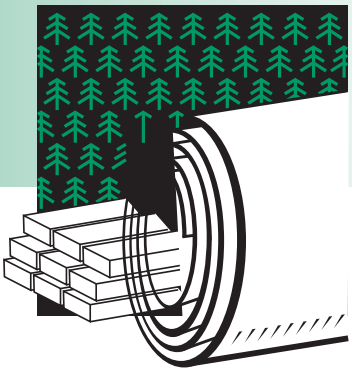
FOREST PRODUCTS

Project Fact Sheet



CHRISTIAN VENEER DRYER

ROTARY VENEER DRYER SAVES ENERGY, MONEY, AND SPACE

Benefits

- Closed rotary dryer reduces energy required to dry plywood veneer by more than 80% compared to conventional in-line dryers
- Cost savings — usually recover installation cost in less than two months of operation
- Eliminates the significant air emissions of conventional dryers —avoiding the need for expensive scrubbers — generating only small amounts of water discharges instead
- Costs 1/10 as much to build and 1/30 as much to maintain as a conventional in-line dryer with comparable throughput
- Uses 1/30 as much floor space as conventional dryers
- Greatly reduces damage to veneer sheets

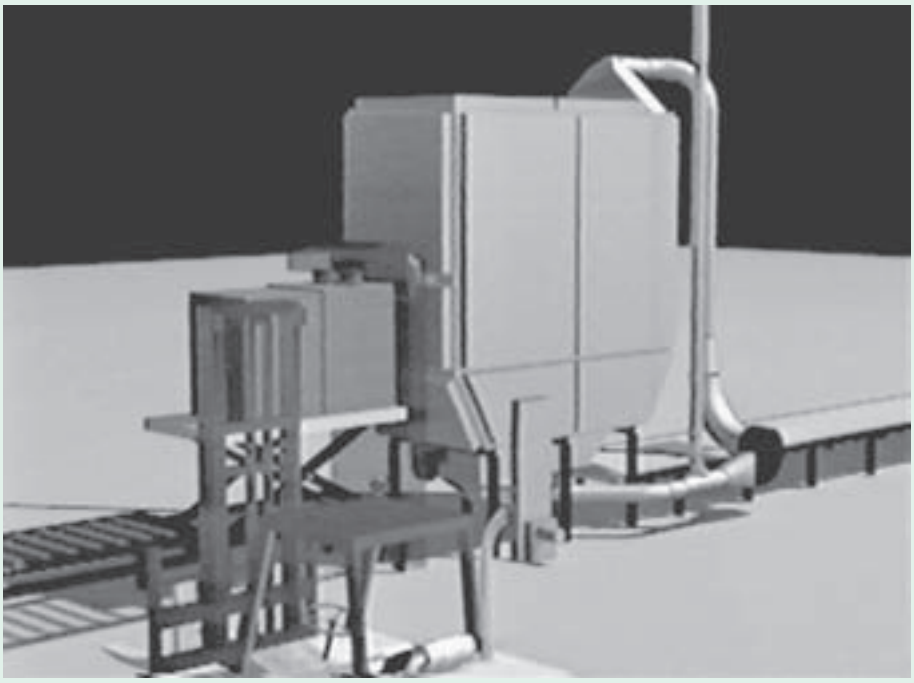
Applications

The Christian Veneer Dryer was developed for drying veneer sheets used in making plywood. It causes little damage to the veneer, making it highly suitable for drying hardwood veneers for paneling and furniture. Within the forest products industry, the dryer can also be used for drying lumber or hog fuel — bark and other scrap burned for fuel. Additionally, the dryer can be used in the agricultural industry to dry crops, such as coffee beans and rice.

Plywood is made by gluing together sheets of wood veneer. The bonding process requires low moisture, so the green veneer needs to be dried first. Conventional in-line dryers are expensive to build and operate, use large amounts of energy, take up a great deal of space, and generate air pollutants that require expensive abatement equipment. The Christian Veneer Dryer significantly reduces these problems.

This new invention offers great advantages over conventional veneer drying systems. Instead of blowing — and then exhausting — very hot air across a conveyor line of veneer, the green veneer sheets are placed in individual slots within a closed rotating drum. Natural gas or cogeneration heat drives the moisture out of the veneer, and the moisture and some pollutants are condensed on cooling coils.

CLOSED ROTARY DRUM CHRISTIAN VENEER DRYER



The closed rotary drum system uses less than one-fifth as much energy, requires minimal use of pollution abatement equipment, and allows a retrofit payback period of less than two months.

OFFICE OF INDUSTRIAL TECHNOLOGIES
ENERGY EFFICIENCY AND RENEWABLE ENERGY • U.S. DEPARTMENT OF ENERGY

Project Description

Goal: The goal of this project was to ready the Christian Veneer Dryer for commercial production. The system was previously demonstrated with a half-size prototype, but needed more development work to prepare it for licensing and commercialization.

Specific project goals included:

- Preparing engineering drawings for manufacturing
- Developing computer simulations of dryer operations
- Calculating detailed construction and operating costs.

As a result of this project, engineering drawings, computer simulations, and detailed cost projections, were created, which confirmed the value of the Christian Dryer and prepared it for pilot plant construction and licensing.

Michael Christian developed this technology with the help of a grant funded by the Inventions and Innovation Program through the Department of Energy's Office of Industrial Technologies.

Progress and Milestones

As a result of work completed under this grant, Michael Christian was able to:

- Complete Auto-Cad drawings and all other engineering work necessary to build the Christian Veneer Dryer.

- Create an animated computer simulation to demonstrate dryer operation.

In addition, the Christian Veneer Dryer is protected by U.S. patent 5,012,595.

Economics and Commercial Potential

- Detailed cost reports prepared by RJ Hill Engineering of Eugene, Oregon, confirm that energy use by the Christian Dryer will cost only 13% as much as for a conven-tional in-line dryer, and that a retrofit system with the rotary drum will pay for itself within 43 days.

- The technology is ready for licensing and an initial system could be constructed and installed for less than $500,000.

The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

For project information, contact:

Michael E. Christian
1701 NE Beulah Road
Roseburg, OR 97470-8212
Phone: (541) 673-6004
whitefin@newshoes.net

For more information about the Inventions and Innovation Program, contact:

Lisa Barnett
Program Manager
Inventions and Innovation Program
Phone: (202) 586-2212
Fax: (202) 586-7114
lisa.barnett@ee.doe.gov

Visit our home page at
www.oit.doe.gov

Office of Industrial Technologies
Energy Efficiency and
Renewable Energy
U.S. Department of Energy
1000 Independence Avenue SW
Washington, D.C. 20585-0121

Order # I-FP-596
January 2002