Report Evaluation of
“Corrosion Effects of ACQ Treated Wood on Metal Fasteners in an Accelerated Test”
Evaluation No. STS09-08A

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<th>Evaluated Report</th>
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<tr>
<td>Report No.</td>
<td>WDL-2009-06</td>
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<tr>
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<td>T. F. Shupe, Q. Wu, J. Curole, M. Voitier, and D. Ring</td>
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<td>Date</td>
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1 Purpose of Evaluation

This evaluation considers the report named above in relation to the requirements of the ICC Evaluation Service, Inc. (ICC-ES) Acceptance Criteria for Test Reports (AC85), effective July 1, 2003. The International Code Council – Accreditation Service has accredited the LSU Wood Durability Laboratory for various physical and structural tests, including AWPA E12. The subject test, specified in ICC-ES AC257 (October, 2007) is similar to the E12 test. ICC-ES has not specifically approved the lab for this test. This evaluation considers the adequacy of the protocol used to support the report's conclusions and meet ICC-ES standards.

2 Overview of Report

The report describes comparative testing that evaluates the corrosion resistance under exposure to fresh water and chemically treated wood of two coated fasteners that use the proprietary OMG, Inc. coating system, LedgerLok and TimberLok to benchmark hot dip galvanized (HDG) fasteners of otherwise similar design. The fasteners were embedded in 3” x 3” x 6” blocks of southern pine treated to ground contact retention (0.40 pcf) with ACQ preservative. The assemblies were exposed in pans for 60 days to 90°F and 90% relative humidity conditions. Following exposure, fasteners were evaluated for visible rust, weight loss, and loss of diameter. Performance is determined by comparison of results to the benchmark samples.

3 Evaluation Findings

3.1 Criteria

The report is evaluated according to ICC-ES AC85 and ICC-ES AC257. Deviations noted are discussed below.
3.2 **ICC-ES AC85 Report Content**

The requirements for reports (Section 4.0 Content of Reports) are included. No deviations are noted.

3.3 **ICC-ES AC257 Corrosion Resistant Fasteners Method Compliance**

The report states that the test was conducted according to the procedures stated in AC257. That document includes criteria for fasteners and wood treatment chemicals. Only the criteria for fasteners apply in this case. For this evaluation, it is assumed that specified procedures were followed unless data is present to indicate otherwise. The following deviations are noted:

3.3.1 *Exposure Conditions*

The specific test conditions depend on the intended exposure conditions, listed in Table 1 of AC257. As stated in the report, the recognition being sought by the applicant is exposure condition 3 (General Construction), which requires testing in accordance with section 4.3.1.3 which requires testing by two ASTM methods, B 117 and G 85, in distilled water spray exposures for 60 days. Appendix A testing is offered as an alternative to ASTM B 117, but apparently only for exposure condition 6, which seems to apply only to tests applicable to preservatives rather than fasteners. The test requirements in AC257 are confusing and unclear.

The exposure described in the report meets the requirements of Exposure Condition 3, following the 1440 hours of exposure required by Exposure Condition 2 (Untreated Wood and Salt Water) and replacing untreated wood with the treated wood and salt water with distilled water as called for in 4.3.1.3. In addition, the samples were placed in shallow pans during the 60 days of exposure as called for.

Thus, although the requirements of AC257 are confusing, the exposure of all fasteners tested was robust and followed the intent of the guidelines set forth in this AC. Based on the weight and galvanizing loss experienced with the HDG samples, this testing was adequate to support comparative conclusions.

3.4 **Discussion**

Following 60 days exposure in a wet and elevated temperature environment, the samples were removed and inspected in accordance with AC 257. Comparative visual ratings for the coated samples were nearly identical to those for HDG, weight loss was approximately 50 times less than for HDG, and diameter loss was approximately one-tenth or less that of HDG fasteners. Additionally, coating adhesion was better for the coated fasteners than for the HDG ones.

4 **Conclusion**

The report titled *Corrosion Effects of ACQ Treated Wood on Metal Fasteners in an Accelerated Test* by T. F. Shupe, Q. Wu, J. Curole, M. Voitier, and D. Ring, dated June 29, 2009, supports conclusions about the corrosion rates of fasteners in contact with wood treated with ACQ preservative as stated in the report. The procedures and requirements of ICC-ES AC85 and the intent of the AC257 Corrosion method are met. It meets the needs for use in
consideration of the “body of evidence” by ICC-ES in considering the acceptability of the subject fastener systems.

Metal fasteners protected with either of the two proprietary coatings covered by the subject report, TimberLok fasteners with FMEC2 (CR-10), and LedgerLok fasteners with FMEC3 should be expected to perform in exterior environments, as defined in AWPA UC1, Use Category 4, as well or better than HDG fasteners of similar designs when installed in ACQ-treated wood. I recommend that the ICC-ES approve such use.

5 Certification

I have reviewed the report discussed above and the referenced criteria and standards. I am qualified to make this evaluation through education and over 25 years of experience in engineering and the field of wood preservation. The findings and conclusions stated above are my professional opinions.

Stephen T. Smith, P. E.  
California Professional Engineer Certificate No. 27309
Expiration 31 March 2011

18 August 2009