Forest Products Laboratory

NewsLine

Volume 4, Issue 1 Winter 2005

In This Issue

Making 8 + 1 = 10

By George Couch, Public Affairs Specialist

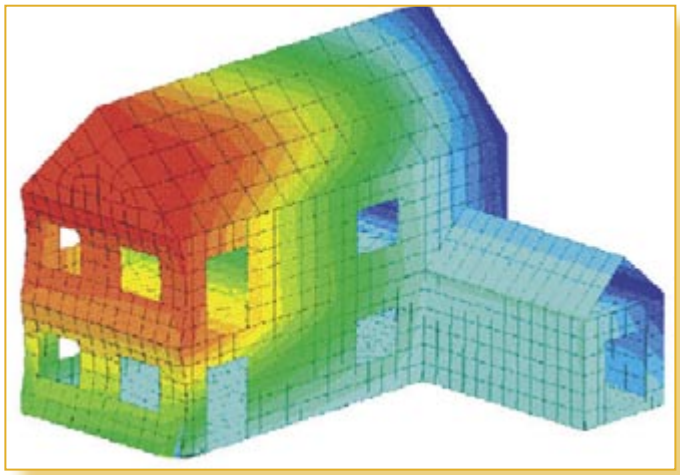
The whole is greater than the sum of the parts. That's the general idea behind joint efforts such as partnerships and coalitions. Such efforts have borne fruit at FPL. Since its early years, FPL has worked closely with industry, whether with the railroads to increase the useful life of railroad ties, or with the pulp and paper industry, or with the home-construction industry. Among the people who benefit from this special math are those who own, buy or build houses . . . and those who pay for research through their taxes.

Home construction is an important part of the U.S. economic engine. Americans will have paid some $250 billion for the 1.1 million single-family homes built this year. Homes constitute the single largest investment most families make; total investment in homes by American families is nearly $9 trillion, according to the National Association of Home Builders.

FPL has been a leading center of research related to home construction and maintenance practically since its founding in 1910. Research findings from FPL have led to building codes, engineering standards, and new products and procedures.

In recent years, issues such as mold, durability and new building products and technologies

(continued on page 4)



In research at North Carolina State University, a computer model shows hurricane-force wind loads on a wood-frame house. **(NCSU photo)**

BLM, FS Team Up to Fight Spread of Invasive Tree Species

By George Couch, Public Affairs Specialist

The Interior Department's Bureau of Land Management (BLM) has joined forces with the Department of Agriculture's Forest Service to find constructive uses for saltcedar, an aggressive tree species that devastates wildlife habitat and ecosystems on more than a million acres of rangeland in the southwestern United States. The high cost of removing saltcedars and the lack of a market for the removed trees has hindered efforts to control the tree's spread.

(continued on page 2)

BLM and FPL Team Up To Fight Invasive Trees

(continued from page 1)

BLM Director Kathleen Clarke (left) and FPL's Craig Clemons examine an extruded board made from plastic and saltcedar composite material.

Also known as tamarisk, saltcedars deplete surface water and groundwater and are believed to increase the salinity of soil, making it inhospitable for native plants. A single saltcedar tree can consume up to 300 gallons of water per day and produce up to 500,000 seeds per year. The seeds establish themselves aggressively along ecologically significant stream corridors, where they crowd out native vegetation, depriving wildlife of the nutrition provided by indigenous trees.

In recent years, however, FPL researchers have developed techniques for combining wood with plastic to make composite materials that can be used for a variety of purposes, such as outdoor furniture, signs, and decking lumber. (See *NewsLine, Spring 2004, vol.3, issue 2.*) As part of the interagency project with BLM, FPL researchers such as Drs. Craig Clemons and Nicole Stark are expanding their work with saltcedar. If markets can be created for these ecosystem-threatening trees, it could help subsidize the cost of their removal.

In November, BLM Director Kathleen Clarke visited FPL and watched as the researchers produced boards made of a saltcedar-and-plastic composite material. The wood-plastic boards will be tested to evaluate their suitability for use as house siding.

NewsLine Team: Gordie Blum, Jim Anderson, Judy Patenaude, George Couch, Rebecca Wallace and Bill Ireland

Published quarterly by USDA Forest Service Forest Products Laboratory, One Gifford Pinchot Drive, Madison, WI 53726–2398. Articles may be reprinted provided credit is given to the Forest Products Laboratory and **NewsLine.** To receive this newsletter electronically or to be removed from our mailing list, write Public Affairs Director Gordon Blum at the address above or at gblum@fs.fed.us or call Forest Products Laboratory at 608–231–9200.

Check out our website at http://www.fpl.fs.fed.us

Accessible Playground Surface Attracts Attention, Praise

Students and teachers at the H. Winship Wheatley Early Childhood Center in the Washington, D.C., suburb of Capitol Heights, Md., showed their delight and gratitude for a new wheelchair-friendly safety surface beneath the swing set in their playground. The playground area, the first demonstration site for accessible engineered wood-fiber surfacing material developed by FPL researcher Ted Laufenberg and others, was opened with a ribbon-cutting ceremony in October. The surface, a mixture of wood chips and a polyurethane binder, provides cushioning to protect children in case of falls while providing the stability needed to maneuver wheelchairs and other mobility aids. (See *NewsLine, Winter 2004, vol.3. issue 1.*)

Thanks to a new, wheelchair-friendly playground surface developed by Forest Products Laboratory researchers, youngsters at the H. Winship Wheatley Center near the nation's capital can enjoy their new swings.

Forest Service Deputy Chief for Research and Development Ann M. Bartuska participated in the ceremonies, telling the group that "This is one of the best things, to see our research put into a product that someone can use."

Public interest in the material has been high. FPL has received numerous phone calls from representatives of schools, parks and day-care centers who had seen a newspaper story about the Wheatley Center playground and are interested in using woodchips. The article originally appeared in The Washington Post and has since appeared in papers throughout the country. After reading about the project in the Duluth News Tribune, one lady sent a note to Laufenberg and the composites team, saying in part, "This is one of the best stories I have heard about government in action—you must feel so good to be helping these children . . ." ☙

Darby Biomass Project Earns Kudos

The collaborative effort that led to the successful implementation of a biomass-fueled heating system for the Darby School District in Montana was one of 23 projects nationwide to receive a Rural Community Assistance Award from Forest Service Chief Dale Bosworth in November. The heating system burns wood chips, which can come from sawmill waste or from the "slash" created during forest-thinning projects. The school district reports that the biomass system has saved them nearly 70 percent in fuel costs compared to their previous oil-fired system. Collaborators on the project included: the Bitterroot National Forest, the State and Private Forestry Technology Marketing Unit at FPL, the Bitter Root Resource Conservation and Development Area, Inc., and Darby-area timber supplier Stan Krueger. ☙

Coordinating Research

(continued from page 1)

have raised the visibility of housing research and motivated other government agencies and laboratories, as well as industry groups and academic researchers, to increase their housing research activities.

In 1999, FPL established the Advanced Housing Research Center (AHRC) as an organizational umbrella to prioritize and coordinate the lab's research activities that relate to new and existing housing.

"The AHRC also permits a strategically managed look at research being done outside the walls of FPL but that might be related to our work," explains Mike Ritter, assistant director of FPL in charge of Wood Products Research and head of the AHRC.

Initially, the AHRC's external focus was on federal agencies and industry trade associations. But in 2002, the AHRC joined a small group of university researchers in establishing the Coalition for Advanced Housing and Forest Products Research (CAHFPR). The coalition assesses national and regional research needs, seeks grants and other funding and allocates projects and funding to its members.

"The university-based housing research programs extend and strengthen FPL's core housing research and enhance the transfer of technology and information," Ritter said.

The university members and their principal housing research areas are:

- Mississippi State University—biodeterioration, wood preservatives, wind resistance, and housing for southern climates.
- University of Arizona—resource efficiency (water, energy), small-diameter round timber utilization, and housing for southwestern climates.
- University of Minnesota—moisture control, affordable housing, envelope performance, and housing for northern climates.
- University of North Dakota—chemical remediation, indoor air quality, and adhesives.
- North Carolina State University—wood connections and structural analysis, wood and moisture, lumber and composites processing, and deconstruction and disposal of wood.
- Iowa State University—bridges and other transportation structures, and utilization of secondary species.

Two schools are in the process of being added as full members of the coalition:

- University of Idaho—small-diameter timber, wood quality, and composites.
- University of California-Berkeley—fire, earthquake design, and wildland-urban interface.

"Our ability to coordinate with the university research projects enables FPL's researchers to access more disciplines and expertise," Ritter says. "The explosion in scientific knowledge and the expanding range of topics that need to be studied make it impossible for one lab to do it all. But a lot of what they're doing at the universities relates to what we're doing at FPL. The coalition enables our researchers to establish relationships with the university researchers."

At the same time, the coalition strengthens the university programs. This helps guarantee a stream of graduates to continue research as older housing experts

in industry, government and academia prepare to retire.

"The coalition allows us in the universities to develop long-term partnerships with FPL researchers," said Prof. Dave Tilotta of North Carolina State University, one of the founders and currently president of CAHFPR. "The coalition allows us to tackle problems that we know will take years of study. Before the coalition, university researchers usually worked with short-term funding. With the coalition, we can map out a 10-year study plan and have confidence that funding will continue."

For an example, Tilotta points to a project at the University of North Dakota, where he taught before moving to North Carolina a year ago. "Following the catastrophic floods in 1997, people realized that heating oil and other potentially dangerous chemicals had permeated walls and foundations of homes. We launched an effort to find ways to remove the pollutants. This important project continues there with collaboration by FPL researchers. But the project will take years as they move it from the lab to field testing in actual homes."

"A key piece of the puzzle is a fundamental understanding of how chemicals get into wood, knowledge that also has applications in areas like adhesives, sealants and coatings," Tilotta said.

"Instead of each researcher applying individually for grants for each project, we can seek funding for a package of research," Tilotta added.

Terry Amburgey, Distinguished Professor of Forest Products at Mississippi State University and an avid supporter of CAHFPR, agrees with Tilotta. "In the past, there's been piecemeal research into housing by various agencies, labs and universities. CAHFPR is the first attempt to funnel that research through one point and to identify regional and national issues," he said.

"Our participation in the coalition enabled us to involve five departments—architecture, civil engineering, forest products, landscape architecture, and mechanical engineering—at Mississippi State in a single project. Working together, we've designed a durable house for a southern climate that would save an estimated 75 percent in annual energy costs.

Research at the University of North Dakota seeks to deal with chemical contamination of flood-damaged wood-frame houses. **(UND photo)**

The project wouldn't have been possible without the coalition," Amburgey said.

"This is a really efficient way to do R and D," Tilotta said. "I've been surprised and pleased at how well the concept of the coalition has been embraced by the universities and by officials in Washington. They perceive that CAHFPR brings together people with different backgrounds to work on a problem and that enhances the potential for success. And people in Washington with whom I've met appreciate CAHFPR's connection with FPL's AHRC. Among other things, such a connection facilitates dissemination of research findings to the public."

In Amburgey's words, "The ultimate beneficiaries of the coalition's work will be the American homebuyers."

ASK FPL

We get thousands of questions each year about wood and paper products. In each issue of NewsLine we print what we feel are some of the best. Here are two we recently received.

The paint on my siding is beginning to flake and peel. I have heard it may be caused by a condition called "mill glaze." What is mill glaze?

Many people believe that using dull planer blades in the milling process overheats the wood, bringing more water-soluble extractives to the surface and creating a hard, varnish-like glaze that can cause the failure of coatings on smooth flat-grained siding.

Researchers at FPL have tried to duplicate mill glaze in the laboratory. Despite a variety of attempts, they were unable to obtain a "glazed" surface. However, that does not necessarily mean that mill glaze cannot happen.

Researchers also investigated a number of reported mill glaze failures over a 3-year period. In all cases, the coating failures were readily explained by other causes, including raised grain, UV degradation of the surface prior to painting, insufficient thickness of the coating, improper surface preparation, and moisture-related problems. Whether or not mill glaze is a condition, clearly there are many factors that can contribute to the failure of coatings on wood.

I love to use spalted wood for turning bowls, but it isn't always easy to find. Is there any way to produce spalted wood on my own?

The decorative, colorful appearance of spalted wood is caused by certain white-rot decay fungi. The biology and taxonomy of many decay fungi are well known, but the art of creating spalted wood is still developing.

Following are some factors to take into consideration when attempting to produce spalted wood. Use this information to develop your own techniques, and be sure to take careful notes so that any successful methods can be duplicated.

Temperature: Wood decay slows as the temperature cools. Below 50°F, the decay process is very slow. As temperatures drop further, fungi lay dormant.

Moisture: The moisture content of wood must be about 30% for decay, and thus spalting, to occur. Freshly cut wood has a moisture content of about 40%, so preventing the wood from drying out is all that is needed. For example, it could be kept in a plastic bag. Wood that is not freshly cut needs to be moistened by rain or kept in contact with wet soil. Wood can be too wet for some types of decay, so avoid soaking the wood.

Food: Decay fungi eat wood but can be "fed" to increase growth. Sugar is an ideal food, but very high levels can be toxic to fungi. Also, encouraging the wrong type of fungal growth is a risk.

Time: Be patient. It can take months or even years for spalting to occur. However, if wood is left to decay for too long, it may become too deteriorated to use.

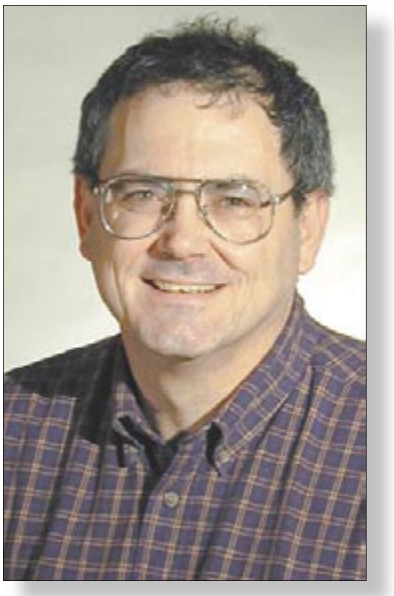
For more information on these subjects, please visit our website at www.fpl.fs.fed.us

FPL Researchers' Work Recognized

By George Couch, Public Affairs Specialist

Two FPL researchers received special recognition from professional organizations in recent months. Research Chemist Kenneth Hammel has been elected a Fellow of the American Association for the Advancement of Science by the association's policy-making council. Hammel, who is also USDA associate professor in the Dept. of Bacteriology at the University of Wisconsin-Madison, was cited for his "outstanding contributions to understanding biodegradative processes produced by microbes and for the discovery of new mechanisms involved in fungal wood decay." Hammel, who holds a Ph.D. degree in comparative biochemistry from the University of California-Berkeley, has been studying how certain fungi cause wood to decay—a vital process in forest ecosystems but the cause of extensive damage to houses and other wood structures.

Supervisory Research Wood Scientist Jerry Winandy was elected a Fellow by the International Academy of Wood Science in recognition of his contributions to his field. Winandy, who holds a Ph.D. degree from the Department of Wood Science and Engineering at the State University of Oregon at Corvallis, has authored or co-authored more than 120 technical papers. A two-time winner (with Dr. Patricia LeBow of FPL) of the Forest Products Society's L.J. Markwardt Award, he was also a co-recipient (with FPL's Susan LeVan-Green and Robert Ross) of the USDA Superior Service Award for Research. As project leader of FPL's Performance Engineered Composites unit, Winandy leads the team's research and development on sustainable bio-composite materials. He is also an adjunct professor in the Dept. of Bio-based Products at the University of Minnesota in St. Paul.



Ken Hammel (top) and Jerry Winandy

Questions?

Contact us at
Forest Products Laboratory,
One Gifford Pinchot Drive,
Madison, WI 53726

http://www.fpl.fs.fed.us

or write
mailroom_forest_products_laboratory@fs.fed.us

…

We can also be reached
by telephone at
608-231-9200

…

TDD
608-231-9544

FAX
608-231-9592

Forest Products Laboratory

NewsLine

Published Quarterly by

USDA Forest Service
Forest Products Laboratory
One Gifford Pinchot Drive
Madison, WI 53726-2398

Chris Risbrudt
Director

Comments, questions, concerns?

We at NewsLine want to do our best to make this a useful publication for you. If you like our content, have ideas for improvement, or simply disagree with something you read here, let us know by e-mailing me at gblum@fs.fed.us, or by telephone at 608-231-9325.

Also, if you are in Madison, Wisconsin, stop by for a tour of the Forest Products Laboratory. Public tours are conducted Monday-Thursday at 2 p.m.

If you have a group, or would like to know more about some specific topics, please make arrangements in advance by calling 608-231-9200. And if you can't come see us, check out our 10 minute overview video "Conserving Our Forests Since 1910" on our recently revamped website at www.fpl.fs.fed.us