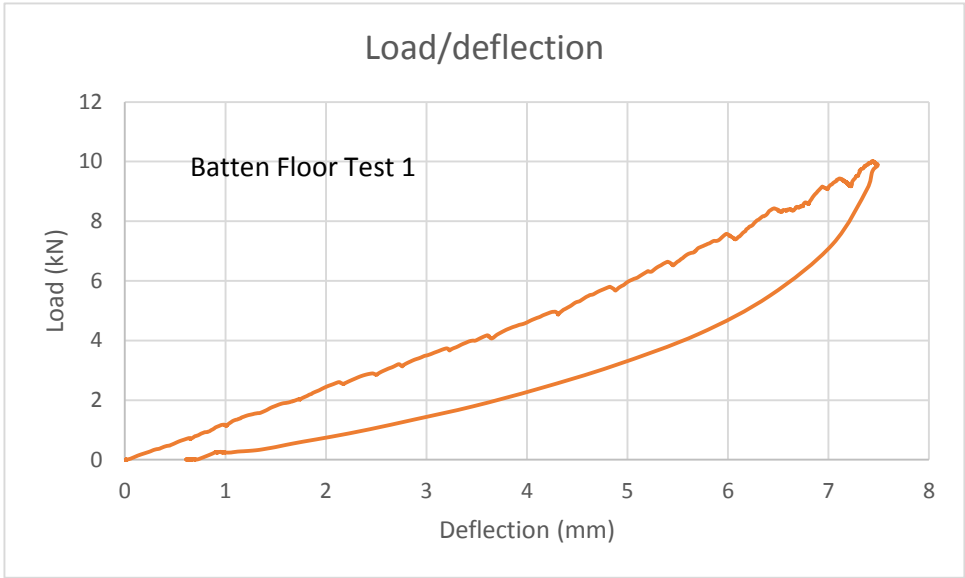


Figure 2. Load/deflection plot, test 1



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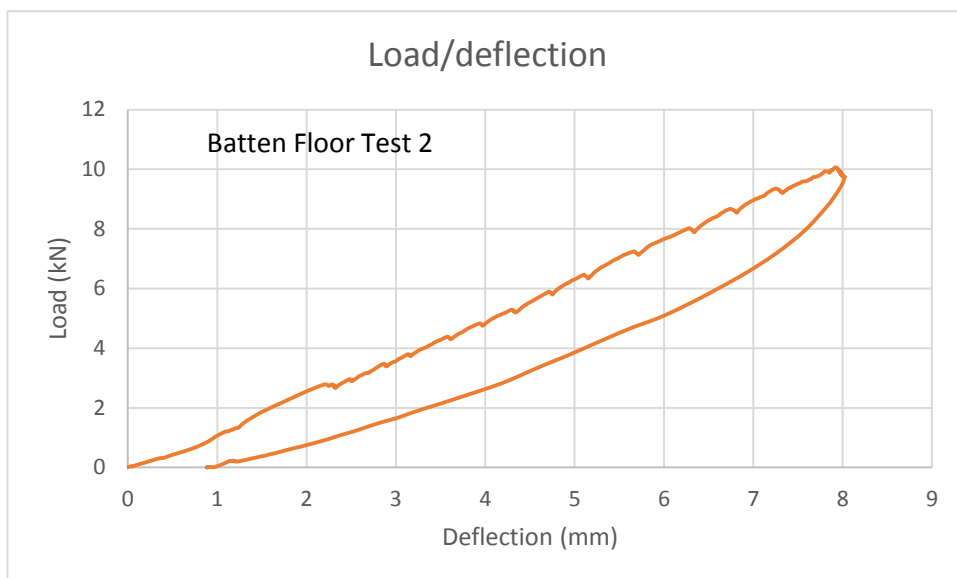


Figure 3. Load/deflection plot, test 2

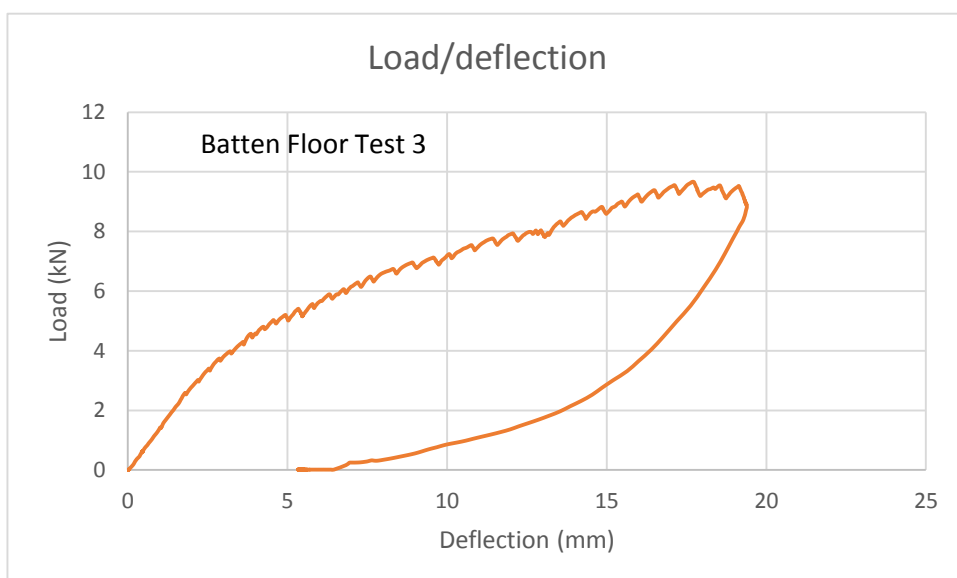


Figure 4. Load/deflection plot, test 3

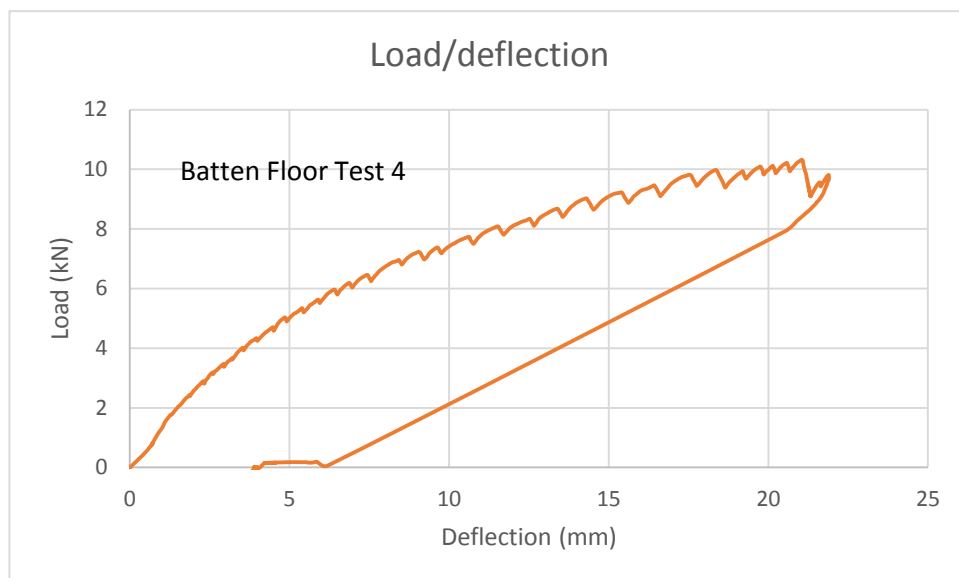


Figure 5. Load/deflection plot, test 4

Test	2.7kN (General Office)		3.6kN (Retail)	
	Absolute	Relative	Absolute	Relative
1	2.7	2.3	3.7	3.1
2	2.6	2.1	3.8	3.0
3	3.4	1.9	4.8	2.7
4	3.7	2.1	5.4	3.1

Table 1. Results summary