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Forest Product's Laboratory's

Newsline

WINTER 2011

What's Old Is New Again—*Historic Building Will Provide Information on Long-Term Performance of Wood*

By James T. Spartz, Public Affairs Specialist (SCEP)

Change is the constant at the Forest Products Laboratory. In the early 1930s, demand for research results, training space, and information on the use of glued structural timber led to the construction of a new service building in 1935. "Building Two" was designed and tested by FPL staff, led by T.R.C. Wilson, J.A. Newlin, A.D. Freas, and A.L. Groth, to showcase the latest developments for the structural use of engineered wood products.

Seventy five years after its construction, in fall 2010, Building Two was taken down as part of FPL's current construction and renovation efforts. All the original structural timber arches were retained and now offer a rare opportunity to evaluate how in-service conditions affect the long-term performance of wood structures. The Building Two arches were exposed to a variety of conditions during their service life, including severe snow load events and, in 1995, a fire.

Definitive information on the first uses of glue in structural members was lacking in the 1930s, and very little commercial development of glued structural timbers in the United States had occurred prior to the development of the Building Two arches. Several types of glued members were used in the building, though not all of them would be considered glued-laminated timbers, or "glulam," by today's standards. During its service life, Building Two served a variety of functions, including housing FPL's packaging research and as a testing and training center during World War II.

In a 1939 Technical Bulletin detailing the design and testing of these arches, T.R.C. Wilson explained how three different types of engineered roof supports were used. End spans were constructed using a solid-wood-framed truss with wood dowel connectors. Next to each end span was a three-hinged arch with a double I-section composed of plywood webs, similar to an I-joist. The middle section of the building used arches with rectangular cross section and constant width tapering

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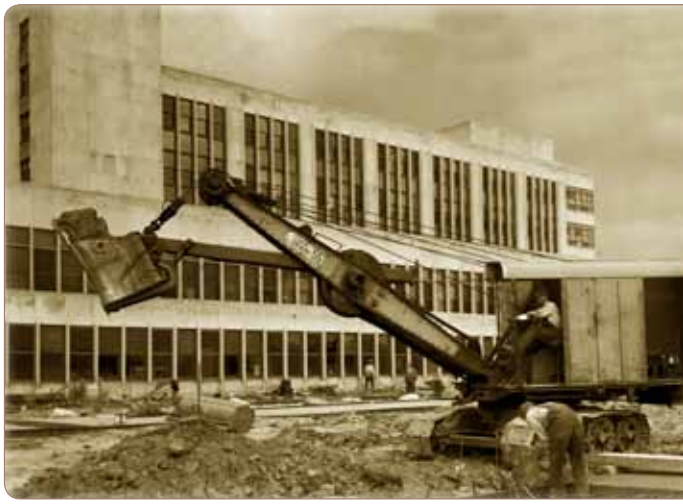
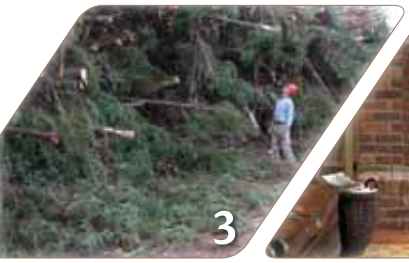
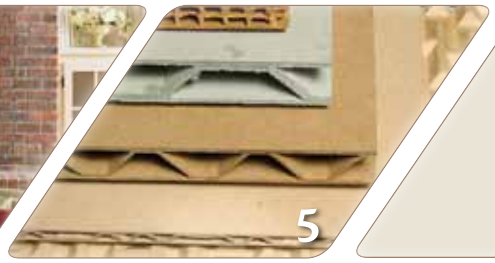


Construction of Building Two at FPL, November, 1934.

Demolition of Building Two at FPL, November, 2010.





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Upcoming Events

11th International Conference on Wood & Biofiber Plastic Composites

May 16-18, 2011, Monona Terrace Community & Convention Center, Madison, Wisconsin, USA

This conference and symposium seeks to bring together industry, government, and academia to share perspectives on what the future holds for wood and biofiber plastic composites. Topics for the conference include additives and formulating, advanced reinforcements, biopolymer matrices, enhanced performance, future applications, nanotechnology, and new processing/recycling. You can view conference information at http://www.forestprod.org/woodandbiofibercomposites/overview.html.

FPL Hosts Open House on Earth Day 2011

April 22, 2011, USDA Forest Service, Forest Products Laboratory, Madison, Wisconsin, USA

The Forest Products Laboratory is inviting the public to visit our facility during an open house on April 22, 2011. Visitors will have the opportunity to learn about FPL's impact on society as they tour our new Centennial Research Facility, speak with researchers about current projects, and view displays on the accomplishments made over the past century. The event will also feature activities for children and a visit from our friends Smokey Bear and Woodsy Owl. Watch for more information on our website at www.fpl.fs.fed.us

Wood You Believe

- When forests become old and overcrowded, trees begin to use more oxygen than they produce. Young, well-managed forests tend to be the most efficient at producing oxygen and absorbing carbon dioxide.
- Wood is recyclable, biodegradable and durable—sometimes lasting for centuries. When it is no longer needed, it can be returned to the earth.
- Our forests are renewable natural resources. Wood products come from a resource that grows, matures and is being replanted for generations to come.

$3.7 Million in Grants Available for Biomass-to-Energy Projects

The USDA's 2011 Woody Biomass Utilization Grant program has made available $3.7 million for grants that address the nationwide challenge in dealing with low-valued material to create renewable energy.

Submission of an application is required for a grant up to $250,000 for wood energy projects that require engineering services. These projects will use woody biomass material removed from forest restoration activities, such as wildfire hazardous fuel treatments, insect and disease mitigation, forest management due to catastrophic weather events, and/or thinning overstocked stands.

The woody biomass shall be used in a bioenergy facility that uses commercially proven technologies to produce thermal, electrical, or liquid/gaseous bioenergy. The funds from the Woody Biomass Utilization Grant program must be used to further the planning of such facilities by funding the engineering services necessary for final design and cost analysis.

Examples of such projects include engineering design of a

- woody biomass boiler for steam at a sawmill,
- nonpressurized system to heat water for various applications at a hospital, and
- biomass power facility, or similar facilities.

This program is aimed at helping applicants complete the necessary design work needed to secure public and/or private investment for construction.

The 2011 Woody Biomass Utilization Grant Program has four principal goals:

- Reduce forest management costs by increasing the value of biomass and other forest products generated from hazardous fuels reduction and forest health activities on forested lands.
- Create incentives and/or reduce business risk to increase use of woody biomass from our nation's forestlands for renewable energy projects.
- Implement projects that target and help remove economic and market barriers to using woody biomass for renewable energy.
- Produce renewable energy from woody biomass

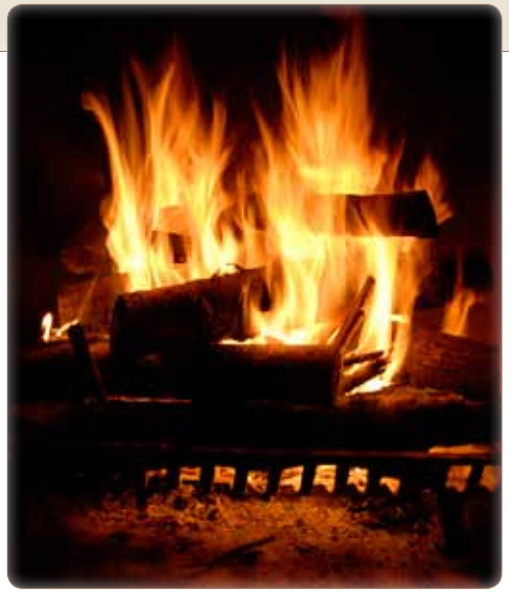
The Woody Biomass Grant Program is intended to address the goals of Public Law 110-234, *Food, Conservation, and Energy Act of 2008, Rural Revitalization Technologies (7 U.S.C. 6601),* and the anticipated *Department of the Interior, Environment, and Related Agencies Appropriation Act of 2011.*

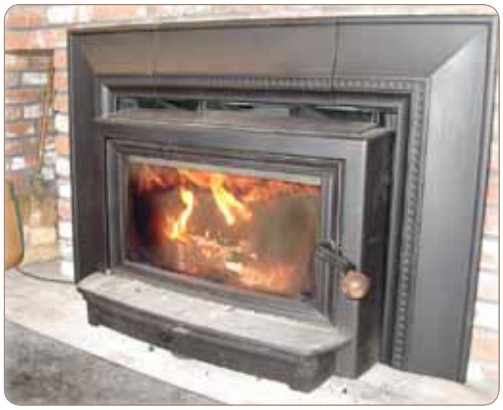
Application Deadline

Postmarked by close of business March 1, 2011.

For more information and grant application materials, visit http://www.fpl.fs.fed.us/research/units/tmu/tmugrants.shtml

Back to Basics: Wood for Warmth





By Rebecca Wallace, Public Affairs Specialist

For all of FPL's technological advances in wood science over the past century, the simple act of wood providing warmth and ambiance in fireplaces and wood stoves is still important.

According to the USDA publication "Firewood for Your Fireplace," choosing the best wood for your fire depends on several factors. You should consider what species are readily available to you, any personal preference you have as to aroma, and what type of fire you want to build.

Softwood species are easy to ignite and burn with a hot flame. However, they also burn rapidly and require frequent replenishing to stay lit. Softwood species are recommended if you're looking to warm up with a short fire that will burn out quickly.

For a longer lasting fire, hardwood species are a good choice. These woods burn less vigorously with a shorter flame and produce long-lasting, steady glowing coals.

The ideal fire, then, would be made with a mixture of softwood logs for easy ignition and hardwood logs for longevity. By adding wood from fruit trees (such as apple and cherry) or nut trees (such as hickory, beech, or pecan), your fire will also emit a pleasant aroma.

The chart below outlines the characteristics of several species and may help you decide which wood to use the next time you're looking to keep warm by the fire.

Types of Wood to Burn in a Fireplace

Species	Relative amount of heat per cord	Is it easy to burn?	Is it easy to split?	Does it give off heavy smoke?	Does it pop or throw sparks?	General rating
Ash, red oak, white oak, beech, birch, hickory, hard maple pecan, dogwood	High	Yes	Yes	No	No	Excellent
Soft maple cherry, walnut	Medium	Yes	Yes	No	No	Good
Elm, sycamore, gum	Medium	Medium	No	Medium	No	Fair
Aspen, basswood, cottonwood	Low	Yes	Yes	Medium	No	Fair, but good for kindling
Chestnut, yellow poplar	Low	Yes	Yes	Medium	Yes	Poor
Southern yellow pine, Douglas fir	High	Yes	Yes	Yes	No	Good, but smoky
Cypress, redwood	Medium	Medium	Yes	Medium	No	Fair
White cedar, western red cedar, eastern red cedar	Medium	Yes	Yes	Medium	Yes	Good, great for kindling
Eastern white pine, western white pine, sugar pine, ponderosa pine, true firs	Low	Medium	Yes	Medium	No	Fair, but good for kindling
Tamarack, larch	Medium	Yes	Yes	Medium	Yes	Fair
Spruce	Low	Yes	Yes	Medium	Yes	Poor

– *Continued from page 1* –

What's Old is New Again

from a maximum depth at the knee, where the wall meets the roof, to lesser depths at the foundation and at the roof peak. All the arches were manufactured by Unit Structures, Inc., of Peshtigo, Wisconsin, and used milk-based casein glue as the primary adhesive.

Structural wood arches are one of the oldest types of glued engineered wood products still commonly used today. The pleasing aesthetics and structurally solid nature of this wood product account for its frequent use when large spaces need to be spanned. Sporting arenas, churches, banquet halls, outdoor walkways, and small bridges are but a few common uses.

As distinguished from the truss or the simple beam, which may serve the same purpose of supporting loads over a large opening, an arch carrying vertical loads exerts horizontal thrust as well as vertical pressure on its supports. Engineered wood arches today are manufactured from suitably selected and skillfully prepared lumber such as Douglas Fir–Larch, Southern Pine, Hem–Fir, and Spruce–Pine–Fir. Arches of this sort have several distinct advantages over sawn timbers or other structural materials, including size capability, architectural effects, seasoning, variation of cross sections, and lower environmental impacts.

"Salvaging the arches from Building Two provides us with a unique opportunity," says Bob Ross, project leader at FPL. "FPL staff responsible for the original design, testing, and evaluation of the arches did an excellent job documenting all the background technical work they conducted," Ross says. Comparing original test results with those obtained from a modern condition assessment of the arches will provide critical information on long-term performance of structural wood, says Ross. Ultrasound testing and full-size testing of the arches will be performed in FPL's new Centennial Research Facility.

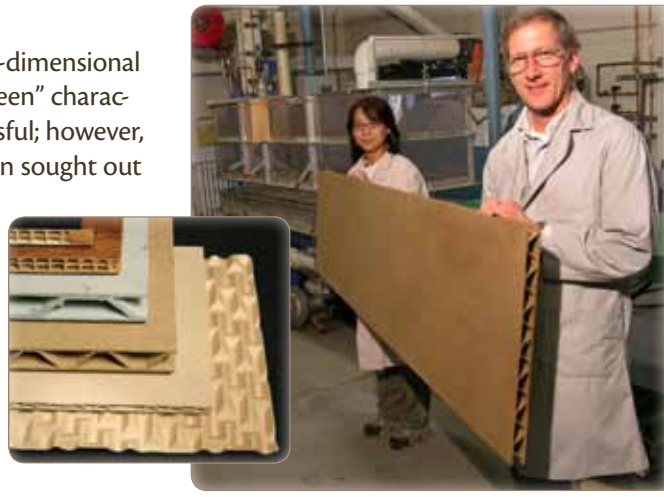
When the results are in, NewsLine will provide "Part II" of this story to discuss what was learned from the analysis and how it may affect future work on glued engineered structural timbers.

Phases of Building Two construction (1934) and demolition (2010).

FPL Research Making Its Way to the Marketplace

By Rebecca Wallace, Public Affairs Specialist

The Forest Products Laboratory has been involved in research to develop three-dimensional molded fiber structures using waste materials since the 1980s. At that time, "green" characteristics did not bring a premium and commercialization efforts were unsuccessful; however, research continued on 3-D structural panels. In 2006, commercial partners again sought out FPL to see what developments had been made and found 3-D engineered fiberboard to be cost effective and appealing to a market that was turning toward greener materials. From 2006 to 2008, FPL worked with Noble Environmental Technologies Corporation to move the technology from the lab to commercial start-up, and Noble has since demonstrated the potential of this FPL-produced material by developing many useful applications. An article in *Surface & Panel* magazine highlighting the commercial products and potential of these materials can be found at http://www.surfaceandpanel.com/articles/tech-spec/shape-green-come



Left: 3-D engineered fiberboard samples. Right: FPL Employees HongMei Gu and John Hunt hold a 3-D engineered fiberboard.

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New Book Reflects Upon 100 Years of Innovation

In honor of the Forest Products Laboratory's centennial year, John W. Koning, Jr. compiled and edited a hardcover coffee table book titled Forest Products Laboratory 1910-2010 Celebrating a Century of Accomplishments.

The curious browser will find this inviting, colorful book full of surprising and remarkable information about the many ways that wood products affect daily life. Scientists, manufacturers, policymakers, and other experts will find it an extraordinary reference and history of significant accomplishments in forest products research.

Copies of the book are available for purchase by contacting Pam Byrd at 608-231-9200 or pambyrd@fs.fed.us