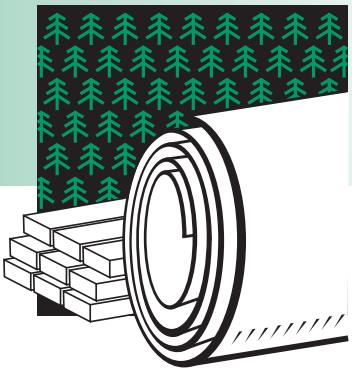
FOREST PRODUCTS

Project Fact Sheet



LUMBER DEFECT DETECTION SYSTEM

Benefits

- Estimated energy savings of more than 966,000 Btu/year per unit (1,000 board feet of finished oak product) through reduced kiln operation; annual energy savings of 2.51 x 10^{12} Btu by the year 2010, with 50% of the domestic kiln-dried oak industry participating
- Reduction in particulate, wood ash, and solid wood wastes of approximately 158 tons per unit
- Economic savings of approximately $7.58 per unit produced
- Material utilization savings by allowing wetwood to be identified, sorted, dried, and separated before it undergoes value-added processing
- Reduction in greenhouse gases through more efficient use of kilns for wood drying

Applications

The process is effective for detecting internal defects, including end check, splits, and honeycomb, in a variety of hardwood species. With this system, producers have a much better idea of how much defective wood is available for economically viable secondary uses. Secondary wood can be chipped to make particleboard, cut to make pallets, or used as fuel for kilns or other heating needs at the plant.

Project Partners

NICE^3 Program
Washington, DC

Penn State University Forest Resources Lab
University Park, PA

Pennsylvania Technology Transfer Center
Wayne, PA

Perceptron, Inc.
Hatboro, PA

State of Pennsylvania's Department of Community and Economic Development
Harrisburg, PA

U.S.D.A. Forest Product Laboratory
Madison, WI

INNOVATIVE METHOD FOR DETECTING BACTERIAL WETWOOD AND OTHER HIDDEN DEFECTS REDUCES ENERGY COSTS IN WOOD PROCESSING

Perceptron, with assistance from the Department of Energy's NICE^3 program, is demonstrating an ultrasound (stress wave) technology for oak wood processors that saves substantial time and money while reducing pollution from lumber mills. The technology identifies green oak containing defects, such as "wetwood," a debilitating bacteria affecting about 10% of the Nation's oak trees. Wetwood retards the drying process of green oak and causes internal wood defects, such as checking and honeycombing.

Prior to using this innovative method to separate infected from healthy trees, processors would slow the dry kiln process by as much as 25% to accommodate infected trees, thus reducing production output at the mill. By detecting wetwood with ultrasound technology, however, affected trees can be segregated and dried at a slower rate, while the unaffected wood can be dried at an accelerated rate, 25% faster than with traditional means. Overall wood output increases, as infected wood can be used as scrap, fuel, or chipping for particle/wafer board.

LUMBER DEFECT DETECTION SYSTEM

Perceptron's ultrasonic lumber inspection system scans green wood to determine if moisture levels are normal or if defects, such as "wetwood," are present.

Project Description

Goal: The project goal is to demonstrate a commercially viable ultrasound measurement system to assess green lumber so that wetwood can be sorted and dried separately. This permits wood processors to accelerate the drying of uninfected wood by 25%.

The system is built with transducers, which emit and receive a certain ultrasound signal. Under this method, a board travels between the transmitting and receiving transducers embedded in rolling contact mounts. If the lumber contains wetwood faults or other internal defects, the ultrasound signal emitted by the sending transducer will change from a normal reading as it passes through the detection system. This detection method is microprocessor driven, providing operational flexibility and simplified interfacing with other mill equipment. The ultrasound instruments can be tuned to provide the most prompt, accurate, and detailed readings possible.

Ultrasound technology is fool-proof, time-efficient, and provides the mill operator with the information needed to achieve maximum yield in the most cost- and energy-efficient manner possible. The reduction in kiln usage results in a corresponding decline in greenhouse gas emissions. Energy savings with this new process are estimated to be 966,000 Btu when producing 1000 board feet of finished oak product.

Perceptron is demonstrating this new technology with assistance from the Penn State University Forest Resources Lab, the Pennsylvania Technology Transfer Center, the State of Pennsylvania's Department of Community and Economic Development, and the NICE^3 Program through the Department of Energy's Office of Industrial Technologies.

Progress and Milestones

- Design and construct a test system.
- Refine the system.
- Demonstrate the project at two sites.
- Develop marketing technology.

NICE^3 – National Industrial Competitiveness through Energy, Environment, and Economics:
An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry.
This grant program provides funding to state and industry partnerships for projects that demonstrate advances in energy efficiency and clean production technologies. Awardees receive a one-time grant of up to $525,000. Grants fund up to 50% of total project cost for up to 3 years.

For project information, contact:

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