

VERMONT SLATE AND COPPER SERVICES, INC.



Quik-Foot Load Test Report

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These tests determined the maximum pullout and moment a QuikFoot would sustain before failure. Three series of tests were conducted, a pull out test where the QuikFoot was pulled directly from the "roof" and two moment tests with different length posts where a side load was applied parallel to the "roof". The average maximum pull out load was determined to be 2312.2lb while the average maximum moment was determined to be 2948in-lb.

For each test, to simulate a typical roof the QuikFoot would be installed on, a 12"x12" square of .5" plywood was screwed to the top edge of a 12" long spruce 2x4 with 1.5" decking screws. The QuikFoot was then fastened through the center of the plywood into the top edge of the 2x4 with two 2" long TFC #14 Concealor screws (Figure 1). A new QuikFoot and screws were used for each test.



Figure 1

For the pullout tests, the load was applied along the axis of the 1" diameter aluminum post screwed onto the top of the QuikFoot (Figure 2). The plywood-2x4 assembly was clamped to the base of the testing machine through a welded steel frame that surrounded the assembly (figure2).



Figure 2

For the moment tests, the load was applied parallel to the axis of the 2x4 to the top of the 1" diameter aluminum post. The plywood-2x4 assemblies was fastened to a welded steel structure which was bolted to the base of the testing machine (figure 3 and 4). Five tests were done for both 6" long posts and 3" long posts.



Figure 3



Figure 4

Loads were applied slowly, each test taking 3-5 minutes until failure. The loads were measured by an ASTM E74 calibrated load cell and display. The results were recorded as follows.

Pull Out

Test	Max Load (lb)	Mode of Failure
1	2463.5	Screw Withdrawal
2	2375.3	Screw Withdrawal
3	2060.8	Screw Withdrawal
4	2301.0	Screw Withdrawal
5	2360.3	Screw Withdrawal

Average 2312.2

Moment, 6" Post

Test	Max Load (lb)	Mode of Failure
1	470.7	Lower Screw Withdrawal
2	676.4	Over 30 Degrees Deformation
3	467.6	Lower Screw Withdrawal
4	550.5	Lower Screw Head Failure
5	370.0	Lower Screw Withdrawal
Average	507.0	

Moment, 3" Post

Test	Max Load (lb)	Mode of Failure
1	955.7	Lower Screw Withdrawal
2	1113.9	Lower Screw Withdrawal
3	1003.4	Lower Screw Head Failure
4	856.3	Lower Screw Withdrawal
5	828.3	Lower Screw Withdrawal
Average	951.5	

In each pull out test the mode of failure was withdrawal of the screws at the maximum load. Some deformation of the QuikFoot occurred in each test (figure 5). The Average maximum load was 2312.2lb.

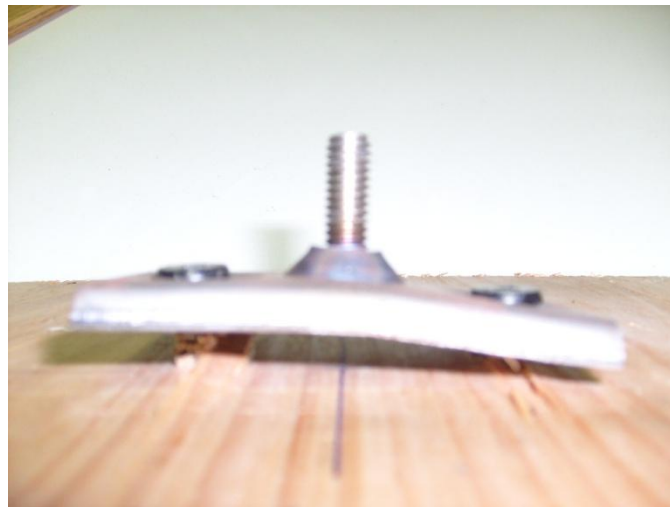


Figure 5

The most common mode of failure for the moment tests was withdrawal of the lower screw. However there were a few tests where the head of the lower screw had failed. In each test the post would deflect approximately 15-20 degrees from horizontal (Figure 6). Typically the post would start to deflect at a load approximately half the maximum load. In each test the QuikFoot was deformed, as the upper edge of the post dented the top surface of the QuikFoot (Figure 7).



Figure 6



Figure 7
QuikFoot Load Test Report

From the average maximum load of each series of moment tests it can be determined that the average maximum moment for the QuikFoot is 2948 in-lb.

$$507.0lb \times 6" = 3042in - lb$$

$$951.5lb \times 3" = 2854.5in - lb$$

$$\frac{(3042 + 2854.5)}{2} = 2948in - lb$$