RESEARCH in Progress

Forest Products Laboratory

Effect of Silvicultural Practices on the Physical and Mechanical Properties of Lake States Hardwoods

Wood quality is an important determinant of its end use and therefore its value. Recent proliferation of novel engineered wood products has created new potential uses for wood. However, a greater understanding of wood quality is needed to allow continued development of these novel wood products. For example, a number of tree species typical of northern hardwood forests (such as sugar maple, American beech, and yellow birch) have been utilized primarily for aesthetic applications and have therefore been graded visually. Novel engineered wood products, including cross-laminated timber (CLT), could utilize lower appearance grade timber, providing a new market and potential higher returns for these lower grades. However, we need to have an improved understanding of the mechanical properties of these species and the influence of silviculture and environmental conditions on those mechanical properties.

A northern hardwood stand on the Menominee tribal land, Wisconsin. (Photo credit: Yvette Dickinson)

Background

Research on the mechanical properties of softwood species has indicated that silviculture and growing environment can both be important determinants. Relatively fewer projects have investigated the mechanical properties of hardwood species, and it is presumed that less is known about the influence of silviculture and environment on the mechanical properties of hardwood species. This is particularly true of northern hardwood species. A review of the literature is needed to ascertain how much is currently known about the influence of silviculture and growing environment on wood mechanical properties, and this knowledge must be synthesized to elucidate our knowledge gaps.

Objective

The objective of this project is to provide a thorough review of published literature pertaining to the influence of silviculture and growing environment on wood grade and mechanical properties in northern hardwood species of the Lake States, including sugar maple, red maple, basswood, yellow birch, American beech, black cherry, quaking aspen, white ash, and northern red oak.

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Sugar maple logs harvested on Michigan Technological University's Ford Forest in Baraga County, Michigan. (Photo credit: Yvette Dickinson)

Approach

Available literature databases will be searched to compile an annotated bibliography of published literature related to the influence of silviculture and growing environment on wood grade and mechanical wood properties of hardwood species of the northern hardwood forests. This information will be synthesized, summarized, and submitted to a journal for publication as a review article.

Expected Outcomes

The outcomes from this review could be used to formulate new research questions and form the basis for future research projects that will advance the development of novel engineered wood products utilizing low appearance grade timber of northern hardwood species.

Timeline

Literature databases will be searched and an annotated bibliography compiled by August 2017. The annotated bibliography will be summarized and synthesized, and a literature review will be drafted by August 2018. The literature review will be submitted to a peer-reviewed journal by October 2018.

Cooperators

Michigan Technological University

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