Tower Test for Evaluating Resistance of Common Building Materials to Formosan Subterranean Termites

Q. Wu¹, W. R. Smith², J.D. Lloyd³, P. Merrick⁴
J. Curole¹, M. Voitier¹, T. F. Shupe¹, and D. Ring¹

¹ Louisiana State University Agricultural Center
² Arch Wood Protection, Inc.
³ Nisus Corporation
⁴ Weyerhaeuser, Boise Technology Center

Abstract

Subterranean Termites, including the Formosan Subterranean Termite (FST) are a significant structural and commercial pest in many parts of the world. Current control techniques include application of soil termiticides prior to construction, the use of preservative treated wood, physical barriers, and baits. Development of relevant testing techniques to evaluate performance of common building materials in a FST region is essential for establishing effective protection measures against this pest. In these evaluations, a new test design, called the tower test, was used to learn more about the ability of certain building materials to resist tubing from the FST.

The objectives of the tower tests were to 1) study the tubing potential of FST over different building materials including concrete, brick, treated wood, PVC, and foam, and 2) determine if the current building practice of using a treated sill adjacent to untreated wall studs is sufficient in a termite prone region.

A typical tower setup consists of 1.5 kg blasting sand, 300 g water, at least 2000 FSTs, and southern pine (Pinus sp.) wood as a food source placed on the top of each tower. Measurements include; termite tubing length, time to reach a certain tube height, termite mortality, and wood damage. In parallel, a standard AWPA E-1 jar test is conducted with untreated southern pine wood samples to measure termite vigor and validate the tower test results. The tower test method has successfully demonstrated that a specific glycol borate prevents FST tubing over non-wood materials (i.e., concrete) and that standard preservative treated sill plates do not prevent attack of adjacent, untreated wall studs.

Results of testing performed to date indicate that this method can be used to generate reliable data on FST tubing potential over common building materials. Future development of the technique includes establishing correlations between tower tests and long-term field performance tests, understanding the effect of repeated exposure of new termites on tower test results, and developing more effective evaluation methods for damage on wood towers. It is believed that this test method is worthy of consideration for Standardization by the American Wood Protection Association (AWPA).
Figure 1. Test set-up showing towers made of brick, PVC, and foam.

Figure 2. FST tubing over concrete and foam towers.
Figure 3. FST tubing over wood towers.

Figure 4. Sill plate test showing FST tubing over a treated sill plate to reach untreated material.