



ADVANCED VIBRATIONAL MEASUREMENTS AS AN INDICATOR OF LUMBER STRENGTH

A McIntire - Stennis Supported Project

The lumber used in constructions is graded during the sawmill process. This commodity is usually graded visually based on knots size and other visual defects. The market also offers mechanical graded lumber, sorted based on stiffness in the industry. Nondestructive evaluation (NDE) plays a major role on Machine Stress Rated (MSR) Machine Evaluated Lumber (MEL), the two main techniques to grade lumber mechanically.

The objectives of this project are to collect stress wave signals from southern pine structural lumber pieces that have been subjected to a longitudinal impact (MEL process) and analyses the vibration signals as strength predictor. The work includes examining the position of peaks other than the fundamental frequency and its harmonics to determine if they provide additional information about the location and severity of defects within the lumber piece. Better estimations of strength allow higher utility usage from the wood resource.

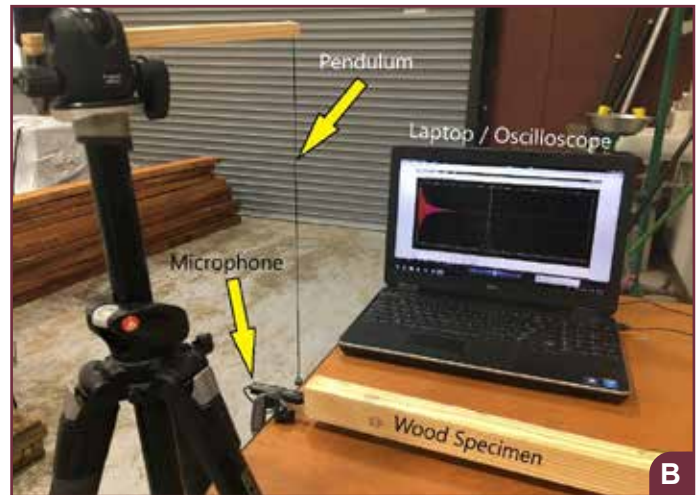
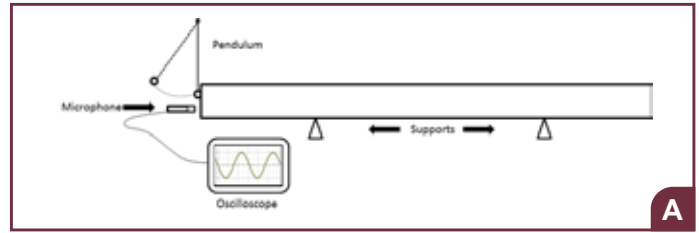


FIGURE 1: Test setup for recording acoustic waves.



COLLABORATION

This project is in collaboration with researchers from the USDA Forest Products Laboratory.

IMPACTS



High frequency sound waves that pass through a material are influenced by the properties of the material.



The sample material will consist in a total of 2000+ lumber pieces (Southern pine) with different lengths and widths to explore longitudinal vibration signals.



The addition of potential NDE parameters in lumber grading process can improve the strength prediction in lumber grading process in sawmills.

ABOUT MCINTIRE-STENNIS

The McIntire-Stennis program, a unique federal-state partnership, cultivates and delivers forestry and natural resource innovations for a better future. By advancing research and education that increases the understanding of emerging challenges and fosters the development of relevant solutions, the McIntire-Stennis program has ensured healthy resilient forests and communities and an exceptional natural resources workforce since 1962.

