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BRE Test Report

Composite Wall and Roof Panel Testing

Prepared for: Mr Paul Tozer
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1 Introduction

Following instruction from Lasermet Limited BRE have carried out testing to confirm and refine design assumptions made by Lasermet. The tests included Axial Compression and Bending testing. This factual report summarises the outcome of the testing.

The 10nr composite panels were received at BRE in November 2019. Axial Compression testing was carried out on 6th December 2019 and Bending testing was carried out on the 9th and 11th December 2019.

2 Test programme

BRE undertook two types of testing: Axial compression testing and Bending testing. 5nr specimens were tested for each testing method and all the panels were 100 mm thick, comprising 0.7 mm steel skins either side of a foam insulating filling.

Axial Compression Testing

For the axial compression testing 5 samples were tested which were 3.5m long and 1.0m wide. The panels were loaded vertically using BRE's 5000kN Universal Testing Machine. Both load and deflection were continuously recorded throughout each test, at 4 deflection measurement locations. The deflections were measured using pull-wire transducers; 3 were located along the length of the panel and 1 was recording the vertical displacement. No corrections were made to the samples if the foam protruded from the steel skin, which was most noticeable on Panel 3, where the foam extended 12mm. No defects were observed in the steel skin of any of the samples before testing was undertaken.

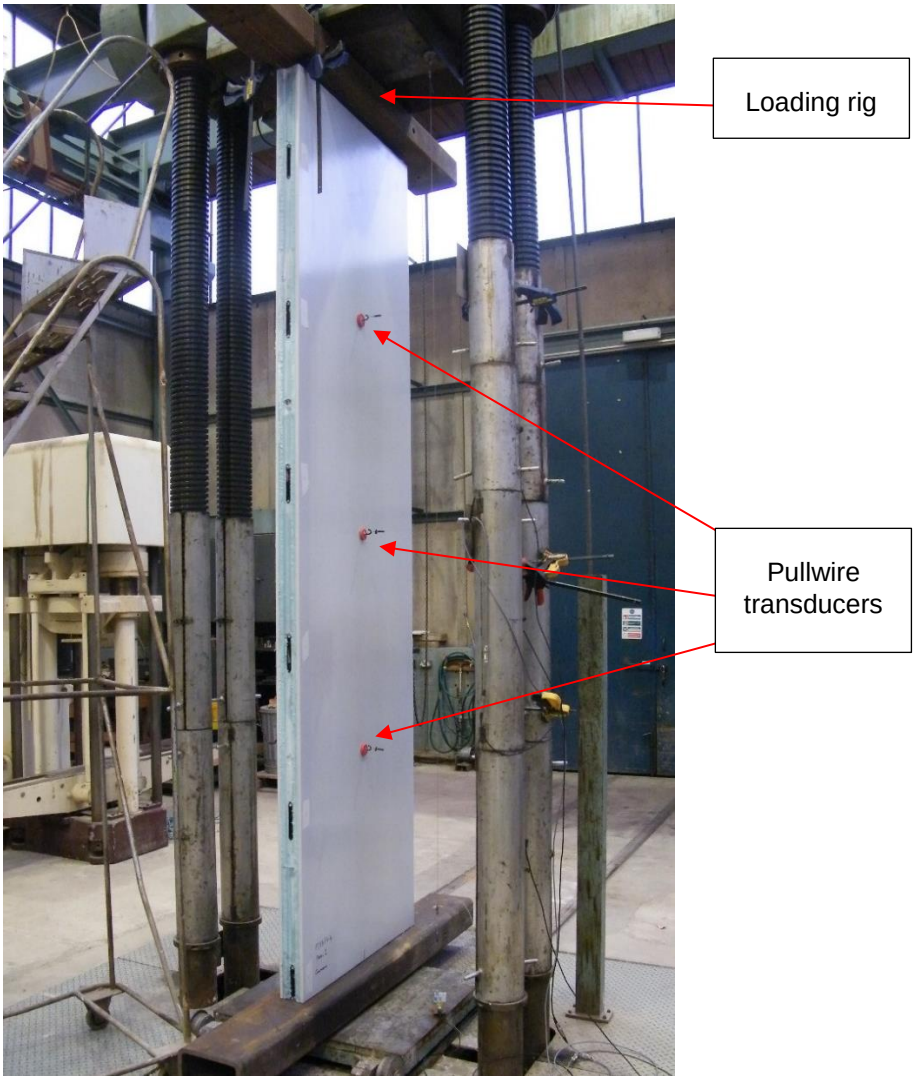


Figure 1 - Axial Compression Testing Set-up

Bending Testing

For the bending testing, 5nr samples were tested which were 5.0m long and 1.0m wide. The panels were placed horizontally and supported and vertically restrained at both ends. The samples were then loaded at two points equally spaced (1/3L and 2/3L) along the length of the panel with pneumatic jacks and the load and deflection were continuously recorded. Deflection was measured using pullwire transducers at 5 locations along the panel; at both supports, both loading locations and in the centre. Load cells were positioned under the jacks in order to measure the applied load.

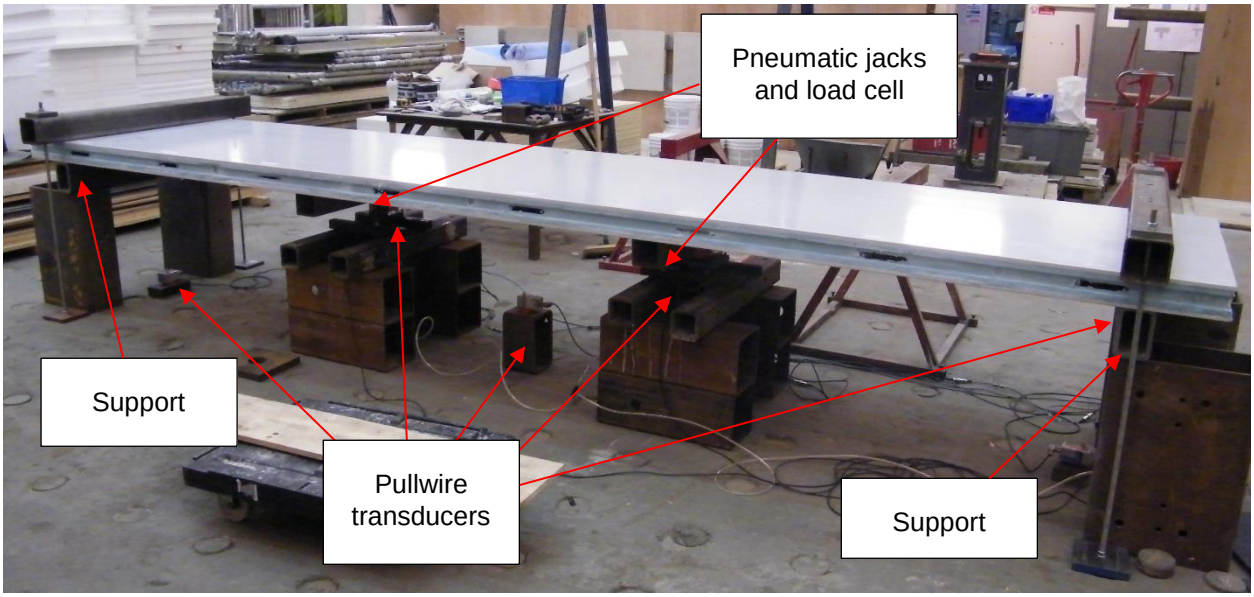


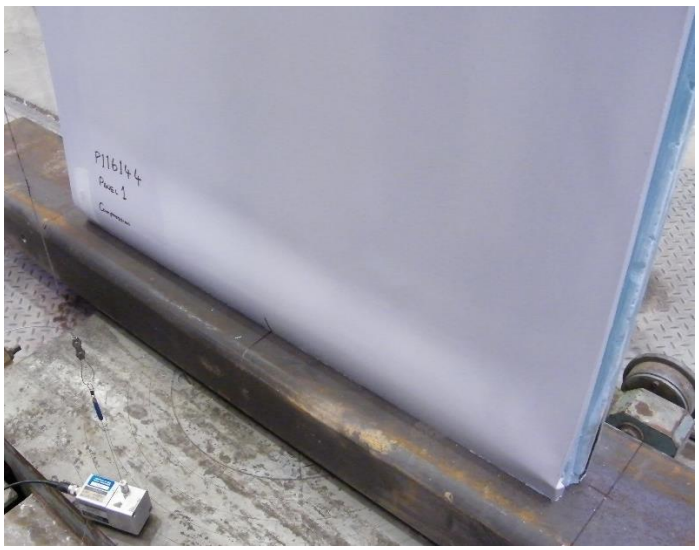
Figure 2 - Bending Testing Set-up

3 Test results

Axial Compression Testing Results

A summary of the maximum loads achieved are given in Table 1.

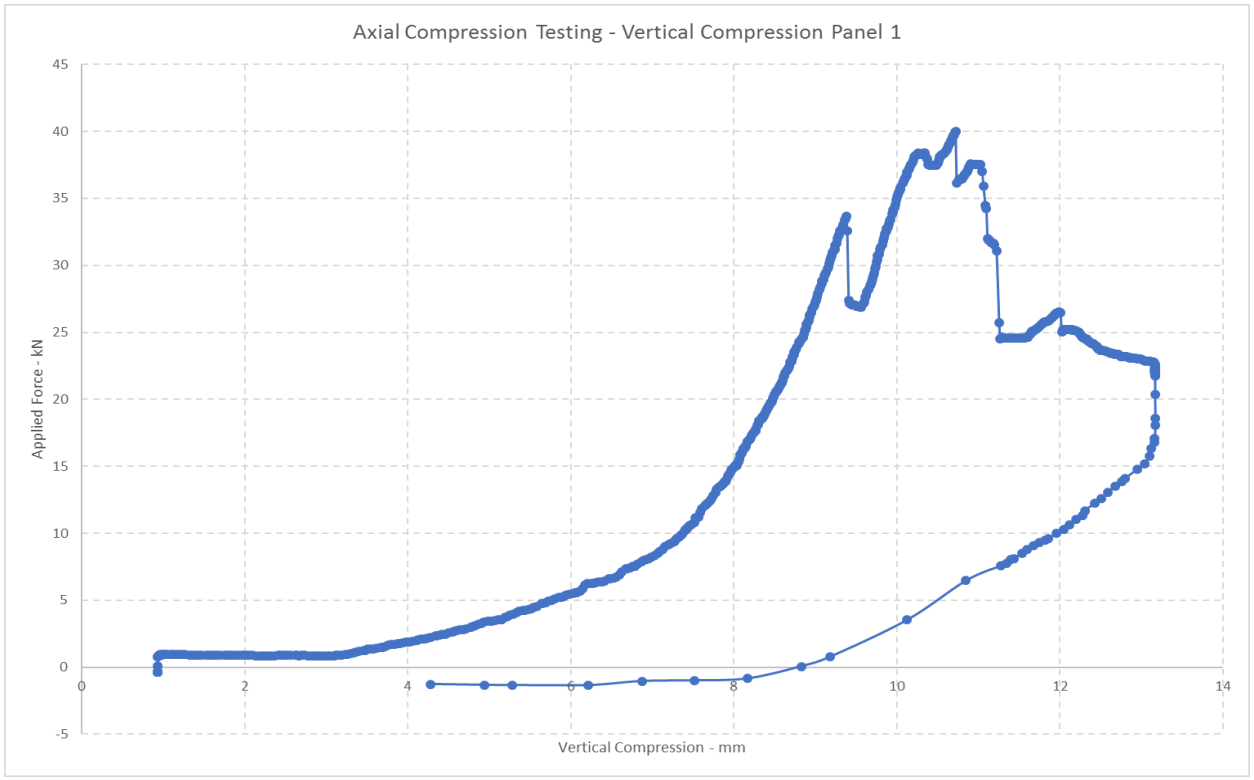
Table 1 - Summary of axial compression test results

Panel No.	Max. Load (kN)	Photo of deformation
1	40.0	
2	71.2	

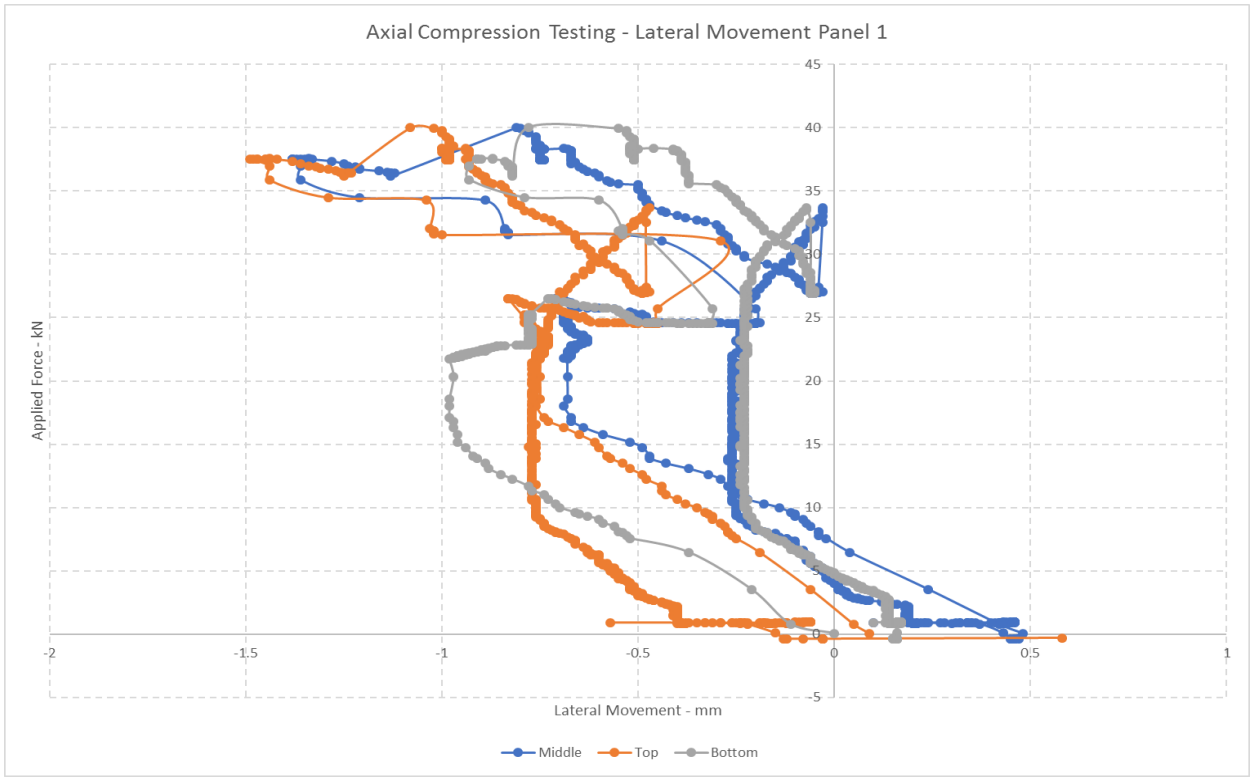
3	35.0	
4	49.2	

5	47.2	

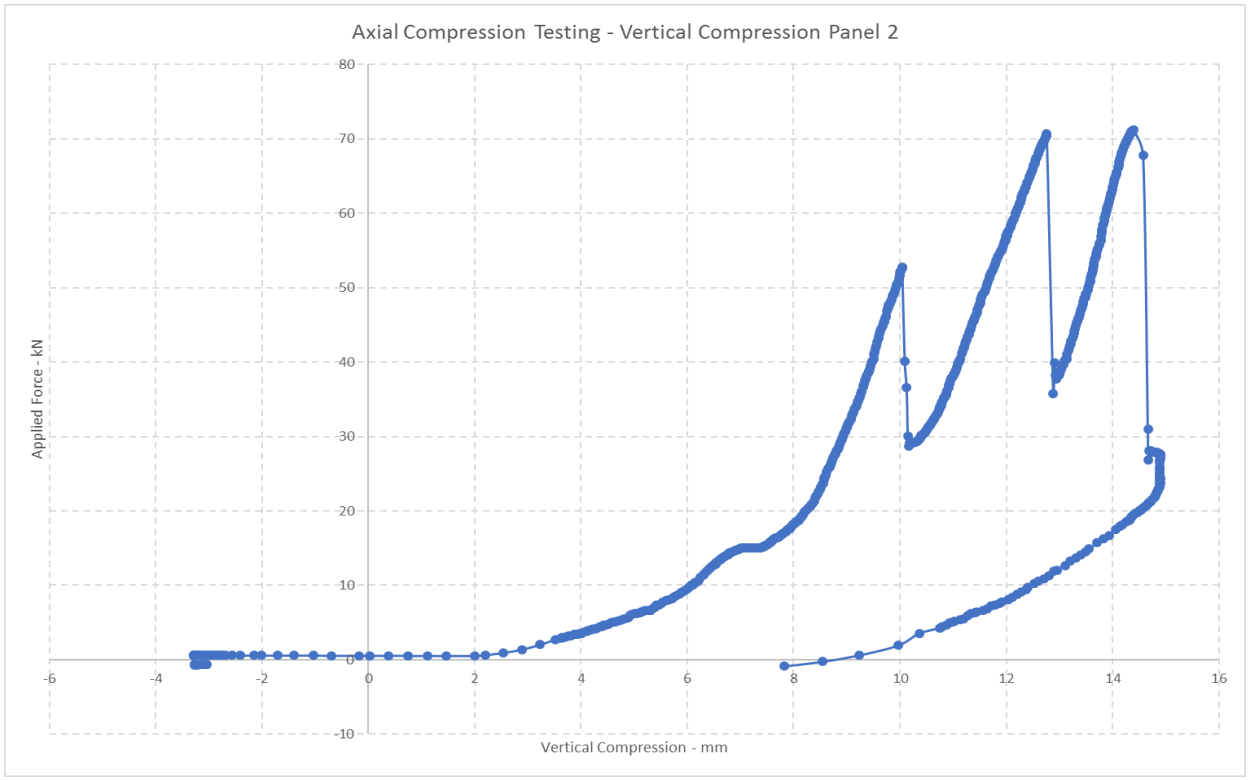
The load vs. vertical compression and load vs. lateral deflection graphs for all the axial compression test are shown in Graph 1 to Graph 10.



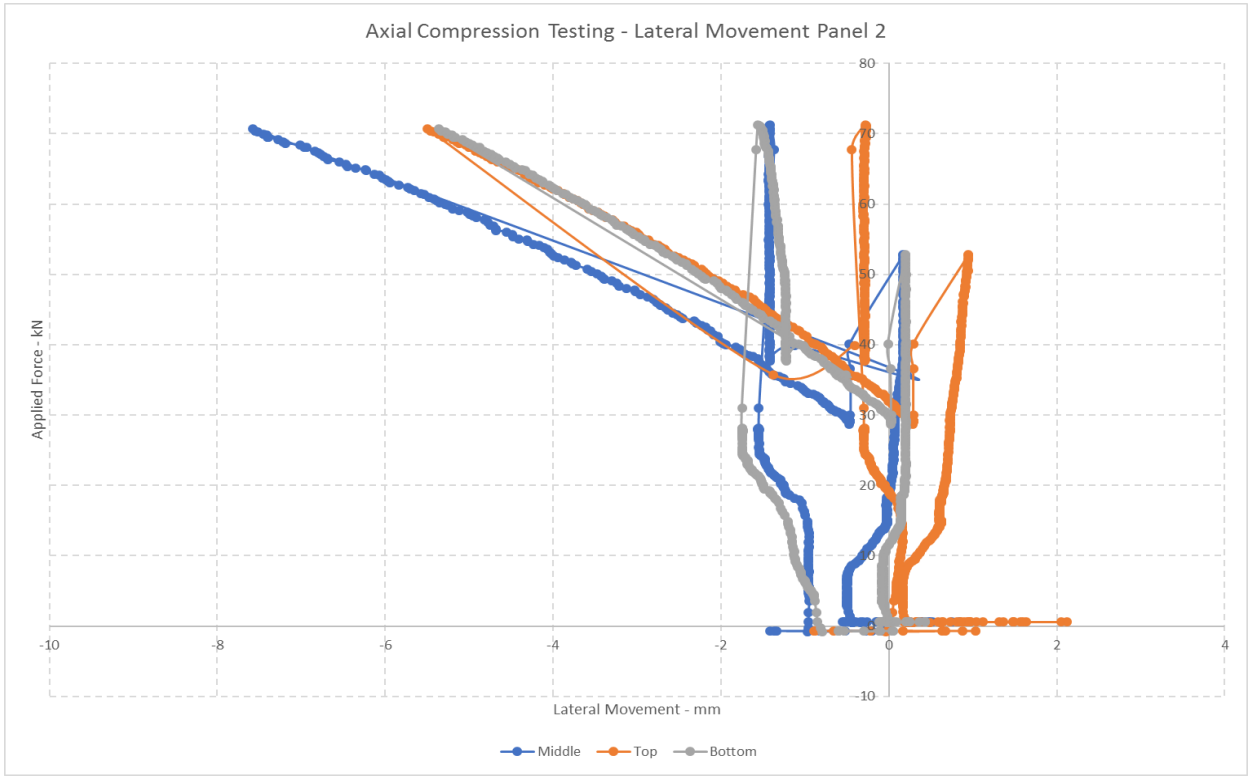
Graph 1 - Axial Compression Testing - Vertical Compression Panel 1



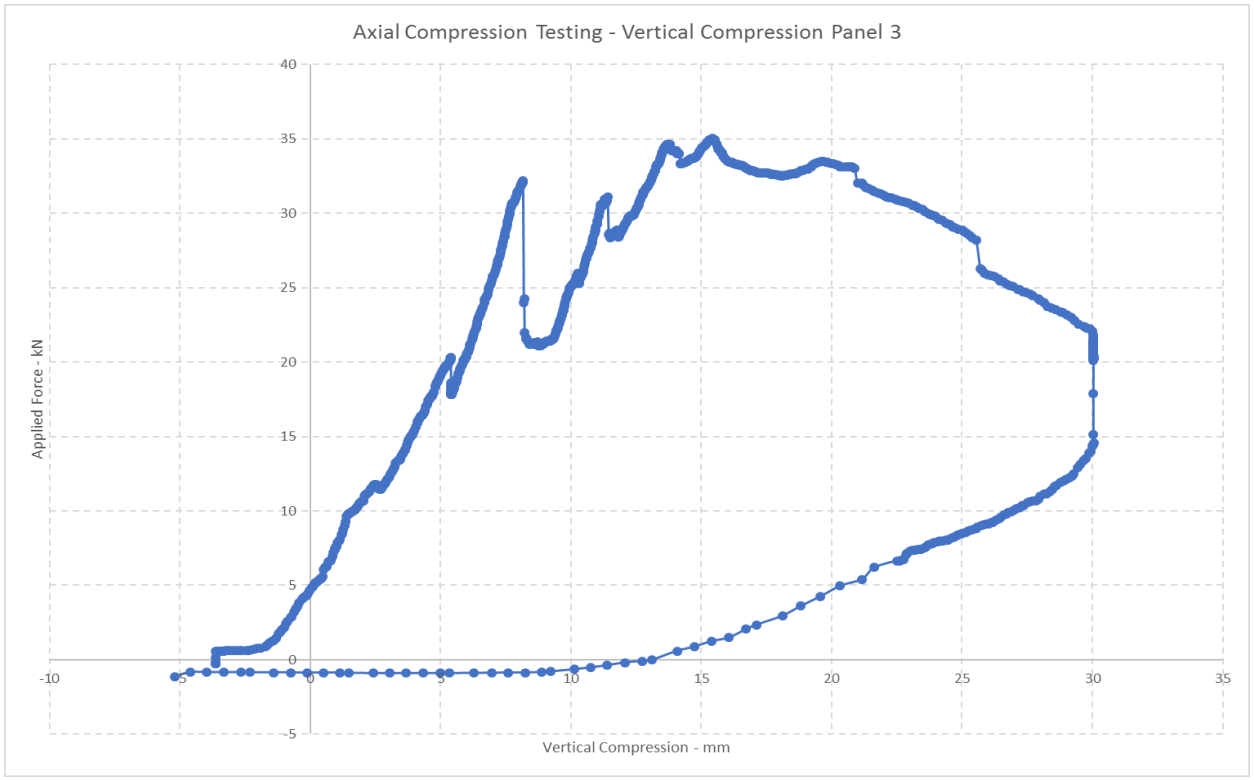
Graph 2 - Axial Compression Testing – Lateral Movement Panel 1



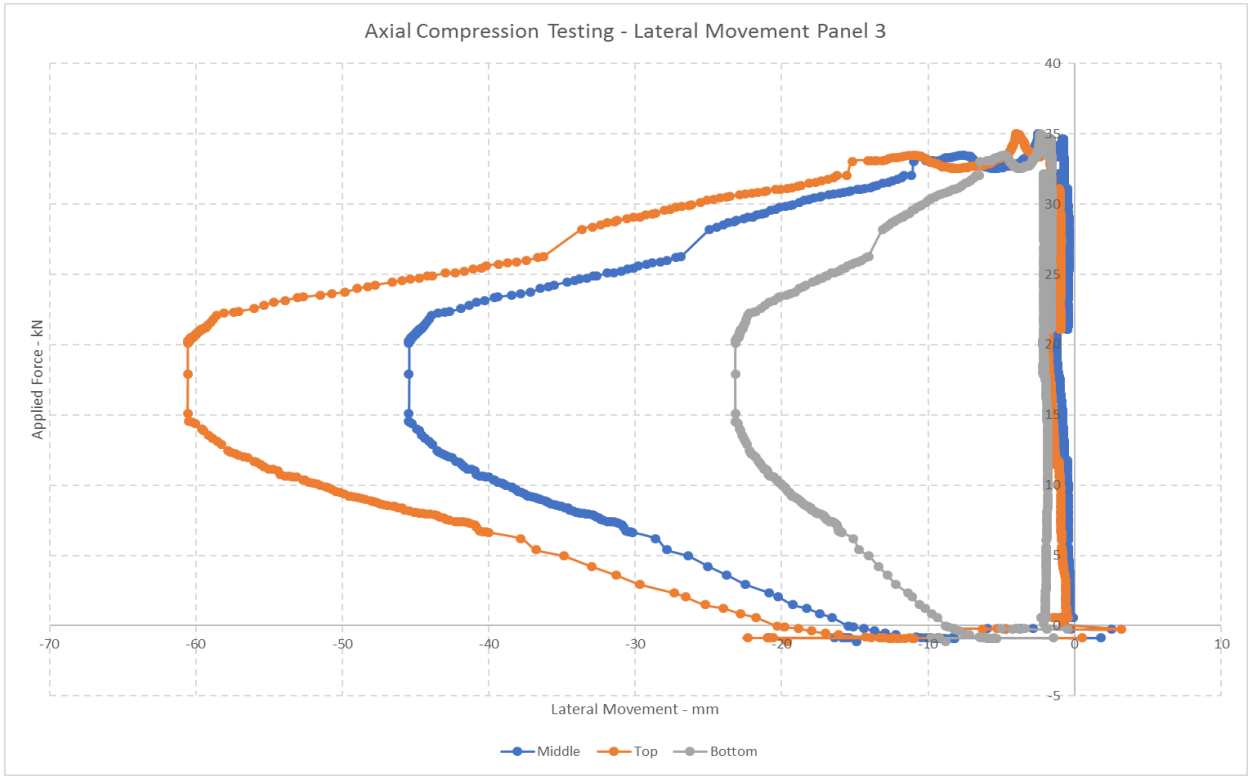
Graph 3 - Axial Compression Testing - Vertical Compression Panel 3



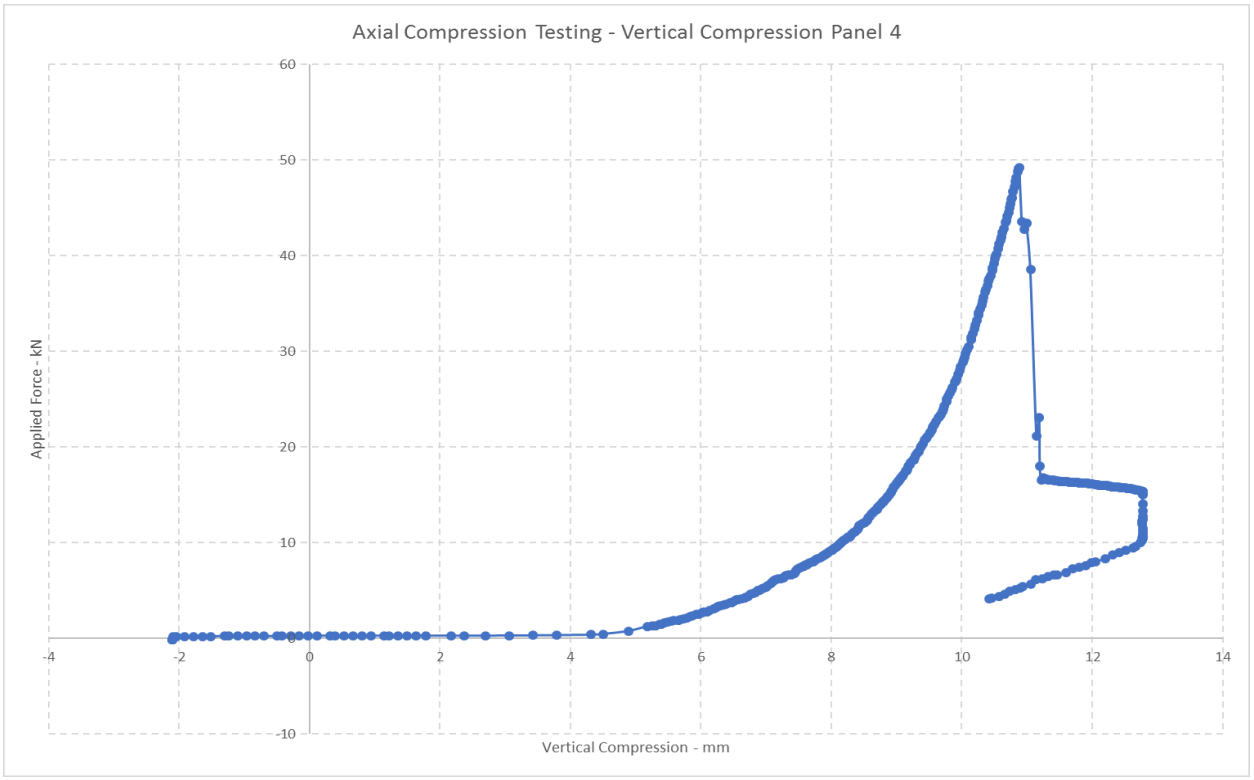
Graph 4 - Axial Compression Testing - Lateral Movement Panel 2



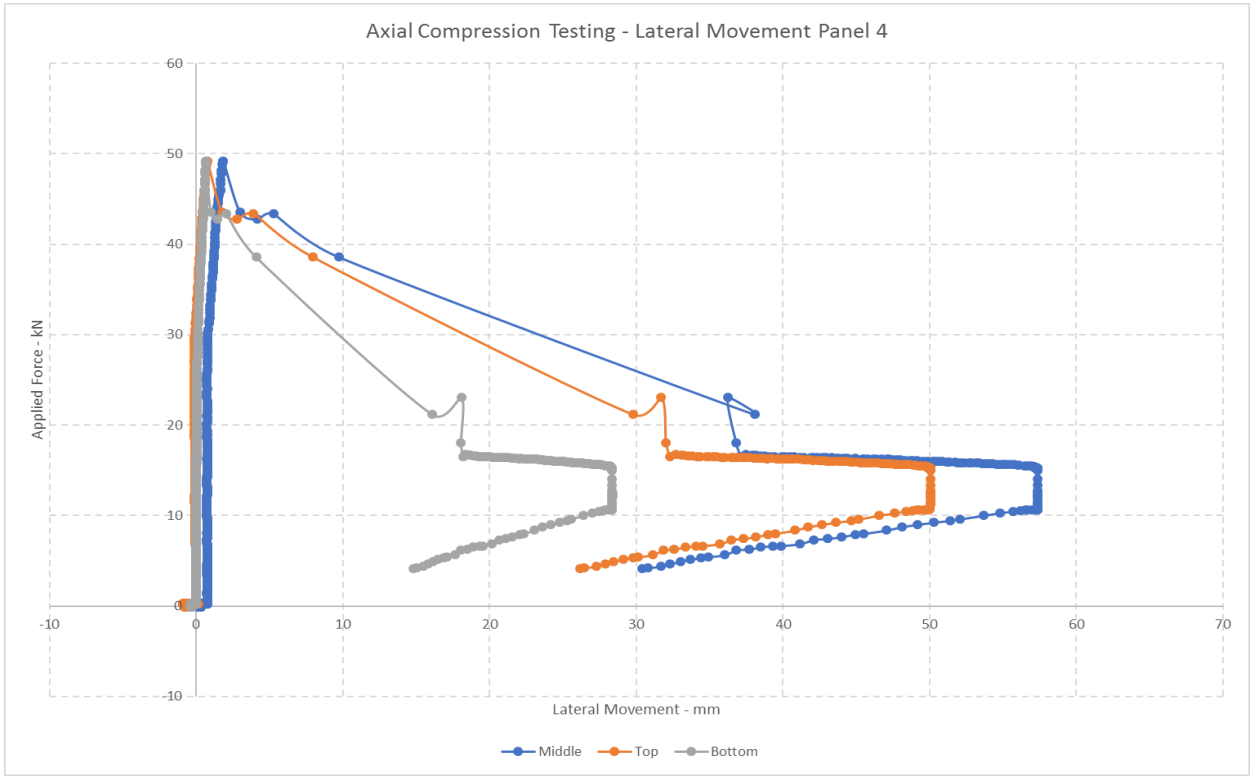
Graph 5 - Axial Compression Testing - Vertical Compression Panel 3



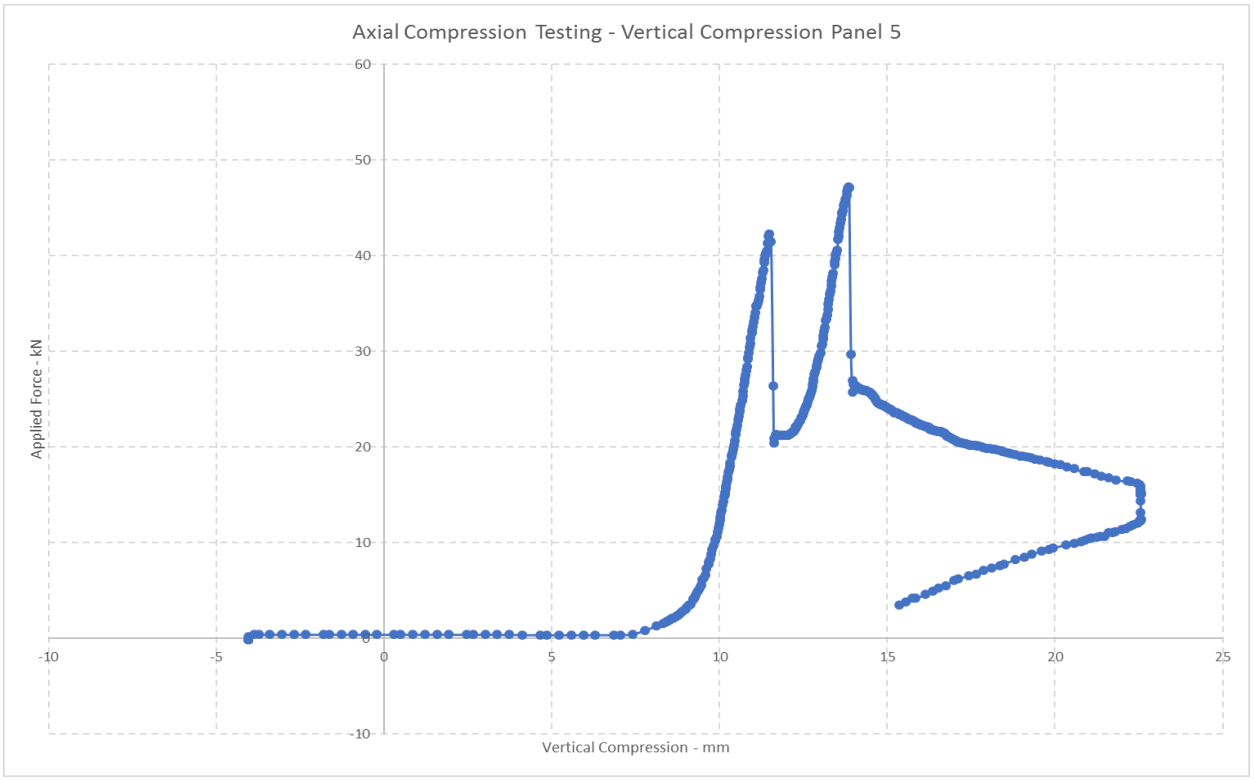
Graph 6 - Axial Compression Testing - Lateral Movement Panel 3



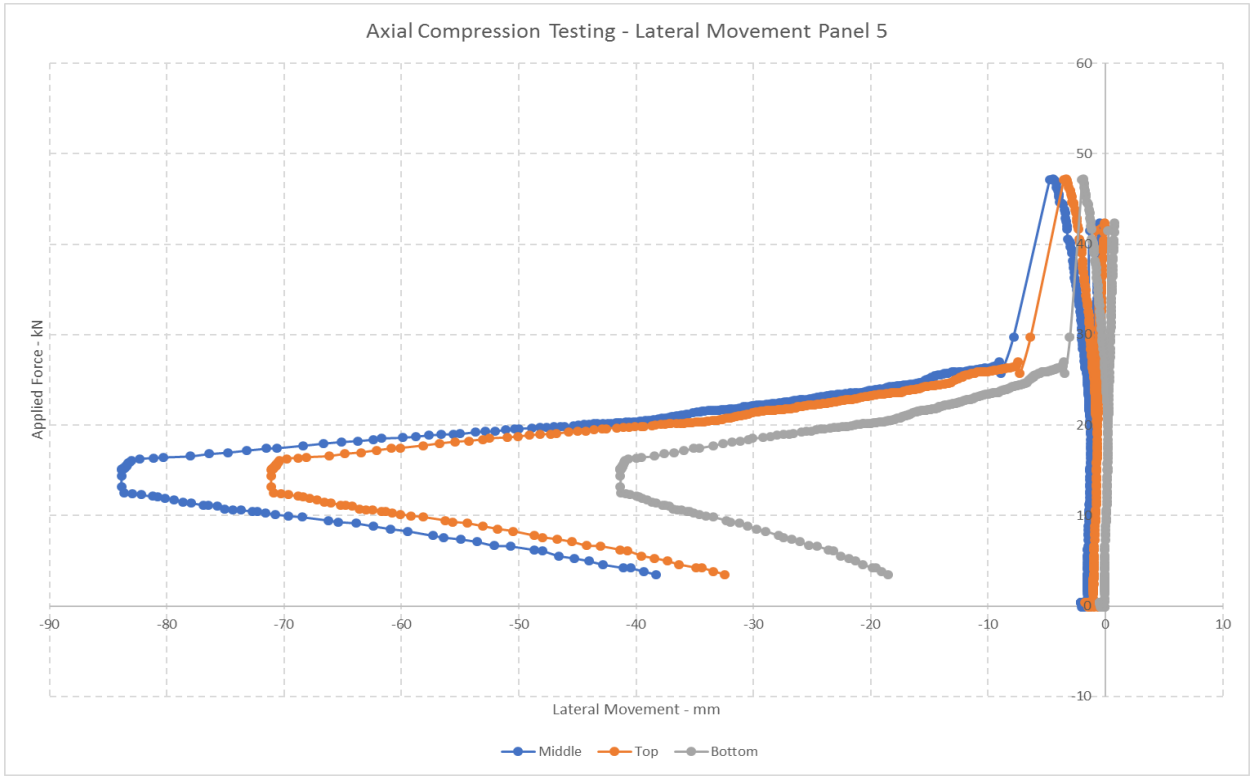
Graph 7 - Axial Compression Testing - Vertical Compression Panel 3



Graph 8 - Axial Compression Testing - Lateral Movement Panel 4



Graph 9 - Axial Compression Testing - Vertical Compression Panel 5



Graph 10 - Axial Compression Testing - Lateral Movement Panel 5

Bending Testing Results

A summary of the maximum loads achieved per jack are given in Table 2.

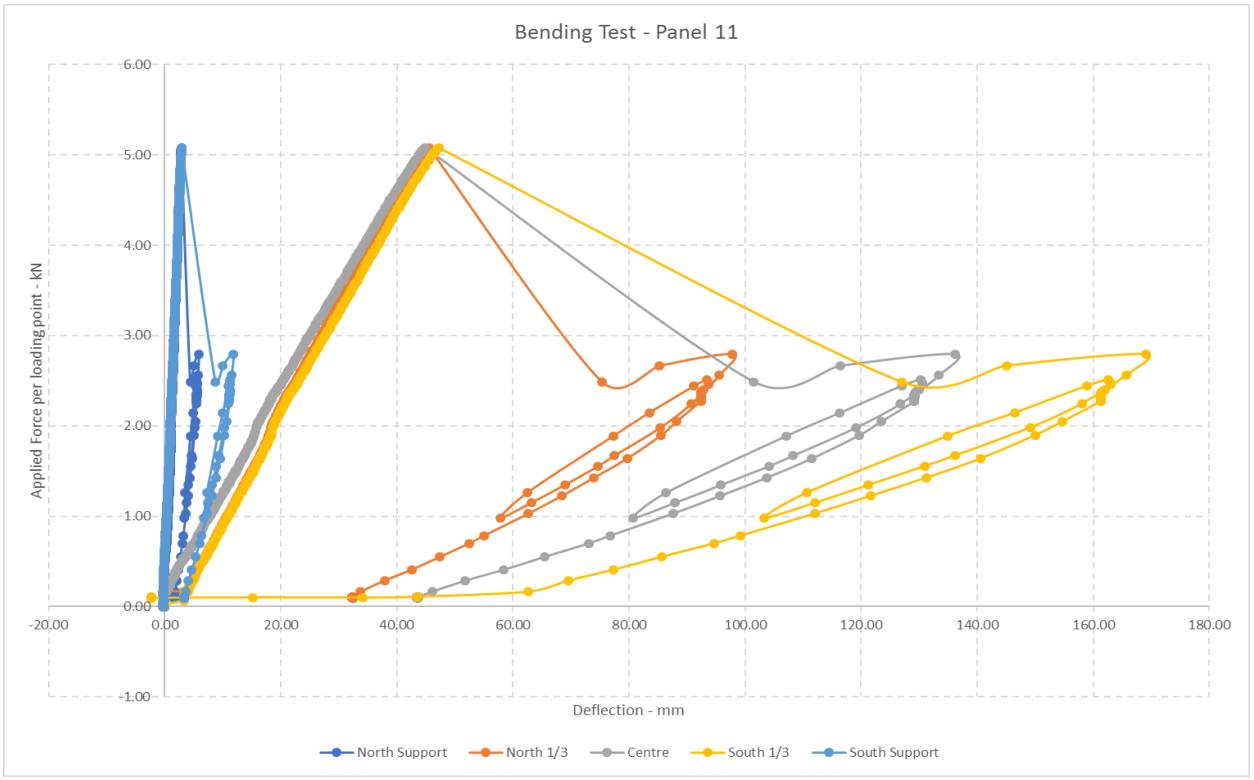
Table 2 - Summary of bending test results

Panel No.	Max. Load (kN)
11	5.10
12	4.00
13	4.25
14	3.90
15	5.20

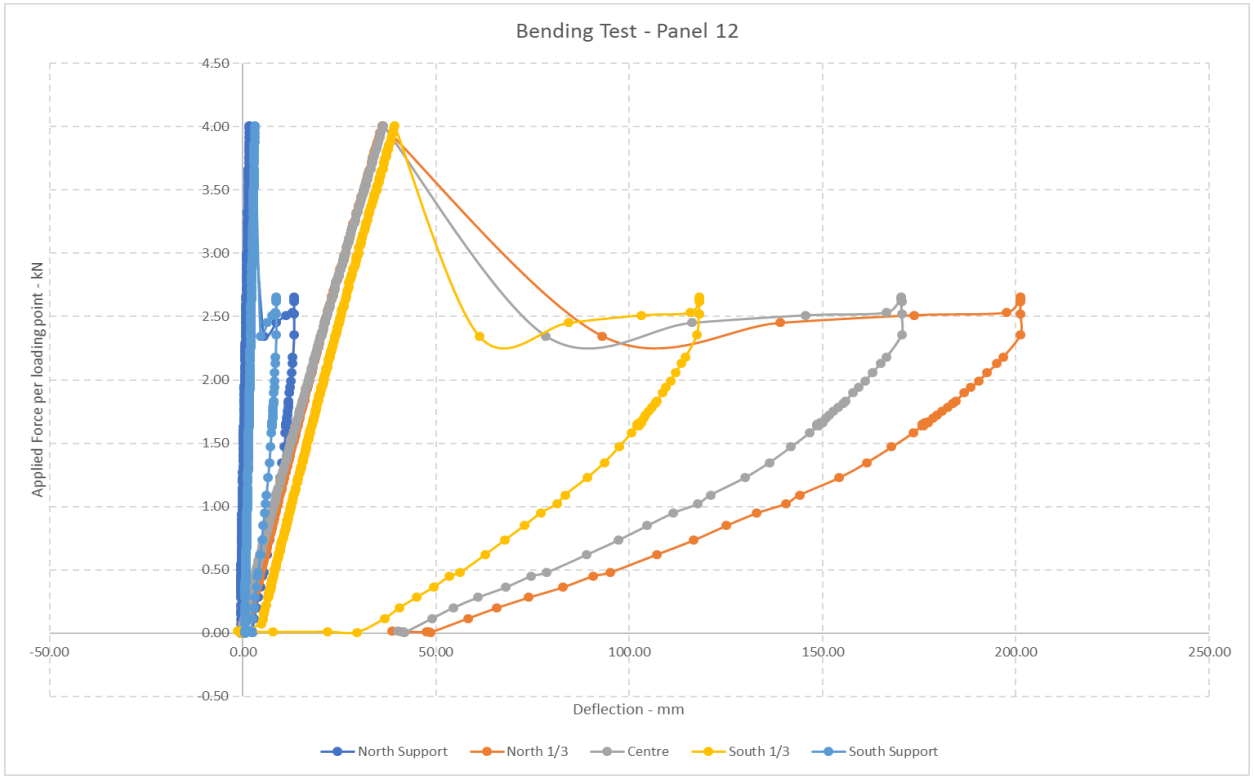
All the panels failed in a similar way and over one of the jacking points. Figure 3 shows the typical deformation of the composite panels from the bending tests.

Figure 3 - Typical deformation of the composite panel after bending test

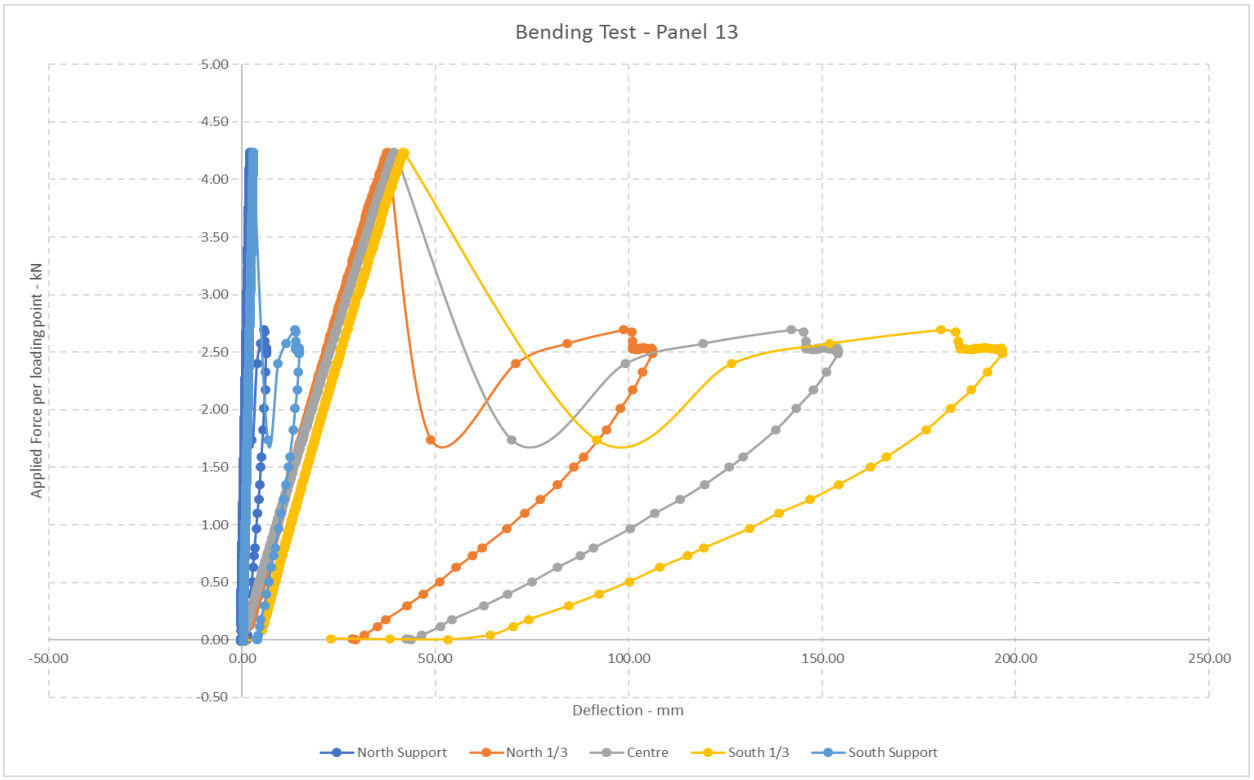
The load vs. deflection graphs for all the bending tests are shown in Graph 11 to Graph 15. The bending load is per jack.



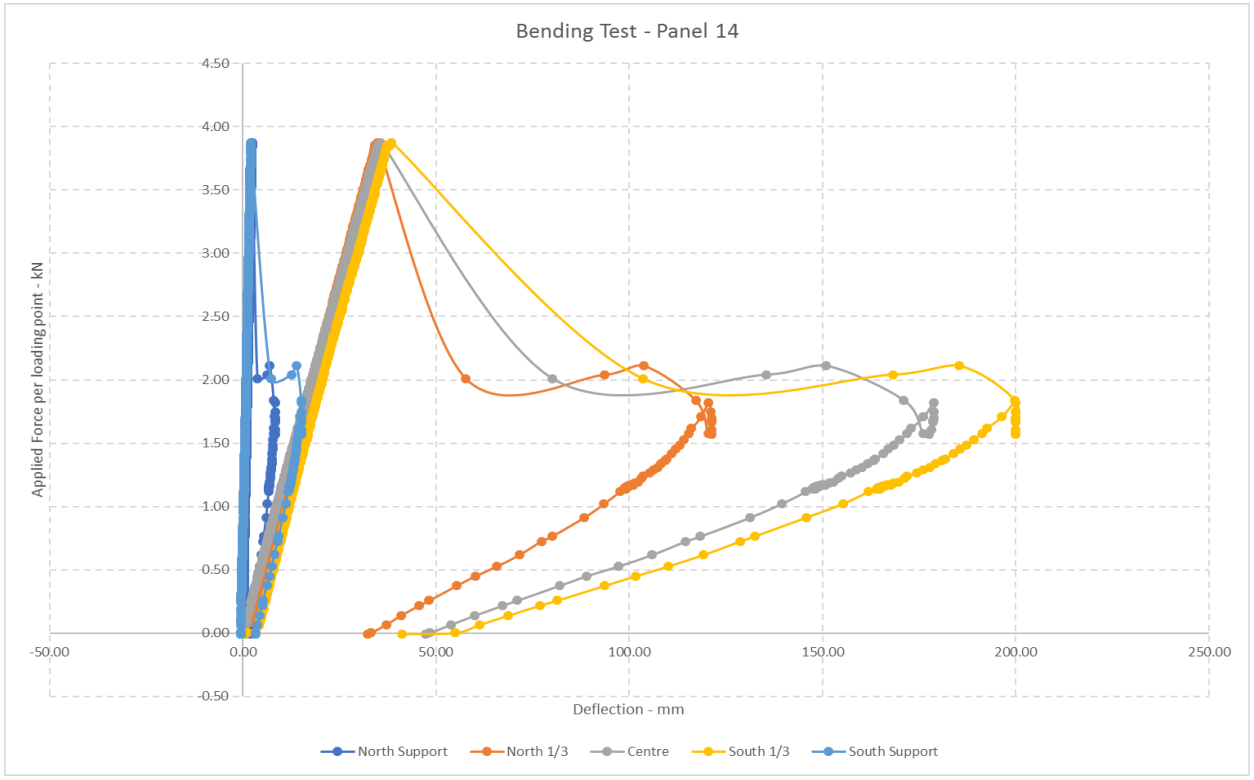
Graph 11 - Bending test - Panel 11



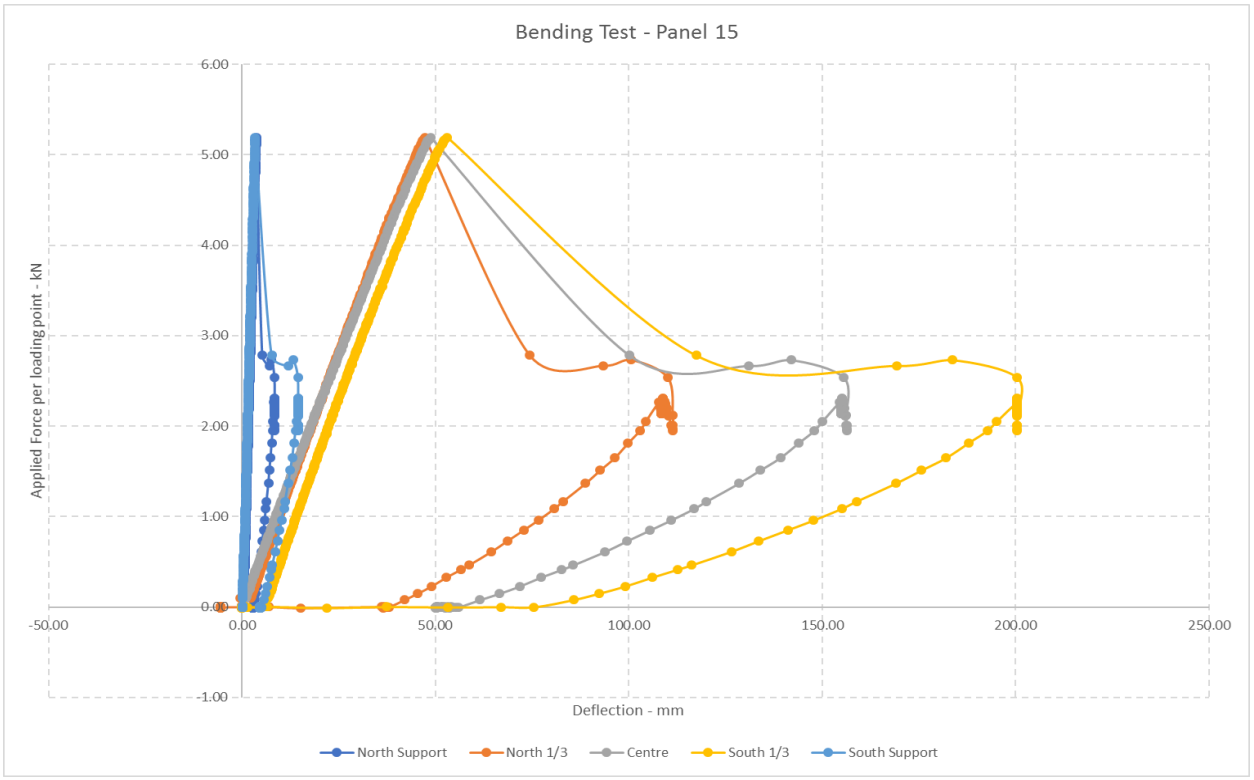
Graph 12 - Bending test - Panel 12



Graph 13 - Bending test - Panel 13



Graph 14 - Bending test - Panel 14



Graph 15 - Bending test - Panel 15