

TECHLINE

Properties and Use of Wood, Composites, and Fiber Products

Structural Use of Red Maple



Test being conducted on full-size maple truss

Hardwoods are abundant in the northeastern forests of the United States. However, past forestry practices have changed the composition of some forests, resulting in an overabundance of low-valued hardwood species. These low-valued species are preventing regeneration of the historical forest type. Numerous stands of hardwood forests around the Lake States and in the Northeast need active management to restore desired forest types and conditions, including greater biodiversity of trees, plants, and animals. One option is to remove low-valued hardwoods, such as red maple, and reforest with desired species. However, such forest management practices are expensive, and the traditional use for this material, making pallets, does not cover the costs of forest restoration. Therefore, higher valued uses need to be found.

Researchers at the Forest Products Laboratory, the Michigan Technological University in Houghton, and the University of Minnesota's Natural Resources Research Institute in Duluth are working to improve the economics of forest restoration by developing value-added structural uses for red maple and finding economical uses for the manufacturing residuals from sugar (hard) maple and yellow birch lumber. Their main objective is to use red maple and these residuals in structural components such as trusses and I-beams.

Several technical and economic difficulties were overcome to allow substitution of hardwoods for traditional softwood species. Highlights of this work include the following:

- Developing shorter, cost-effective drying schedules
- Evaluating engineering properties of lumber from these species
- Assessing performance of fasteners to be used
- Determining lumber yield and recovery information
- Developing engineering designs for I-beams and trusses
- Demonstrations of prototype I-beams and trusses
- Conducting preliminary financial assessments

The project's industry partners are enthusiastic about the program. Rossi Northern Hardwoods in South Range, Michigan, Superior Wood Systems in Superior, Wisconsin, and Kylmala Truss in Duluth, Minnesota, have manufactured lumber trusses and I-beams. Although this project focused on hardwoods from Upper Michigan and Northern Wisconsin, the results are applicable to other regions where these species are abundant. The industry partners are delighted with the success of this program because hard maple trusses had 29% more strength and 10% more stiffness than equivalent spruce-pine-fir trusses.

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