

Species Identification and Field-Grading of Woods in Covered Bridges

To extend the service life of historic covered bridges in the United States, methods for accurately estimating the strength and safety of the structure are required. Critical parts of this estimate are the species and grade of wood used in the construction of the bridge. With accurate information, an engineer or other professional can make determinations about maintenance, repair, restoration, or decommissioning of the structure.

Background

The strength of timber found in covered bridges can vary considerably, not only because of age and condition but also because of species and grade. For evaluation purposes, design values for existing wood members must be determined with as much accuracy as possible. The current practice is to assign wood values for strength and moduli from existing specifications, but often these values are inaccurate for the specific condition and can result in an unreliable assessment of the structure. This could be hazardous where the type, source, and grade of the existing wood are uncertain. This study will develop methodologies for species identification and approximated field grading of timbers. The end product will be presented in a guideline or manual for use by engineers.



Red Bridge, a historic covered bridge located in Union County, Pennsylvania, includes burr-arch trusses. Photo by James Wacker.

Objective

The objective of this project is to produce an easy-to-use field manual for engineers covering the topics of wood identification, sampling, and field grading of timbers used in covered timber bridges.

Approach

The research will take place in phases, beginning with a review and compilation of pertinent literature, grading standards, and references. Field data and observations will be collected during on-site evaluation of two or three covered bridges. During these visits, a real-world methodology will be developed, focusing on the needs and practical concerns

of a practicing engineer who lacks access to laboratory facilities. Practical observations will be melded with traditional wood anatomical methods of identification and published grading standards to produce the timber identification and grading manual.

Expected Outcomes

The primary deliverable is a full-color field manual for identification, sampling, and grading of wood used in covered bridges in the United States. We are also attempting to create a small device that would allow the rapid and easy preparation of wood specimens for field wood identification.

Timeline

Literature and grading standards will be compiled during summer 2009. Field visits to bridges will take place in summer and fall 2009. The manual will be published by spring 2010.

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