Improving Dryer and Press Efficiencies Through Combustion of Hydrocarbon Emissions

New Technology May Eliminate Need for Expensive Emission Control Devices on Wood Dryers and Presses

The current technology used to dry and press wood requires expensive emissions controls to meet environmental regulations. The most commonly used emission control device is the RTO (Regenerative Thermal Oxidation) unit, which is energy intensive (natural gas) and has high operating and maintenance costs. The aim of this project is to identify ways in which the drying and pressing processes can be altered so that control units may be significantly reduced or even eliminated.

The project is based on results from a six-year industry-funded study from which IPST researchers created a model to predict the release of VOC streams during drying based on wood tissue temperature. The project developed several alternatives for removing or reducing the need for control devices. These include trapping of VOCs with boiler ash and reducing fines by matching knife sharpness angle to wood temperature.

Benefits for Our Industry and Our Nation

- Decreases natural gas used in control equipment
- Decreases capital costs
- Improves product quality
- Decreases VOC emissions during drying and pressing

Applications in Our Nation’s Industry

The process will minimize the need for emission controls for the drying and pressing of hardwood and softwood. The unit will be retrofitted to existing dryers and presses.
Project Description

Goal: To develop strategies to alter dryer and press operations to reduce the volume of VOC-containing airstreams.

The project developed ways to isolate hydrocarbons released during drying in a low-volume stream at a concentration high enough to support combustion. Data was used to develop an understanding of the relationship between drying practices and press emissions. Drying strategies were then developed to reduce emissions with the goals of eliminating control technology for hardwood and reducing the size and energy requirements of the control unit for softwood. Models based on drying strategies were used to estimate product performance from pressing operations.

Results

• A heat transfer model for estimating pinene emissions from hot-pressing strand for the manufacture of flakeboard was constructed from first principles and validated. The model showed that most of the emissions originate from the 1-mm layer of wood adjoining the platen surface. Hence, a simple control option is to surface a softwood mat with a layer of hardwood prior to pressing.

• It was shown both theoretically and in full-scale work that particles smaller than 400 μm are disproportionately responsible for HAPs. As a result, Georgia-Pacific is considering green-screening their furnish at several of their mills in order in order to remove these particles and reduce their treatment costs.

Awards, Patents, and Invention Records

• American Forest & Paper Association 1998 Environmental & Energy Achievement Award


Project Partners

Electric Power Research Institute
Raleigh, NC

Georgia-Pacific Corporation
Atlanta, GA

Institute of Paper Science and Technology
Atlanta, GA

International Paper
Tuxedo, NY

Lawrence Otwell
Mississippi State University
Mississippi State, MS

Potlatch Corporation
Bemidji, MN

For additional information, please contact

Drew Ronneberg, Ph.D.
Industrial Technologies Program
Phone: (202) 586-0205
Fax: (202) 586-9234
E-mail: Drew.Ronneberg@ee.doe.gov

Dr. Sujit Banerjee
Institute of Paper Science & Technology
500 10th Street, N.W.
Atlanta, GA 30318
Phone: (404) 894-9709
E-mail: sujit.banerjee@ipst.gatech.edu

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

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