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Variety of Projects Demonstrate Versatility of Small-Diameter Roundwood

By George Couch, FPL public affairs specialist

Since the USDA Forest Service showcased small-diameter roundwood construction at the 2002 Olympic Winter Games in Utah (reported in the first issue of NewsLine), the State and Private Forestry, Technology Marketing Unit (TMU) at Forest Products Laboratory (FPL) has continued to work with communities and organizations on a variety of projects employing small-diameter logs in structural applications.

People working with roundwood have experimented with a variety of approaches. For example, some projects, such as one of the original Olympic kiosks, used turned logs with smooth, uniformly cylindrical or tapered profiles; the other Olympic

kiosk used hand-peeled logs; and some structures have used undressed logs, some with the bark still on.

According to Mark Knaebe, roundwood structures coordinator at the TMU, the most innovation has been required in developing methods to join logs together. “In traditional log-home construction, you make a wall by stacking one log on top of another and cutting notches where two logs join at a corner. Using roundwood for framing and trusses, however, produces a variety of situations where three or four—or even more—logs come together, necessitating a variety of connecting systems. At FPL, we’ve been able to help evaluate and establish engineering criteria for some of the connectors,” says Knaebe.

People are also using roundwood for a variety of structures more challenging than kiosks.

In northern Arizona, for example, a consortium of Native American tribes, Indigenous Communities Enterprises (ICE), has built several Navajo hogan-style houses for elders and others. The houses have a basic structure similar to the kiosks but combine centuries-old, culturally important design features with affordability and new construction techniques and technologies. With involvement by numerous agencies



New structural designs incorporate small-diameter timbers and traditional Navajo hogan features.

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New “Wheelchair-friendly” Surface Material Being Tested at State Parks



People who use wheelchairs may find it easier to move around at parks and playgrounds thanks to a field trial of new surface materials being conducted by researchers from Forest Products Laboratory (FPL) and Wisconsin’s Department of Natural Resources (DNR).

FPL and the DNR have joined forces to field-test improved surface materials called accessible engineered wood fiber at two Wisconsin state parks.

“Engineered wood fiber”(EWF) is the technical name for a loose, mulch-like mixture of hardwood chips that meets certain specifications regarding size and shape of the chips, consistency, drainage, impact attenuation and other qualities. A 10- to 12-inch layer of EWF is widely used in playgrounds to prevent injuries around swings and other playground equipment.

“Traditional EWF and other loose materials such as sand or pea gravel are effective at

reducing injuries from falls, but such surfaces pose a serious obstacle for anyone using a wheelchair or walker,” says FPL research engineer Ted Laufenberg.

“At FPL, we’ve been working to develop a cost-effective surfacing material that combines shock-absorbance with enough firmness to enable a wheelchair or other mobility device to maneuver easily and safely,” Laufenberg said. “This would make it less costly for states and local communities to comply with federal regulations requiring accessibility of public parks and playgrounds.”

Currently available materials such as a molded rubber can be prohibitively expensive.

The prototype surfacing material consists of a 1½- to 2½-inch thick layer of EWF mixed with an adhesive binder or stabilizer. In the playground area at one park, the stabilized fiber is on top of eight to 10 inches of loose

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Roundwood Versatility *(continued from p. 1)*

and organizations, including FPL, TMU, the Rocky Mountain Research Station, and Cocosino National Forest, ICE reports they have been able to create jobs in all aspects of the project, from harvesting trees to sorting and processing logs to constructing the homes.

Park planners in Westcliffe, Colorado, came up with a completely different structural design when they accepted a challenge from the TMU and the Four Corners Sustainable Forests Partnership to build a new park pavilion using small-diameter roundwood timbers to support the roof. The 32- by 64-foot structure presented a design and engineering challenge as specifications called for a 32-foot open span. Roundwood logs were used for trusses as well as for the purlins, which run from truss to truss and to which the steel roofing is fastened.

The largest structure so far to employ significant amounts of small-diameter roundwood is the 5,000-square-foot library under

construction in Darby, Montana. The TMU partnered with Friends of the Darby Library for a cost-share challenge grant to “push the edge” on design and engineering with small-diameter roundwood. Small-diameter roundwood is being used in roof trusses, columns, and parallel chords. Though standard dimensional lumber is used in the framing, the roundwood roof trusses will be visible under the eaves and inside the library. Plans also call for the library’s furnishings, including tables, desks and chairs, to be made from small-diameter roundwood.

Travelers’ Rest State Park in western Montana, already home to one of the newest kiosk-type structures—though in this case an open-sided shelter—may become home to the first bridge built with small-diameter roundwood. TMU’s Knaebe and others are working with the park and a Montana engineering firm to design a 110-foot-long pedestrian bridge over Lolo Creek.

Thanks to the Healthy Forests Restoration Act of 2003 signed by the President in ceremonies at USDA headquarters, December 3, the bridge at Travelers’ Rest and other projects may be a step closer to reality. Title II of the bill specifically authorizes the TMU at FPL “to accelerate adoption of technologies using biomass and small-diameter materials; to

As many as nine logs connect at one point in the roof structure of Westcliffe Pavilion in Colorado.



create community-based enterprises through marketing activities and demonstration projects;” and “to establish small-scale business enterprises to make use of biomass and small-diameter materials.” The bill also authorizes appropriations of \$5 million annually for the next five years for such work. (The actual appropriation of funds will require additional Congressional action.)

“These specific provisions passed by Congress underscore the importance of this kind of effort and the important role that small businesses and rural communities can play in restoring healthy forests,” said Susan LeVan-Green, program manager of the TMU. “While we’re delighted that Congress has recognized that what we’ve been doing is effective, we are all eagerly looking forward to working on new projects with communities and organizations throughout the western United States.”





ASK FPL

Here are some questions that often come up this time of year.

Now that the days are shorter and the weather is cooler, is it too late to refinish my patio furniture?

When finishing wood outdoors, the most important thing to consider this time of year is the temperature, so the answer here depends on where you live. If you plan to apply a pretreatment of a paintable water-repellant preservative (the recommended method), temperatures should be above 70°F for the best possible results. If you are applying an oil-based paint, the temperature outdoors needs to be at least 40°F; for latex paints, it should be at least 50°F.

If you decide to move outdoor furniture inside to apply a finish, please take precautionary safety measures. The area should

be well ventilated, with an open window or a good ventilation system. Remember solvent-borne formulas are flammable and volatile mixtures. To be on the safe side, read and follow the directions and precautions on the container of the finish you are using. Preservatives

should not be used indoors unless recommended.

Is there anything I can do now to avoid ice dams on my roof this winter?

Ice dams—large sections of ice that form at the edges of roofs in cold climates—can cause deterioration of shingles and water leaks. These dams occur when heat from the attic melts the snow on the roof, and the melted snow freezes again into ice as it runs over the cooler edges of the roof. Water accumulation behind the ice dam may then leak into the roof and cause water damage. Finished attics and complicated roofs with valleys are especially prone to ice dams.

Although lack of attic ventilation is often blamed for ice dams, most are actually caused by warm air leaking into the attic from below or from unsealed and uninsulated hot air ducts in the ceiling or attic. Ice dams can also result from insufficient insulation in the ceiling. Therefore, the best way to minimize ice dams is to add insulation to minimize warm air leaking into the attic. In addition to this important step, adding attic vents can also reduce the chance for ice dams.

For more information, visit www.fpl.fs.fed.us



Questions?

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Would you Believe...

A mature, healthy sugar maple tree produces about 2 tons of sugar through photosynthesis during a growing season? Scientists can replicate photosynthesis in the lab. However, the process is incredibly slow and requires a lot of energy and high tech equipment. During the time the maple tree is producing 2 tons of sugar, a scientist would produce less than a gram!

Source: LEAF: The Wisconsin K-12 Forestry
Education Program



“New” Floor Made From 60-Year-Old Army Barracks Addresses Many Problems

The newest addition to the research-demonstration house at the Forest Products Laboratory (FPL) is also the oldest.

FPL’s carpenters have installed a wood floor in one of the house’s four bedrooms using boards that had served for some 60 years as exterior siding on a WW II-era barracks building on the Army’s Ft. Ord base in California. The layers of old paint were removed, and the boards were machined to a standard tongue-and-groove flooring profile of five-eighths inch thick and 3 and 1/8 inches wide.

“The floor is significant because it provides one answer to the question of what to do with the millions of board feet of high-quality lumber that could be recovered from buildings scheduled for demolition on dozens of military bases around the country,” says Robert Falk, research engineer at FPL.

The standard procedure for removing unneeded buildings is to demolish them and dispose of the material in landfills. But that has drawbacks.

“Most of these military buildings were constructed during the decades of old-growth timber harvest and contain high-quality wood largely unavailable from any other source. It is a huge waste to simply throw away this lumber,” Falk said. “Also, the reuse of these materials helps conserve our natural resources, maintain carbon sequestration, and ease harvesting pressure on our existing forest resource.”

And sending material to landfills is expensive. According to Army researchers, a typical two-story barracks produces about 400 tons of scrap, and tipping fees at a landfill can run from \$30 to \$90 per ton, not counting transportation.

Falk has been working with the Army, Habitat for Humanity, the Environmental Protection Agency and other organizations to explore the possibility of “deconstructing” unwanted buildings. In deconstruction, a building is dismantled in such a way as to preserve the lumber and other components for reuse. Without deconstruction, thousands

of unwanted buildings on old military bases, with more than 200 million board feet of valuable old-growth lumber, would end up in landfills.

Falk seeks to encourage deconstruction by finding “high value” uses for the reclaimed lumber, thereby making it possible to recoup some of the costs of deconstruction.

“Flooring is certainly an appropriate use,” Falk said. “The old Douglas-fir being evaluated as flooring is tight-grained and knot-free, making it suitable for low-traffic areas. New flooring of this quality would cost several dollars per square foot.”

In addition to his work on flooring, Falk is developing grading standards for used lumber in structural applications

The research-demonstration house was built two years ago (*see NewsLine, vol. 1, number 1, Winter 2002*) in a cooperative effort by FPL, APA-The Engineered Wood Association, and the Southern Pine Council, to demonstrate proper building techniques and new building technologies. The house continues to be used for research by FPL. The floor can be seen as part of the regularly scheduled public tours of the house. ♪

“Wheelchair-friendly” Surface Material *(continued from page 2)*

(unstabilized) EWF, which is on top of a layer of stone and landscape fabric to ensure good drainage. On a beach path at another park, the prototype surfaces are laid directly on the sand.

The field test is expected to reveal which adhesive binder—polyurethane or latex—performs best under real-use conditions.

The research has been partially funded by the U.S. Access Board, an independent federal agency devoted to accessibility for people with disabilities.

Technical reports describing FPL research into improved engineered wood fiber (and many other topics) are available on FPL’s website: www.fpl.fs.fed.us.





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Evergreen Magazine Features FPL

The title of the latest issue of Evergreen Magazine is “Giant Minds, Giant Ideas: The USFS Forest Products Laboratory at Madison, Wisconsin.” The 16-page publication highlights many aspects of the Lab, from its history dating back to the early days of the Forest Service to the work of today involving small-diameter timber and rural businesses. For a copy of this issue, please contact the Forest Products Laboratory.

