

New wood technology may offer hope for struggling timber

December 30 2016, by Gillian Flaccus And Phuong Le



In this Nov. 11, 2016 photo, John Redfield, chief operating officer of D.R. Johnson Lumber Co. in Riddle, Ore., poses for a photo as he shows an example of a cross-laminated timber, or CLT, panel that underwent a flammability test. D.R. Johnson is one of just two companies in the United States currently able to produce CLT panels. (AP Photo/Gillian Flaccus)

John Redfield watches with pride as his son moves a laser-guided precision saw the size of a semi-truck wheel into place over a massive panel of wood.

Redfield's fingers are scarred from a lifetime of cutting wood and now,

after decades of decline in the logging business, he has new hope that his son, too, can make a career shaping the timber felled in southern Oregon's forests.

That's because Redfield and his son work at D.R. Johnson Lumber Co., one of two U.S. timber mills making a new wood product that's the buzz of the construction industry. It's called cross-laminated timber, or CLT, and it's made like it sounds: rafts of 2-by-4 beams aligned in perpendicular layers, then glued—or laminated—together like a giant sandwich.

The resulting panels are lighter and less energy-intensive than concrete and steel and much faster to assemble on-site than regular timber, proponents say. Because the grain in each layer is at a right angle to the one below and above it, there's a counter-tension built into the panels that supporters say makes them strong enough to build even the tallest skyscrapers.

"We believe that two to five years out, down the road, we could be seeing this grow from just 20 percent of our business to potentially 60 percent of our business," said Redfield, D.R. Johnson's chief operating officer. "We're seeing some major growth factors."



This Nov. 15, 2016, photo shows a piece of cross-laminated timber, or CLT , in Portland, Ore. CLT is made up of 2-by-4 beams laid out in perpendicular layers that are then glued together to make giant panels. (AP Photo/Don Ryan)

From Maine to Arkansas to the Pacific Northwest, the material is sparking interest among architects, engineers and researchers. Many say it could infuse struggling forest communities like Riddle with new economic growth while reducing the carbon footprint of urban construction with a renewable building material.

Visually blemished wood that currently goes to waste can be used in the middle layers of a CLT panel without sacrificing strength or look. Supporters say it could bring sawmills back online while improving forest health through thinning dense stands and making use of low-value wood and local tree species. Trees as small as 5 inches in diameter at the top and those damaged by pests and wildfire are prime candidates.

But challenges remain before CLT becomes as common in the United States as it is in Europe and Canada, and not all builders are sold.

U.S. building codes generally place height limits on all-wood buildings for safety reasons, though a special committee of the International Code Council is investigating potential changes to address the use of CLT in such structures. And research is still underway on critical questions of how these buildings withstand fire and earthquakes in high-seismic regions.



In this Nov. 15, 2016, photo, Lever Architecture founder Thomas Robinson poses for a photo in his company's all-wood headquarters building, built with cross-laminated timber, or CLT, in Portland, Ore. Lever Architecture is about to break ground on a 12-story all-wood building, using CLT, in Portland's Pearl

District that the company says will be the tallest all-wood building in the world in a seismic zone and the tallest all-wood building in North America. (AP Photo/Don Ryan)

Building codes in Oregon allow cutting-edge designs using new technology like CLT in some cases, but only after rigorous testing and an intensive approval process.

That can make such projects cost-prohibitive, said Peter Dusicka, an engineering professor at Portland State University who's been researching the strength of CLT panels.

"The early adopters are looking at it and seeing it as a good opportunity," but before CLT can take off, there will have to be more examples to get people excited and more mills producing it, said Thomas DeLuca, professor and director of University of Washington's School of Environmental and Forest Sciences.

SmartLam in Montana is the other company producing CLT panels.



This Nov. 15, 2016, photo shows Lever Architecture headquarters, a four-story all-wood building built using cross-laminated timber, or CLT, in Portland, Ore. CLT is made up of 2-by-4 beams laid out in perpendicular layers that are then glued together to make giant panels. (AP Photo/Don Ryan)

This spring, cross-laminated timber will get its ultimate test in the United States when a Portland architectural firm breaks ground on a 12-story wood building in the city's trendy Pearl District. It would be the tallest all-wood building in the world constructed in a seismic zone and the tallest all-wood building in North America.

An all-wood building in Norway is taller, but is not in a seismic zone. An 18-story wood building in British Columbia is also taller, but rests on a traditional concrete core.

Lever Architecture is using \$1.5 million it won in a tall wood building

competition sponsored by the U.S. Department of Agriculture and the softwood industry that's intended to promote CLT as a domestic building material. A 10-story residential tower in New York City also got \$1.5 million.

The Portland firm has been working with scientists at Portland State University and Oregon State University to test the panels' strength by subjecting them to hundreds of thousands of pounds of pressure. They are also testing various methods for joining the massive panels together.



In this Nov. 15, 2016, photo, Lever Architecture founder Thomas Robinson looks over artist renderings in Portland, Ore., of a 12-story all-wood building that his firm is working on to be built in Portland's trendy Pearl District. Construction is set to begin soon using cross laminated timber, or CLT, that will make the structure the tallest all-wood building in the world in a seismic zone and the tallest all-wood building in North America. (AP Photo/Don Ryan)

"We're looking at creating a resilient design, a design that could withstand a major earthquake—basically the earthquake that we all worry about—and be repaired," said Thomas Robinson, founder of Lever Architecture.

The results of the structural testing in Oregon will be made public for other U.S. designers, bringing the material one step closer to the mainstream, Dusicka said.

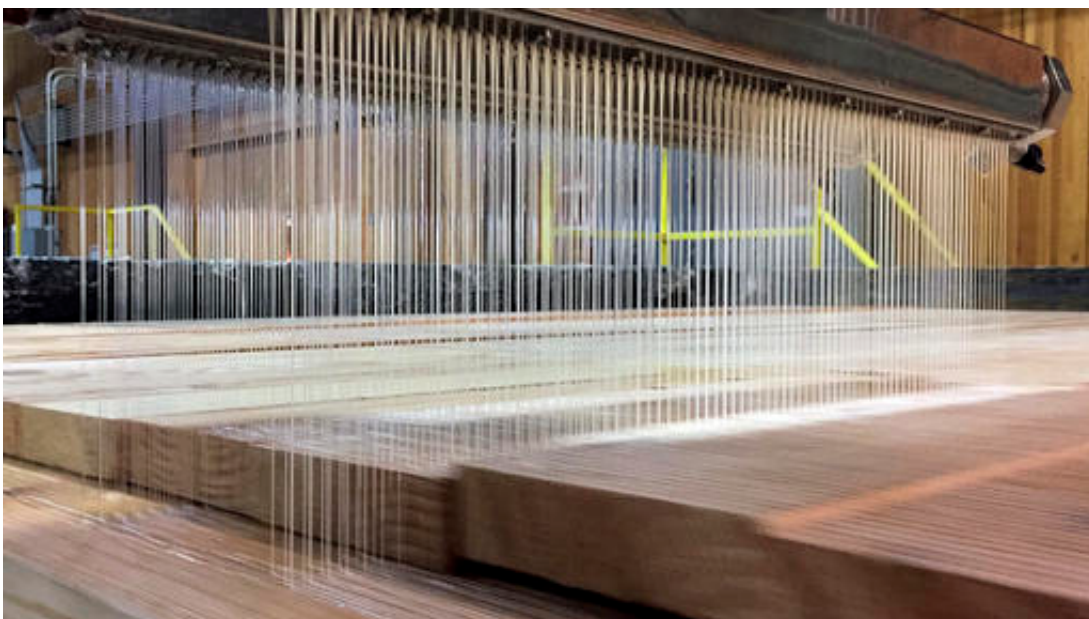
Back in Riddle, a tiny town tucked in the mist-shrouded forests of Douglas County, Redfield is once more excited about timber in a place where logging used to be king.

The 125-employee company has been inundated with visitors from around country interested in touring their new CLT business expansion.

Watching as layers of beams whirred through a glue machine, Redfield said: "We're able to take [wood](#) that may be turned into chips or pulp and turn it into a product that's pretty exciting."



In this Nov. 11, 2016 photo, a logging crew harvests new timber on private land near the headquarters of D.R. Johnson Lumber Co., in Riddle, Ore. D.R. Johnson is one of just two companies in the United States currently able to produce cross-laminated timber panels, or CLT. (AP Photo/Gillian Flaccus)



In this Nov. 11, 2016 photo, a machine applies glue to the next layer of a panel of cross-laminated timber, or CLT, in the production facility of D.R. Johnson Lumber Co., in Riddle, Ore. D.R. Johnson is one of just two companies in the United States currently able to produce CLT panels. (AP Photo/Gillian Flaccus)



In this Nov. 11, 2016 photo, a forklift driver moves a newly assembled panel of cross-laminated timber, or CLT, to a stack in the production facility of D.R. Johnson Lumber Co., in Riddle, Ore. D.R. Johnson is one of just two companies in the United States currently able to produce CLT panels. (AP Photo/Gillian Flaccus)

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