



July 5, 2011

Mr. Stewart Wentworth
QUICK MOUNT PV
936 Detroit Avenue, Suite D
Concord, CA 94518-2539

Project Number 111317C

Subject: Flat Tile Mount Hardware Load Testing

Dear Mr. Wentworth:

As requested, Applied Materials & Engineering, Inc. (AME) has completed load-testing the Flat Tile Mount hardware. The purpose of our testing was to evaluate the tensile and shear load capacity of the Flat Tile Mount hardware attached to a commercially available 2"x6" Douglas Fir rafter.

SAMPLE DESCRIPTION

Six (6) mockup samples were delivered to our laboratory on June 17, 2011. Mockup configuration consisted of one 12" long rafter, screwed to 1/2" Structural 1 plywood. The Flat Tile Mount hardware is attached through the plywood into the rafter with four 1/4"x1-1/2" lag bolts torqued to 7ft-lbs. Product hardware drawings are provided in Appendix A.

TEST PROCEDURES & RESULTS

1. Tensile Strength

Three samples were tested for tensile strength on June 29, 2011 using a United Universal testing machine. Samples were rigidly attached to the testing machine and a tensile load was applied to the 5/16"x1" machine bolt connected to the aluminum post. The samples were loaded in tension at a constant rate of axial deformation of 0.05 in./min. without shock until failure occurred. Based on the above testing, the average ultimate tensile load of the Flat Tile Mount hardware in Douglas Fir was determined to be 1090 lbf.

The specific gravity and moisture content of the rafter was tested in accordance with ASTM D2395, Method A (oven-dry). The average specific gravity and moisture content was determined to be 0.429 and 18.9%, respectively. Detailed results are provided in Table I. Test setup is illustrated in Figure 1 of Appendix B.

Mr. Stuart Wentworth
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2. Shear Strength

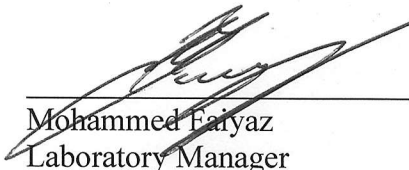
Three samples were tested for shear strength on June 29, 2011 using a United Universal testing machine. Samples were rigidly attached to the testing machine and a shear load was applied to the 5/16"x1" machine bolt connected to the aluminum standoff. The samples were loaded perpendicular to rafter at a constant rate of axial deformation of 0.01 in./min. without shock until failure occurred. Based on the above testing, the average ultimate shear load, parallel to rafter, of the Flat Tile Mount hardware in Douglas Fir was determined to be 602 lbf.

The specific gravity and moisture content of the rafter was tested in accordance with ASTM D2395, Method A (oven-dry). The average specific gravity and moisture content was determined to be 0.411 and 18.0%, respectively. Detailed results are provided in Table II. Test setup is illustrated in Figure 2 of Appendix B.

If you have any questions regarding the above, please do not hesitate to call the undersigned.

Respectfully Submitted,

APPLIED MATERIALS & ENGINEERING, INC.


Mohammed Faiyaz
Laboratory Manager

Reviewed By:

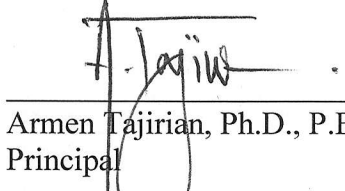

Armen Tajirian, Ph.D., P.E.
Principal



TABLE I
FLAT TILE MOUNT
TENSILE LOAD TEST RESULTS
PROJECT NUMBER 111317C

| SAMPLE ID | ULTIMATE TENSILE LOAD (LBF) | RAFTER MOISTURE CONTENT (%) | RAFTER SPECIFIC GRAVITY | FAILURE MODE |
|------------------|------------------------------------|------------------------------------|--------------------------------|---------------------|
| PULL-1 | 1047 | 20.7 | 0.456 | Lag bolt pull-out |
| PULL -2 | 1338 | 16.0 | 0.402 | Lag bolt pull-out |
| PULL -3 | 885 | 20.1 | 0.429 | Lag bolt pull-out |
| AVERAGE | 1090 | 18.9 | 0.429 | .. |

¹ Upper bolt.

TABLE II
FLAT TILE MOUNT
SHEAR LOAD TEST RESULTS
PROJECT NUMBER 111317C

| SAMPLE ID | ULTIMATE SHEAR LOAD PARALLEL TO RAFTER (LBF) | RAFTER MOISTURE CONTENT (%) | RAFTER SPECIFIC GRAVITY | FAILURE MODE |
|------------------|---|------------------------------------|--------------------------------|----------------------|
| SHEAR-1 | 696 | 15.9 | 0.396 | 5/16"x3/4" bent bolt |
| SHEAR-2 | 629 | 17.4 | 0.434 | 5/16"x3/4" bent bolt |
| SHEAR-3 | 482 | 20.5 | 0.403 | 5/16"x3/4" bent bolt |
| AVERAGE | 602 | 18.0 | 0.411 | .. |

APPENDIX A

APPENDIX B

FLAT TILE MOUNT

LOAD TEST SETUP

PROJECT NUMBER 111317C



Figure 1. Tensile Test



Figure 2. Shear Test