Early Detection of Decay in L-joints and Lap-joints in a Moderate Decay Hazard Zone

Aboveground performance of wood has been the subject of numerous studies and evaluation techniques. Aboveground tests are carried out to assess the ability of wood preservation systems to protect wood used in exterior applications such as millwork, decking, and fascia. They are also useful for evaluating natural durability of building components that are intended to be protected from the environment. If, for example, millwork joints are not properly clad, they will experience rapid failure if water becomes trapped between cladding and frame. Water entrapment in joinery is a common problem and results in one of the most common wood decay inquiries by homeowners and builders alike: How quickly does decay begin after wood becomes wet? Aboveground tests may help us better understand the period of time between water entrapment and onset of decay.

Aboveground L-joint test.

Background

Typically, aboveground test procedures specify inspection of specimens at least every 12 months, depending on the severity of the test site. While annual inspection is adequate for testing preservative systems, more frequent inspections and modification of the test method to encourage moisture entrapment may provide more information on the initiation of decay. Limitations of current aboveground test procedures include the subjective nature of the rating system and lack of accurate methods for detecting and measuring the extent of decay, particularly early stages of decay. Two common tests—L- and lap-joint tests—are designed to effectively trap water and provide conditions favorable for wood decay. However, it is recognized that both tests are dependent on rainfall, temperature at the chosen test site, and exposure time for a reliable set of performance data.

Objectives

It may be possible to accelerate aboveground tests, even in a climate of moderate decay hazard, by shading the test set-up or covering the test units to trap condensation and prevent rapid drying. Our objective is to determine the amount of time required to detect early stages of decay in shaded L- and lap-joint test units in a moderate decay hazard zone using traditional and experimental decay detection methods.

Approach

The test site, Valley View Experimental Test Site, located near Madison, Wisconsin, was selected because it is moderately favorable for promotion of decay, with an absence of decay-supporting conditions during late fall and winter months. L- and lap-joint test units from white pine sapwood or sugar maple (two species typically used in joinery) were exposed aboveground on elevated platforms under the shade of a tree.

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Aboveground L-joint test.

Five different specimens of each wood type and treatment were evaluated at 2-week intervals from April through October during the first summer and at 4-week intervals during the second summer to determine the first signs of decay. Assessment methods include color changes, visual signs of microbial growth, softening (pick test), moisture meter measurement in the joint, laboratory culture for the presence of decay fungi, and immunodiagnostics (an experimental method that detects enzymes produced by decay fungi). Five specimens are evaluated on a rotating basis, so that specimens are re-evaluated during every fourth inspection. DNA analysis was conducted on fungi cultured from specimens that were presumptively identified as decay fungi. Cumulative rainfall data during the course of the study were collected by a weather station at the experimental site.

Expected Outcomes

Frequent inspections during the first two years are expected to give an indication of the timeframe for the onset of decay for white pine and sugar maple in a moderate decay hazard climate. Because the test set-up is shaded and rainfall and specimen moisture are monitored, we expect to correlate moisture availability with onset of decay. This study also provides an opportunity to collect valuable field performance data on an experimental method and compare results with those from standard inspection methods (which are considered by some to be subjective) and fungi cultured from the test specimens.

Timeline

- Test specimens installed April 2003
- Inspections conducted bi-weekly during 2003, monthly during 2004
- Compilation and reporting of data, 2006

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