ST0791/2

Shear tests of Rockcote anchors in the Rockcote AAC panel wall cavity system

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  iii. BRANZ is neither an insurer nor a guarantor and disclaims all liability in such capacity. Clients seeking a guarantee against loss or damage should obtain appropriate insurance.

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  viii. In the event of any claim the Client must give written notice to BRANZ within 30 days of discovery of the facts alleged to justify such claim and, in any case, BRANZ shall be discharged from all liability for all claims for loss, damage or expense unless legal proceedings are commenced in respect of the claim within one year from:

    - The date of performance by BRANZ of the service which gives rise to the claim; or
    - The date when the service should have been completed in the event of any alleged non-performance.

b. Indemnification: The Client shall guarantee, hold harmless and indemnify BRANZ and its officers, employees, agents or subcontractors against all claims (actual or threatened) by any third party for loss, damage or expense of whatsoever nature including all legal expenses and related costs and howsoever arising relating to the performance, purported performance or non-performance, of any Services.

c. Without limiting clause b above, the Client shall guarantee, hold harmless and indemnify BRANZ and its officers, employees, agents or subcontractors against all claims (actual or threatened) by any party for loss, damage or expense of whatsoever nature including all legal expenses and related costs arising out of:

  i. any failure by the Client to provide accurate and sufficient information to BRANZ to perform the Services;

  ii. any misstatement or misrepresentation of the Outputs, including Public Outputs;

  iii. any defects in the Products the subject of the Services; or

  iv. any changes, modifications or alterations to the Products the subject of the Services.

Shear tests of Rockcote anchors in the Rockcote AAC panel wall cavity system

1. CLIENT

Rockcote Resene Ltd
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2. OBJECTIVE

To determine the characteristic shear strength of Rockcote anchors in nominal 50 mm thick autoclaved aerated concrete (AAC) for the Rockcote cavity wall system. This data is used to verify the anchors may be relied upon to carry the self weight of the AAC cladding.

3. DESCRIPTION OF SPECIMENS

Six specimens were tested as shown in Figures 1 and 2. Three specimens had a central timber stud and three had a central "C" channel steel stud. On each face of the central stud a 200 x 650 mm AAC panel was fixed to the stud with two anchors and with a polystyrene batten sandwiched between. The central stud was the same length (650 mm) as the panels but was offset by 50 mm as shown in Figure 1.

The products were supplied by the client already assembled for the tests. This report pertains to the products tested only. The products used for each test are described below.

- Four 100 mm long, hot dipped galvanised steel anchors with a 14 mm diameter head. The anchors had a shank of 5.0 mm diameter, with the bottom 50 mm threaded with an outside thread diameter of 6.4 mm and were designed to be self drilling in timber and steel.
- Two autoclaved aerated concrete panels with a measured density of 622 kg/m^3 and nominal dimensions 200 x 650 x 50 mm thick. A steel mesh with 3.2 mm diameter bars at nominal spacing of 140 mm in two directions was embedded centrally in the lightweight concrete.
- Two polystyrene battens of dimensions 50 x 20 x 600 mm long.
- Either, a radiata pine kiln dried timber stud of dimensions 90 x 45 x 650 mm long or a 90 mm deep, 50 mm wide cold-rolled steel "C" shaped channel with 10 mm lips, rolled from 0.8 mm thick sheet.

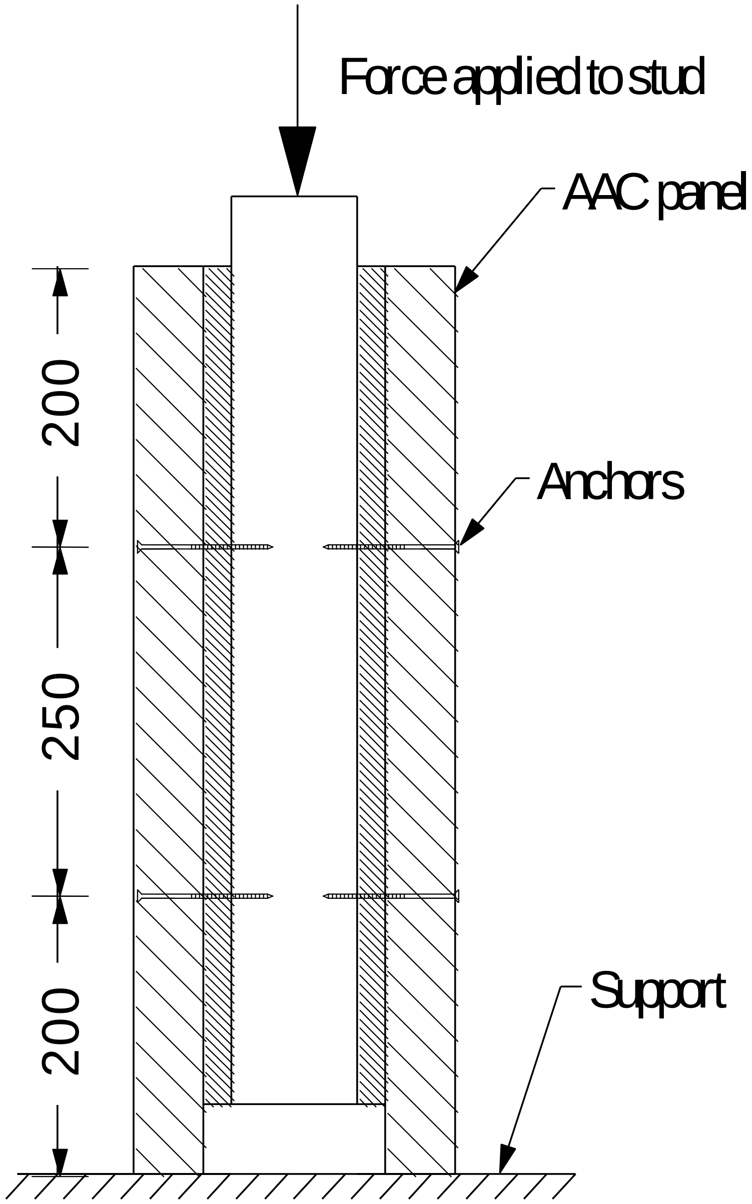

Figure 1. Cross section showing a schematic view of test setup and specimen construction

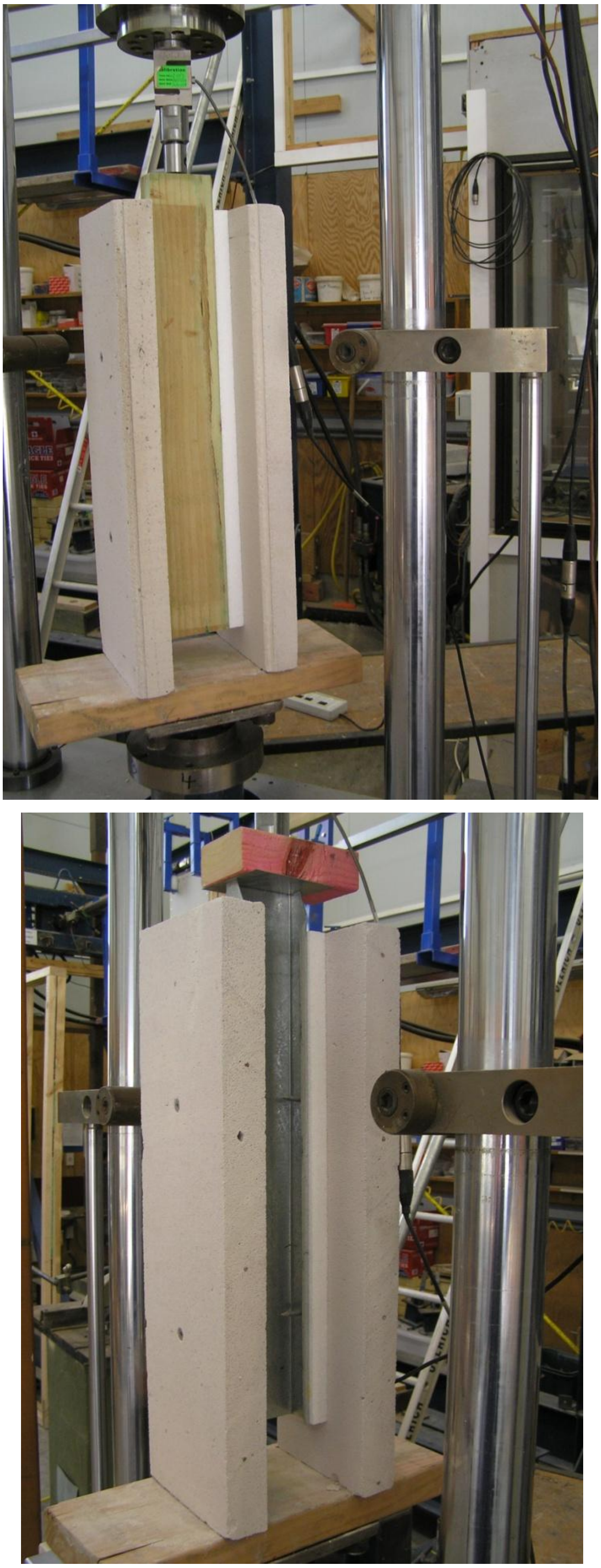

Figure 2 Photograph of setup with timber and steel stud constructions.

4. DESCRIPTION OF TESTS

4.1 Date and Location of Tests

The tests were carried out in August 2009 at the Structural Engineering Laboratory of BRANZ Ltd, Judgeford, New Zealand.

4.2 Test Arrangement and Equipment

The tests were undertaken in a Dartec Universal testing machine. A view of the test setup is given in Figures 1 and 2.

The test load was measured with a 20 kN loadcell calibrated to International Standard EN ISO 7500-1 1999 Grade 1 accuracy. The loadcell output was monitored on a datalogger which also recorded the test machine load and deflection.

4.3 Test Procedure

Compression load was applied to the top of the stud to give a vertical movement of approximately 5 mm per minute. This was transferred via shear load in the four anchors to the outside AAC panels. Loading was continued until peak resistance was exceeded. The limitation in all instances was due to the shear strength of the anchor-to-ACC panel connections which failed by bearing in the ACC panels.

5. RESULTS

Peak loads resisted by the test specimens are shown in Table 1.

Table 1. Peak loads resisted by the test specimens

	Peak shear (kN)	
	Timber Framing	Steel Framing
No 1	8.49	10.69
No 2	7.89	8.74
No 3	9.82	10.92
Average:	**8.73**	**10.11**

A typical load-deflection plot from the shear tests with a timber stud is given in Figure 3.

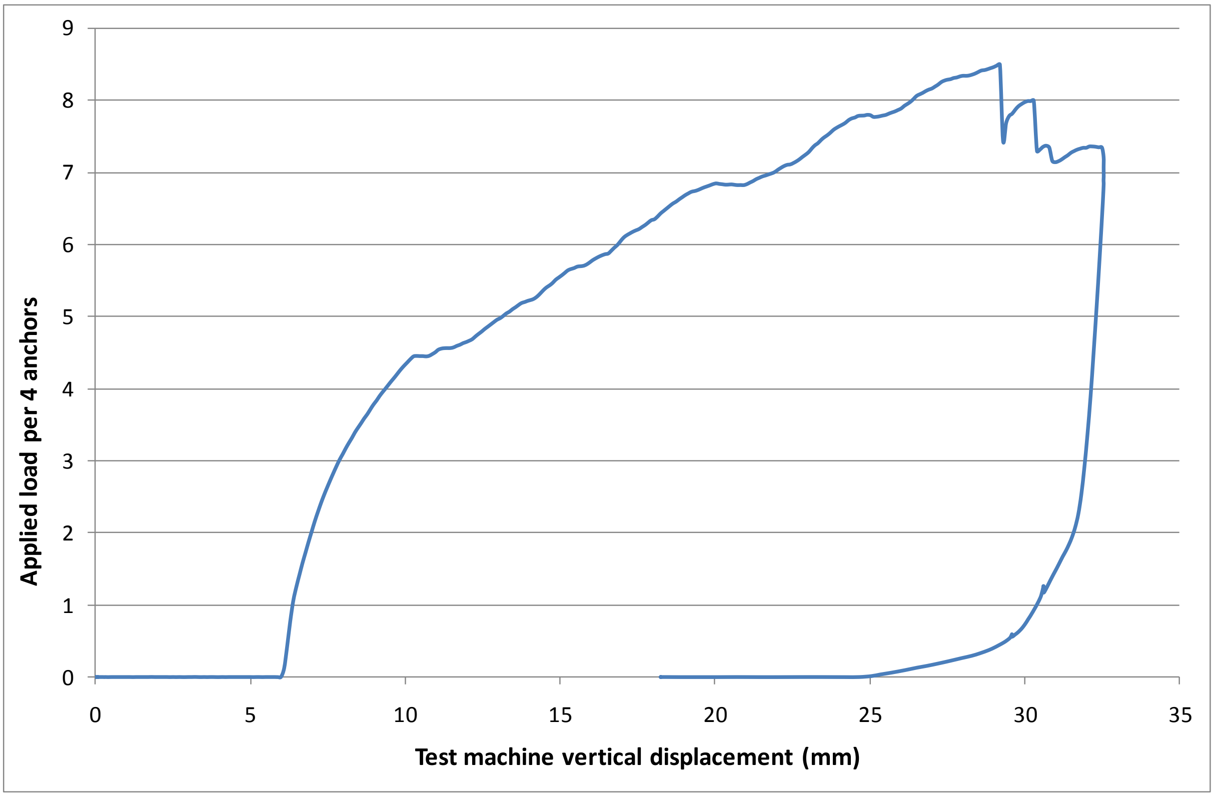

Figure 3. Typical plot of load versus displacement for a timber stud

6. CHECK OF ABILITY OF FIXINGS TO CARRY SELF-WEIGHT

For an assumed cladding self-weight of 622 kg/m^3 and maximum fastener spacing of 300 mm vertically and 600 mm horizontally, the gravity shear load F_G per anchor is:

$F_G = 622 \times 9.81 \times 0.05 \times 0.3 \times 0.6 \times 10^{-3} = 0.055$ kN.

The ratio of the average shear strength per anchor to the gravity weight of the associated cladding is determined by dividing the mean values in Table 1 by 0.055 kN and by the four anchors used in the test. This shows that the shear strength of the anchors with timber studs is 40 times the self weight and with the steel studs is 46 times the self weight. Even considering the likely variability in anchor shear strengths and the extra weight of any surface plastering (render), the results show that the fasteners have far more than the required strength to support the cladding self-weight.

7. CONCLUSION

The fasteners have far more than the required strength to support the Rockcote Cavity System cladding self-weight.

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