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EVALUATION OF BASE SHOE MOULDING WITH WEDGE-BOLT MOUNTING

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I. DESCRIPTION AND PURPOSE

Three aluminum, base shoe moulding channels were received for testing. Each channel was four feet long, and had four countersunk holes through the bottom, spaced at 12 inches on center. It was requested that each base shoe be installed into concrete using Wedge-Bolt® fasteners and tested in general accordance with ASTM E 935, "Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings." It was requested that a steel panel be substituted for the standard glass rail and installed to the base shoe moulding with the GlassWedge® system. It was specified that the deflection was to be measured during the application of a 300 pound concentrated load to the top corner of the rail. The deflection was to be measured at the top of the rail, and evaluated against criteria in ASTM E 985, "Standard Specifications for Permanent Railing Systems and Rails for Buildings."

II. TESTS AND RESULTS

Three aluminum base shoe moulding units were installed into a concrete slab using four Wedge-Bolts® tightened to a torque of 40 foot-pounds. In normal service, the infill is a half-inch thick glass panel measuring 42 inches by 48 inches. For this test, a half-inch thick steel plate was substituted, per the request of R&B Wagner, Inc. The steel plate was installed vertically using the minimum installation requirements of the GlassWedge® system. Three plastic isolators were fitted around the steel plate and in the aluminum channel. One isolator was placed in the middle, and one at 4 inches on center from each end of the channel. The aluminum wedges were hammered into place with the wedge setting chisel, per the manufacturer's instructions.

Load was applied through a clamp at the top right corner of the panel, approximately centered at 0.75 inches down, and 1.25 inches left of the top right corner. The load was adjusted with an instrumented turnbuckle attached to a gusseted support. The support was attached to the concrete slab via four anchor bolts. The deflection was measured with a dial indicator at approximately 1.5 inches down, and 2.5 inches left of the top right corner of the panel. The setup is shown in Figures 1 and 2.

For each test, a preload was applied and released before measuring. The dial indicator was set at approximately full extension with a 15 to 18 pound load applied to remove the slack. The load was applied in increments of about 100 pounds by tightening the turnbuckle until the desired load was achieved, and the displacement was recorded. The load deflection data is listed in Table 1. Maximum displacements for the three samples varied from 1.09 to 1.78 inches at 300 pounds. It is speculated that unevenness of the concrete may have contributed to the variation in the maximum deflections.

III. CONCLUSIONS

Three base shoe moulding with GlassWedge® and WedgeBolt® fastening systems were evaluated. Steel panels were used in place of standard glass panels per the request of R&B Wagner, Inc. The load-deflection was measured with a concentrated load at the

upper corner of a steel panel. The deflections at 300 pounds varied from 1.09 to 1.78 inches. The maximum allowable deflection, per ASTM E 985, is determined by dividing the total height by 12, or 3.5 inches for the 42 inch railing. However, this specification applies to the base shoe with a glass panel as used in service. Generally, the modulus of glass is only one third that of steel. Therefore, it is recommended that this difference be accounted for in R&B Wagner's analysis.

If you have any questions concerning the contents of this report, please contact me. All test parts were picked up on June 22, 2005.

Respectfully submitted,

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Mechanical Engineer

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Table 1

Load-Deflection Data

Sample No.	Applied Load (lbs.)	Displacement (in.)
1	18	0.00
	100	0.43
	195	0.95
	300	1.78
2	18	0.00
	102	0.43
	192	0.99
	300	1.76
3	15	0.00
	100	0.28
	198	0.61
	265	0.96
	300	1.09

Load was applied at top right corner of plate, centered at 0.75 inches down, and 2.5 inches left. Displacement measured at top right corner of plate, at 1.5 inches down, and 2.5 inches left.

Fig. 1 - An overall view of the test setup is shown.

Fig. 2 - The setup of the deflection measurement system is shown.