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# Wood Pallets Wasted No More

*A public partnership strives to cut down on wood waste and uses pallets as its springboard to a new hardwood flooring enterprise.*

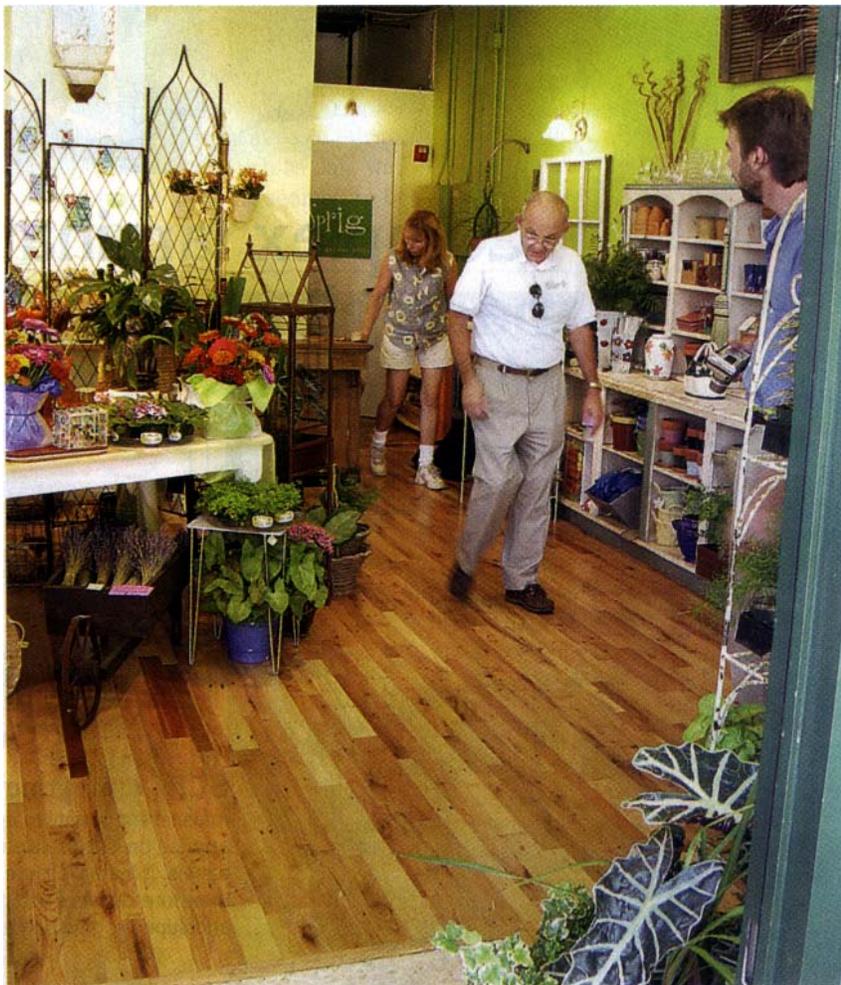
**BY J.D. PILAND**

A consortium of national and Southeast regional agencies took almost two years perfecting a new use for discarded wooden pallets. And as of the beginning of July, Oaks Unlimited of Waynesville, NC, became the first company to employ the pallet-to-hardwood flooring process.

Wooden pallets like the ones on the right are now being used to produce high-end hardwood flooring. A partnership of several government, academic and private agencies came up with the idea to help reduce wood



**Test runs for producing the flooring from pallets were completed at North Carolina State University's Hodges Wood Products Laboratory. Among the pilot project installations was a demo floor at a flower accessories shop in Asheville's Grove Arcade public market.**



"It is a product that has a good potential and a good story to it," says Joe Pryor, owner of Oaks Unlimited, a hardwood lumber processor. "We have always been involved in preserving our resources, and we wanted to get the most we can out of them."

The desire to preserve resources — although still wasting far more than necessary — is what drove the U.S. Department of Agriculture Forest Service to explore the options of wooden pallets. In fact, in North Carolina alone, more than 300,000

## PALLETS TO FLOORING Increasing Productivity

tons of wooden pallet waste ends up in landfills each year. That amount is about equivalent to the weight of water in 96 Olympic-sized pools.

Even more staggering is that the South produces 75 percent of the nation's wood waste. Phil Araman of the USDA Forest Service says 38 percent (about 4.5 billion board feet) of the country's hardwood lumber is used in pallet manufacturing, which makes it the largest use of such lumber. With such a large amount — and the fact that most pallets are used for logistics, then trashed — landfills fill up quickly. The Forest Service adds that pallets total 2 percent, or 170 million units, of all municipal solid waste, and 3 percent of landfill construction and demolition waste.

With that in mind, Araman based at Virginia Tech University, headed the initiative that also included involvement by academia, government and private businesses to determine what products could be produced, as well as commercialized, from these discarded wooden pallets.



**NCSU students helped complete test runs to determine the viability of turning pallets into high-end flooring.**

The consortium came up with the high-end hardwood flooring idea.

Recycling of wooden pallets, mostly as repaired or rebuilt pallets, already is a \$3.5 billion industry, according to the Forest Service. However, in the end, most of the wood from the used pallets ends up as boiler fuel, animal bedding or mulch. Because a large portion of pallets are made of hardwoods such as oak, walnut and maple, flooring seemed to be an appropriate choice.



## PALLETS TO FLOORING *Increasing Productivity*

Urs Buehlmann, assistant professor of Wood Products at North Carolina State University in Raleigh, says the pallet-to-flooring project was devised to add a new dimension to the 'woodworking industry and, better yet, to gain profits.

"We want to capture the most value from these used pallets, and convert them into building components and building materials such as flooring, paneling, furniture, cabinets and similar products," Buehlmann says. "The pallet-to-flooring project expands on existing research by the U.S. Forest Service and represents a multi-disciplinary effort to build a commercially viable, sustainable and successful pallet flooring enterprise."

Involved with the program are NCSU's Department of Wood and Paper Science, the Land-of-Sky Regional Council, based in Asheville, NC, the U.S. Environmental Protection Agency, the North Carolina Division of Pollution Prevention, Land-of-Sky's Waste Reduction Partners (WRP), and several manufacturers and recyclers in North Carolina. WRP conducted experiments and cost analysis with the Forest Service after receiving a grant in 2003.

The EPA and the Community and Rural Development Program funded pilot projects that led to installation of flooring in some commercial properties, the overall goal of the pro-



gram. A demo floor has been installed in a flower accessories shop in Asheville's Grove Arcade public market.

"This project allows for woodworking industry enterprises where wood doesn't grow," says Dave Lowles, WRP project manager.

Initially, the project was widely en-

**A stack of deckboards await processing during test runs conducted at Hodges laboratory.**

### *Want to Get Involved?*

Those companies with a large number of pallets to be recycled should contact a pallet manufacturer or rebuilder, which can often be found in the yellow pages under pallets, says Dave Lowles, project manager with Waste Reduction Partners. For those with smaller amounts, the local solid waste coordinator, often in the county government, may be able to direct you appropriately, Lowles adds. Firms interested in making pallet flooring may reach Lowles by phone at (828) 698-4926.

# Increasing Productivity PALLETS TO FLOORING



Some of the flooring is harvested from pallets taken from landfills.

Below: Imperfections have proven to be attractive drawing points. Pallet deckboards, before (at left) and after processing.



Hardwood flooring experts review several stain options during a focus group to determine the market for pallet flooring.



dorsed by pallet recyclers. At the time, the economy was at a low point and the demand for rebuilt pallets was low, leaving a surplus of pallet boards in the industry.

However, with the economy improving again, recyclers are providing services to their traditional rebuilt pallet customers, resulting in a shortage of used boards for flooring applications. WRP has recently applied for a grant to develop a pallet harvesting program aimed at recovering more of the wood that escapes the traditional pallet recycling industry. At the moment, production goals are set at 25,000 square feet a year.

## Dual Purpose

The project team and the manufacturers' main goal is to produce green materials, while making sure the environment is not polluted or trees chopped down needlessly.

"Profit is the predominant driver for all recycling enterprises," Buehlmann says, "including rubber, vinyl, glass, metal, paper and wood. The best way to get material out of the waste stream is to find the potential value in it and exploit it for profit."

Buehlmann adds that wood floor-

ing is relatively simple to manufacture, and has proved profitable in the wood-working industry at \$1.7 billion a year in business. "It's often made from the same wood used in pallets, and the region already has the infrastructure to produce and market flooring," he says.

In order to get manufacturers and recyclers interested in pallet flooring, the project team devised a business plan to identify markets and calculate costs for production and installation. Lowles headed the market study, which included input from architects, interior designers, flooring manufacturers, flooring marketers and installers and prospective builder customers. Some of the companies involved with the project were American Floor Finishing Co., Kings Kountry Pallets, Vintage Hardwood Flooring and Oaks Unlimited.

Lowles says they responded well, saying there would be a sizable market of those interested in ecology and the "green" movement.

"Our market study showed that the nail holes are a mark of recycled authenticity, and that recycled wood is of great interest to a number of custom builders and end customers alike," he says. "The marketing of this flooring is

therefore directed at designers, architects and owners who are concerned about using natural resources.

"It sells on its looks and the fact that it is a recycled or reclaimed product," Lowles adds.

In addition to the resource recovery and profit potential, the project may help create jobs in an area struck hard by the economy. Buehlmann says there is more demand than supply, which helps validate the venture.

## First Out of the Gate

Earlier this year, Oaks Unlimited became the first company to join the pallet-to-flooring enterprise.

Pryor says he decided to expand his company's capabilities when he read an article about the pallet-to-flooring operation and became interested in the concept. As a result, Oaks Unlimited has received a grant from the state to help start up the operation.

While Oaks Unlimited began production early this month, Pryor and company have been working on the setup for a year. In that time, Pryor says pilot runs have been well received by pretty much everyone, including designers, architects, end customers and the media.

"The interest in the product has been pretty high," he says. "I'm not advertising the product yet because we haven't fully started production yet, but word of mouth is getting around."

Buehlmann and Araman went to Oaks Unlimited and explained the pallet-to-flooring conversion process, demonstrated test runs, provided samples and helped set up the process, Pryor says.

## Increasing Productivity **PALLETS TO FLOORING**



"It's really their project, their work," Pryor says. "They've been very helpful and I'm trying to take their work into production.

"It has been a long process," Pryor adds. "We have been working for a year doing pilot runs and installing the equipment. We're just trying to walk before we run."

**Oaks Unlimited became the first company to employ the pallet-to-flooring operation.**

So far things seem to be working out well. Pryor says the transition to flooring production has been easy. Oaks Unlimited purchases the pallet deck boards from pallet recyclers, Pryor says. The pallets are dismantled and the nails are removed at the recycler. The boards are then shipped to Oaks Unlimited for further processing.

All processing, except fishing, is done in-house: removing the middle nails, grading, kiln-drying, ripping, moulding, the tongue-and-groove, end-matching and regrading.

Oaks Unlimited already had the planer and rip-saws to produce the flooring blanks, so all that needed purchasing was a Weinig six-head moulder and an end-matcher. Pryor has hired only one person, who has been trained to run the moulder, for the new operation.

Additional equipment includes: a bandsaw with a takeaway and sorting table, a saw to trim off nails, a pneumatic nail removal tool — which was developed through Bildon of Hendersonville, NC, during the project—a dry kiln and a router with a one-way sliding table. It was determined that a bandsaw dismantler was the most appropriate machine, compared to a disc-type dismantler, because it does not leave cracks or splinters in the wood.

The pre-finished flooring is packaged for shipping by a third-party company.

Installation of the flooring has the same procedures and guidelines as any other flooring. While most floorboards are  $\frac{3}{16}$ -inch or  $\frac{1}{4}$ -inch thick, the pallet flooring is  $\frac{3}{8}$ -inch thick. Lowles predicts that the flooring could be sold at \$5 a foot, not including installation.

The flooring is still comparable to other high-end flooring in regards to price and cost of production. Currently, Lowles says the flooring is available in three standard flooring finishes (chosen during the focus group), with diamond and aluminum oxide particles suspended in an advanced UV-cured urethane as the final coat for maximum wear resistance. ◆

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