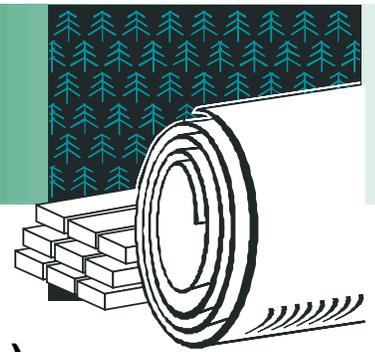


FOREST PRODUCTS

Project Fact Sheet



MICROWAVE PRETREATMENT: IN-MILL EVALUATION, KILN SCHEDULE, AND PROCESS MODEL (CONTINUED PROJECT)

BENEFITS

- Decreased kiln drying time by 25-50%
- Energy savings of at least 30%
- Reduced wood degradation
- Fewer cooking chemicals required
- Decreased production costs
- Reduced VOC emissions
- Reduced process “bottlenecking”

APPLICATIONS

The process improves the conventional drying process of paper and paperboard. This gas-fired dryer can be installed in new or existing equipment. Other potential applications include preheating, hot pressing, incremental drying, moisture profiling, and hot calendaring.

NEW, HIGH-SPEED TECHNOLOGY CAN REDUCE DRYING TIMES FOR HARDWOOD

Oak Ridge National Laboratory (ORNL) has developed a high-speed microwave pretreatment that can substantially improve the drying rate of wood. Microwave pretreatments work primarily by rupturing pit membranes in hardwood. Because internal pressure created by the microwave pretreatment pushes water out of the wood, the technology also lowers moisture content. The technology does not affect wood quality since the pressure within the wood is low and the heating time is short.

During the first phase of the project, researchers conducted successful proof-of-concept studies. These studies revealed that microwave pretreatment can lower energy costs for kiln drying of hardwood lumber by 30% without damage to wood properties. During the second, follow-on phase of the project, partners will test larger sections of hardwoods, such as dimensional lumber.

PRETREATMENT PROCESS LINE TO IMPROVE DRYING RATES



Figure 1.

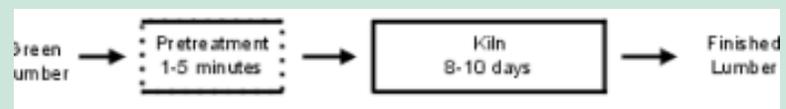


Figure 2. Continuous microwave pretreatment of lumber at 915 MHz.



Project Description

Goal: Reduce overall time and energy required to produce hardwood lumber for furniture, flooring, and other related applications using high-speed microwave pretreatments.

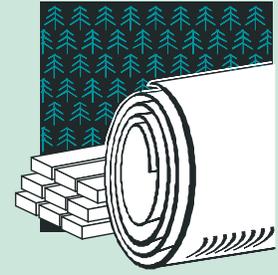
During this second phase of the project, partners will demonstrate and evaluate, at mill scale, the use of more aggressive kiln drying schedules to enhance the drying rate. Mechanical, machining, gluing, and finishing properties of the wood will be a major focus. Partners also plan to develop models to predict kiln drying parameters. Mill tests will be conducted at three lumber mills and a clock factory. Test results will provide the information required to design, construct, and operate an industrial-scale microwave pretreatment unit for high-volume hardwoods.

Progress & Milestones

- Researchers demonstrated proof-of-concept during Phase I.
- Studies indicated that rates of drying for pretreated whole wood sections were better than that for untreated wood.
- Researchers will evaluate aggressive kiln schedules and soaking times in drying for selected sizes of microwave pretreatments of dimensional lumber of two major hard wood species.
- Process models will be developed for kiln drying of dimensional pretreated lumber.
- An in-mill evaluation of the microwave pretreatment process and kiln drying will be completed.

Awards, Patents, and Invention Records

1999 Tribute to Tennessee Technologies Award



PROJECT PARTNERS

Averitt Hardwoods International
Clarksville, TN

Communications and Power Industries
West Los Angeles, CA

Huntersville Hardwoods
Huntersville, NC

Mountain City Lumber Company
Laurel Bloomery, TN

North Carolina State University
Raleigh, NC

Oak Ridge National Laboratory
Oak Ridge, TN

Rhyne Lumber Company
Newport, TN

SII Dry Kilns, Inc.
Lexington, NC

Tennessee Forest Products Center
Knoxville, TN

University of Tennessee
Knoxville, TN

GL&V Pulp Group, Inc.
Pittsville, MA

FOR ADDITIONAL INFORMATION,
PLEASE CONTACT:

Charles Russomanno
Office of Industrial Technologies
Phone: (202) 586-7543
Fax: (202) 586-1658
E-mail: charles.russomanno@ee.doe.gov

Dr. A.L. Compere
Oak Ridge National Laboratory
Oak Ridge, TN 37831
Phone: (865) 574-4970
Fax: (865) 576-2755
E-mail: compereal@ornl.gov

Please send any comments,
questions, or suggestions to
webmaster.eren@nrel.gov



May 2001