



CYCLONE TESTING STATION

COLLEGE of SCIENCE and ENGINEERING

James Cook University

REPORT NO. TS1093

31 October 2017

Static Simulated Compression Strength Testing of Moroblock Wall System

By

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for

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NATA Accredited Laboratory Number 14937
Accredited for compliance with ISO/IEC 17025.

1 Introduction

The aim of this test programme was to perform static simulated compression strength testing of the *Moroblock* wall system manufactured by *E-Abode Pty Ltd*. The test sample was manufactured by the client.

The test was conducted using the hydraulic compression testing equipment, in the Structures Laboratory, located at James Cook University. The Cyclone Testing Station is a NATA accredited testing laboratory. All trials for this testing programme were performed in accordance with NATA requirements.

2 Test Programme

A programme of compression strength testing was conducted on *Moroblock* wall system. A summary of the test programme is provided in Table 1.

Table 1: Test Programme Summary for Compression Strength Tests on *Moroblock* Wall System

Trial No.	Wall Length (mm)	Wall Height (mm)	Test Regime
CS1	1230	2670	Compression Strength

3 Sample Description

The *Moroblock* sample was stated to be manufactured from 18 mm thick engineered bamboo panels. The standard size of a *Moroblock* was nominally 800 mm in length and 300 mm in height. Half-length blocks were used at the end of rows due to the staggered pattern used to build the wall. The width of the blocks was 200 mm (i.e. thickness of wall).

The blocks were described to have been assembled horizontally together with a key cut from hardwood 12 mm × 6 mm shaped into a double dovetail. The rows of blocks were fitted together at top and bottom using a tongue and groove system 6 mm × 6 mm.

Vertical wall spacers, manufactured from engineered bamboo panels, were used to join the wall faces together. The wall spacers were 400 mm centred with the end wall spacers at 200 mm from the edges of the walls. A dovetail female shape was cut on the internal faces of the walls and the wall spacers had a matching male dovetail shape to link both wall faces together.

The wall spacers were stated to have been manufactured in a way that the fibre orientation of the outer skins of the wall spacers were running vertically in respect to the whole wall.

A 'ground plate' manufactured from engineered bamboo panels was screwed to the bottom of the wall using type 17 stainless steel, 8 gauge, 9 thread per inch, 50 mm (8-9 × 50 mm) countersunk square drive screws as seen in Figure 2.

The top plate and wall sides were manufactured from engineered bamboo panels and assembled to the wall using a 6 mm × 6 mm tongue and groove system, glued with PVA glue and screwed using type 17 stainless steel, 8 gauge, 9 thread per inch, 50 mm (8-9 × 50 mm) countersunk square drive screws as seen in Figure 2.

The panels were stated to have been glued together using PVA glue.

Figure 1 shows the wall sample constructed with the *Moroblock* system.



Figure 1: *Moroblock* Wall System Sample

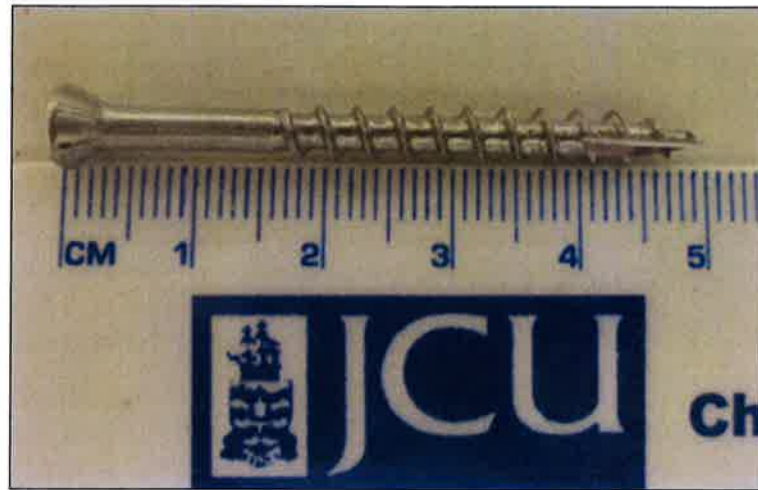


Figure 2: 8-9 × 50 mm stainless steel countersunk screw

4 Test Apparatus and Procedure for Compression Test

4.1 Compression Test Set Up

The test wall samples was installed in the compression test rig. The compression test rig comprised of six hydraulic rams connecting the top and bottom plates of the wall through steel rectangular hollow section (RHS) beams. Figure 3 shows the test setup in the compression test rig.

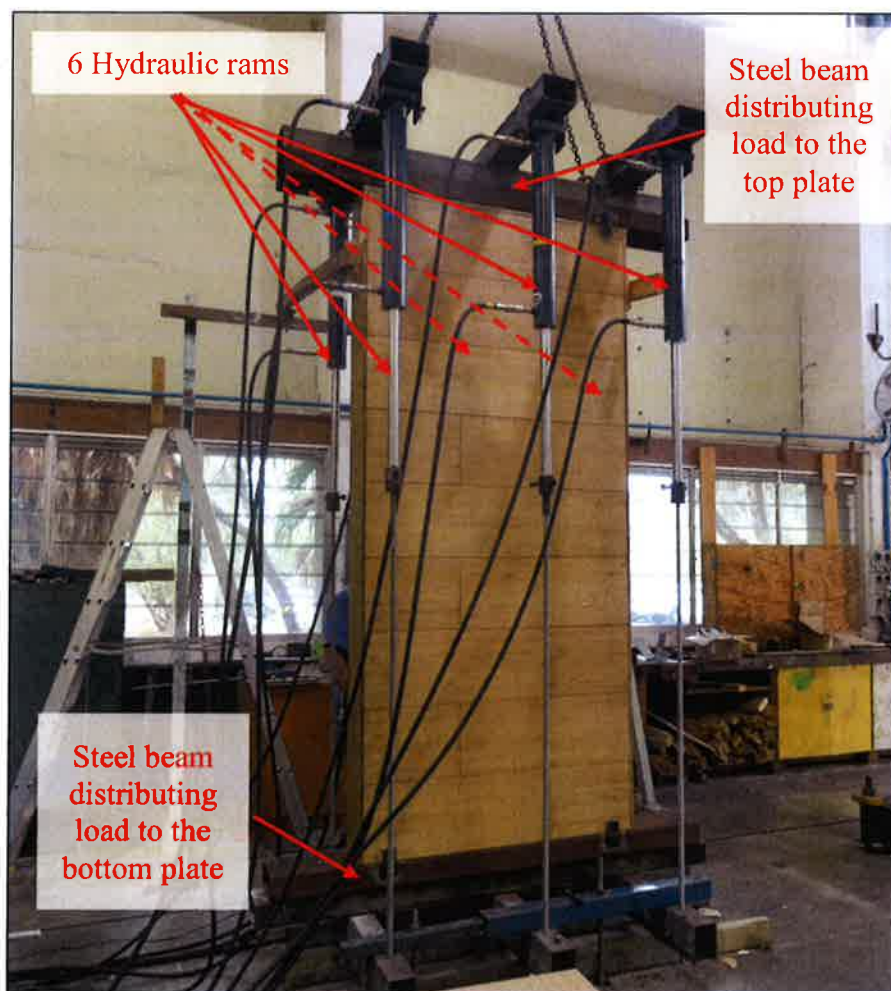


Figure 3: Sample Installed in the Testing Rig

The test wall was restrained from sliding off the RHS sectors by eight steel sections welded to the load distributing beams of the testing rig as detailed on Figure 4.

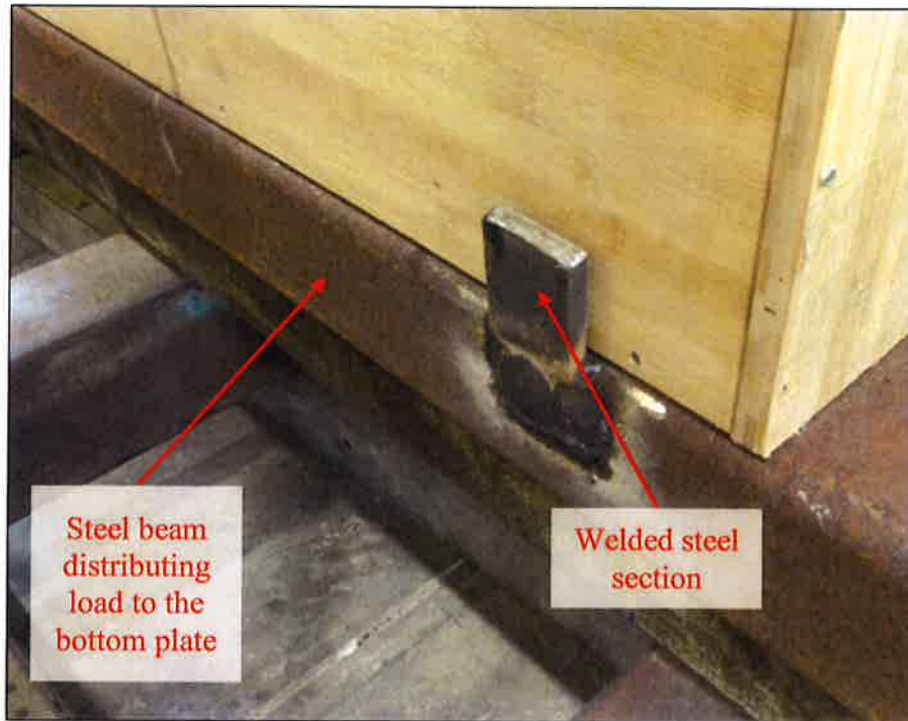


Figure 4: Detailed View of the Restraining Steel Section

A load cell was placed in line with one of the hydraulic rams to monitor the load applied by the ram. All rams were connected to the same hydraulic manifold, hence all rams applied the same load simultaneously to the sample and the total load experienced by the sample was six times the load monitored by the load cell. Figure 5 shows the load cell in line with one of the rams.



Figure 5: Load Cell

To ensure the wall remained in vertical position, two timber rafters were fixed to the top of the wall and attached to a supporting frame. Figure 6 shows the location of the timber rafters.



Figure 6: Sample Maintained in Vertical Position thanks to Timber Rafters

A horizontal dial gauge was placed at the centre and mid-height of the wall on one of its sides to measure movements of the wall during the test.

4.2 Test Procedure for Compression Testing

The load was slowly increased by the testing operator increasing the hydraulic pressure sent to the rams. Once the desired load was reached it was held for one minute.

5 Results

5.1 Static Compression Strength Test

A summary of the recorded static compression strength test results is provided in Table 2.

Table 2: Static Compression Strength Testing Results

Trial No.	Date Tested	Maximum Load Applied by One Ram (kN)	Maximum Total Load Applied		Observation
			Max. Force Applied (kN)	Max. Horizontal Deflection (mm)	
CS1	10 Oct 2017	25.5	153.0	0.54	Max. Test Load held for 1 min. The test wall sustained the load with no sign of damage and no observable deformation

6 Conclusions

A static compression strength test was performed on *Moroblock* wall system manufactured by *E-Abode Pty Ltd.*

The methods of testing have been presented.

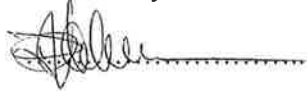
The test result has been presented in Table 2.

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