

CLIENT: **Easy Rock**
2260 South Haven, Unit B
Ontario, CA. 91761
Attn: Mark Lynders

Test Report No: RJ3245

Date: May 29, 2014

SUBJECT: Structural Performance Testing of composite stone panels.

SAMPLE ID: Easy Rock Stacked Stone composite panels with dimensions of 12" x 48" x approximately 1" thick.

SAMPLING DETAIL: Test samples were randomly selected by QAI Representative Matt Antell at the client's distribution facility located at 2260 South Haven, Unit B Ontario, CA. 91761 on May 15, 2014. QAI documented the sampled material in accordance with ICC-ES AC85.

DATE OF RECEIPT: May 15, 2014.

TESTING PERIOD: May 23 thru 28, 2014.

AUTHORIZATION: Signed QAI Test Proposal # MB-2014-041401 dated May 12, 2014.

TEST PROCEDURE: Testing was performed in accordance with ASTM E 330-14, Procedure B, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*.

Additional test procedures and methods are provided on page 2 of this report.

TEST RESULTS: See page 2 of this report for detailed test results.

Prepared By



Matt Antell
Project Engineer

**Signed for and on behalf of
QAI Laboratories Inc.**



Larry Burmer
Project Leader- Physical Testing

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UNIFORM LOAD TEST PER ASTM E330

Test Panel Construction: Six 4' wide x 8' high test panels were constructed for the testing. Each wall panel consisted of nominal 2 x 4, SPF, wood studs spaced 16 inches on center, $1\frac{5}{32}$ -inch thick, APA, OSB sheathing board, Tyvek[®] Housewrap weather resistive barrier and Easy Rock tongue and groove Stacked Stone composite panels.

The OSB sheathing was fastened to the wood framing with #6 drywall screws 8 inches on center around the perimeter and 8 inches on center in the field. The Tyvek[®] Housewrap was placed over the OSB sheathing and stapled into place. Eight tongue and groove composite panels were horizontally placed over the weather resistive barrier and fastened to the wood framing with #8 x $1\frac{5}{8}$ -inch long deck screws per the manufactures installation instructions.

The panels were installed in such a manner so that the joints were staggered from top to bottom in the wall assembly and that no joint was within 6" of each other and that no panel was less than 18" long. One screw was located in the top tongue, 1" from each edge of the panel. Additional screws were placed approximately 12" O.C. thereafter, with a minimum of three screws fastened into the tongue of each panel. Two screws were then place on the side tongue of each panel. Two additional screws were placed in the cut edges of each panel which formed the parameter of the test assembly.

Test Procedure: Testing was performed in accordance with ASTM E 330-14, Procedure B. Three panels were tested under positive load conditions and three panels were tested under negative load conditions.

After initial mid-panel deflection readings were recorded, a test load was applied to the panel and increased in 20 psf increments for positive load tests and 10 psf increments for negative load tests until an ultimate load was reached. The test load was held for a minimum of 10 seconds at each increment and then released at each increment. Deflection readings at the midpoint of the panel, between framing members, were recorded at each load increment. Once the ultimate load was reached, the load was reduced to zero and the mode of failure recorded. The panel was then removed from the chamber and examined for component failure and cracking of the finish.

For positive load tests, the panels were individually placed horizontally, face up, on a vacuum chamber. The exterior side of the panel was covered with a 2 mil. thick plastic film thus facilitating a positive load on the exterior side of the panel. The plastic film was then sealed around the perimeter of the test chamber. To prevent failure in the framing, the studs were supported between the panel and the chamber floor.

For negative load tests, the panels were individually placed horizontally, face down, on the test chamber and an airtight seal provided around the perimeter of the panel. To prevent failure in the framing, two, 6-inch wide steel "C" channels were attached across the back of the studs, approximately 32 inches apart. The loads were uniformly applied to the exterior side of the panel using a reversible controllable blower system.

A photograph of the negative load test set-up is provided in the appendix of this report.

UNIFORM LOAD TEST PER ASTM E330 (CONT.)

Test Results:

Positive Load Test

Applied Load (psf)	Mid-Panel Deflection (in)		
	Panel #1	Panel #2	Panel #3
0	0.000	0.000	0.000
20	0.075	0.127	0.116
40	0.118	0.200	0.190
60	0.147	0.236	0.230
80	0.165	0.251	0.239
100	0.178	0.262	0.263
120	0.186	0.272	0.275
140	0.197	0.283	0.284
160	0.206	0.292	0.292
180	0.213	0.300	0.300
200	0.210	0.308	0.308

Panel #	Observations
1	The test panel withstood an ultimate test load of 200 psf without failure. No cracking of the exterior finish was observed.
2	The test panel withstood an ultimate test load of 200 psf without failure. No cracking of the exterior finish was observed.
3	The test panel withstood an ultimate test load of 200 psf without failure. No cracking of the exterior finish was observed.
	The average ultimate test load for the three panels is 200 psf which is equivalent to a wind speed of 283 mph.

UNIFORM LOAD TEST PER ASTM E330 (CONT.)

Negative Load Test

Applied Load (psf)	Mid-Panel Deflection (in)		
	Panel #1	Panel #2	Panel #3
0	0.000	0.000	0.000
10	0.008	0.014	0.017
20	0.013	0.025	0.024
30	0.024	0.040	0.032
40	0.044	0.052	0.039
50	0.056	0.064	0.049
60	0.077	0.081	0.057
70	0.103	0.097	0.065
80	0.114	0.111	0.072
90	0.139	0.129	0.080
100	0.156	0.145	0.093
110	---	0.088	0.081
120	---	---	0.087

Panel #	Observations
1	At a test load of 100 psf, the heads of the deck screws pulled through the foam panels. Failure at the tongue and groove joint was also observed.
2	At a test load of 122 psf, the heads of the deck screws pulled through the foam panels. Failure at the tongue and groove joint was also observed.
3	At a test load of 126 psf, the heads of the deck screws pulled through the foam panels. Failure at the tongue and groove joint was also observed.
	The average ultimate test load for the three panels is 116 psf which is equivalent to a wind speed of 214 mph.

A photograph showing the typical mode of failure is provided in the appendix of this report.

APPENDIX

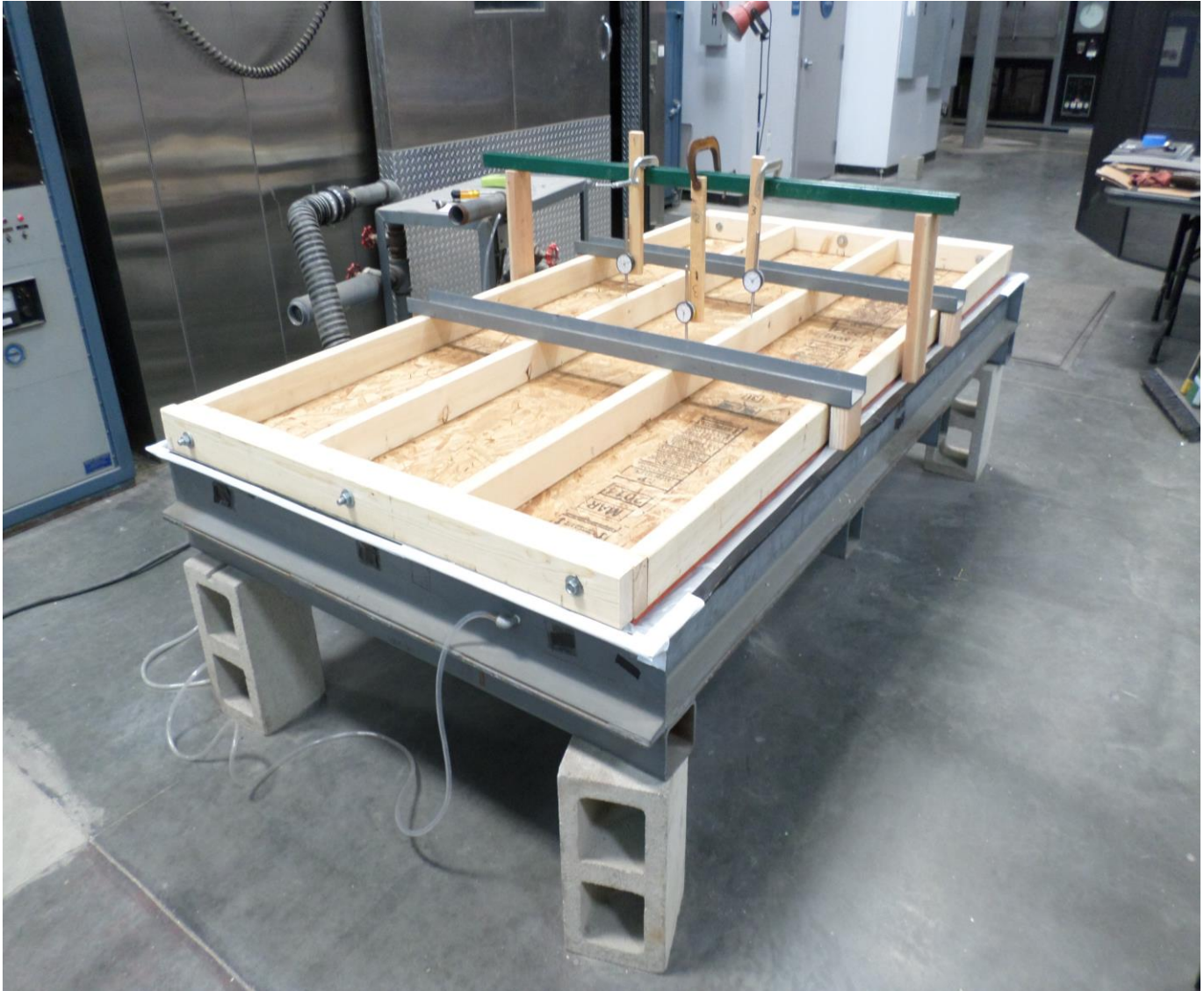
Photograph No.1
Composite Stone Test Panels



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Photograph No.2
Negative Load Test Set-Up



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Photograph No.3
Typical results of the negative load test
Tongue and groove failure



***** END OF REPORT *****