

# Oregon pushes for wooden skyscrapers to revive timber industry



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**By Elliot Njus and Molly Harbarger**

It's rare that a governor shows up to celebrate a new condo tower.

But this one's made of wood, and that's a bigger deal than it seems.

Gov. Kate Brown was on hand the day Carbon12 in North Portland reached its full eight stories and became the nation's tallest wood building. The feat was made possible by cross-laminated timber, wood engineered to have the strength of steel.

The distinction won't last long. Another Portland development, an 11-story high-rise made of the same wood product, is expected to secure a building permit within weeks and start construction this summer.

For Oregon, cross-laminated timber represents a chance to revive the moribund wood products industry, restoring logging and manufacturing jobs in rural communities — where the state's natural resources give it a clear advantage over foreign competitors.

The state is investing hundreds of thousands of taxpayer dollars to promote CLT. Right now, only a handful of buildings in the U.S. have been built with it, and most are in Oregon.

But even as CLT presents an opportunity for the state, the nation's building codes are slow to endorse new materials, and industries that could lose sales to CLT aren't giving up market share without a fight.

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Driving south on Interstate 5 toward the small timber town of Riddle, the smell of mulch hits first. Wood planks sit stacked 10 feet high in lumber yards.

D.R. Johnson Lumber Co. is down Pruner Road, the second mill on the right. It has been cutting custom lumber since 1951.

Founder D.R. Johnson's investment in a glue laminating system early in 1967 proved prophetic, sustaining the company while others in the state crumbled to environmental, economic and political forces.

The mill is once again on the cutting edge. Valerie Johnson, daughter of the founder, dove into the opportunity to become the country's first and only CLT producer.

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Inside the mill, a machine cuts triangular joints into wooden boards, which are slathered with yellow glue and then heated to 180 degrees and pressed together into a panel.

The next layer goes on at a 90-degree angle — the "cross" in cross-laminated timber — and the process is repeated until the panel reaches the desired thickness. Then it's coated in plastic and set to dry.

The result is flexible but strong enough to span long distances without support beams.

The panels are built to exacting specifications based on the design of the building. Johnson has hired or trained staff to use computer design systems that simulate how each panel will fit together so the workers on the mill side can cut them within 1/16th of an inch.

They're flat-packed like Ikea furniture and shipped directly to a job site. In 2016, a D.R. Johnson truck left Riddle around 6 a.m. and pulled up to the construction site for a four-story office building in North Portland. Just four hours later — including a break for lunch — the first floor was finished.

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That building was Albina Yard, the first in the U.S. to use domestically sourced CLT for its structural system. It now houses offices for Lever Architecture, the building's designer.

That was followed by Carbon12, the condominium project that's nearing completion on North Williams Avenue just a few blocks away. That building, at 85 feet and eight stories, pushed the envelope of wood construction.

So eager were officials in Salem to see the project get underway that they urged developer Ben Kaiser to secure a building permit through the state, rather than the city of Portland.

Because Oregon building code doesn't account for tall-timber construction, designers must show through computer simulations and modeling that the building would be as safe as the construction types outlined in code. That approach adds costs.

Going to Salem for a permit unsurprisingly caused some jurisdictional friction, Kaiser said. City officials wanted a costly outside review of the design work — an understandable request, Kaiser said, given that Portland firefighters would have to respond to any emergency at the building.

"It's sitting right there. It's not sitting in Salem," he said, gesturing at the building. "Everybody was just trying to understand, because this has never been done before."

Therein lies the challenge. No U.S. building code exists for wooden towers higher than 85 feet, but that's not going to change until people start demonstrating it can be done safely.

"Theoretical work is fantastic," Kaiser said, "but only built structures will change an industry."

The next CLT structure will take an even bigger leap. Beneficial State Bank, the California parent of Portland's Albina Community Bank, plans to build Framework, an 11-story office and apartment tower in the Pearl District.

At 148 feet, it would take the title of tallest wood building from Carbon12.

"They're really building on each other," said Thomas Robinson of Lever Architecture, which is designing Framework.

The state is also reviewing that building's application for a building permit, which the developer, Project^, hopes to secure within weeks.

Framework would be treated as a high-rise under the state's fire code, which means it must be able to burn for more than two hours without collapsing. Robinson says testing conducted by a third-party nonprofit shows that CLT and glue-laminated timber can.

And while Kaiser bought CLT panels from a mill in Canada, where the product is slightly more common, the developers of Framework plan to source at least 50 percent of their wood from the United States.

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Last month, as Portland hosted the International Mass Timber Conference, the governor convened the summit focused on CLT and similar products, bringing together experts from around the state.

"Oregon's forests are a tried and true resource that may again be the key to economic stability for rural Oregon, expanding opportunity for communities hit hard by the decline of the natural resource economy," Brown told those gathered. "Mass timber presents a new opportunity for Oregon, an opportunity we are perfectly suited to take on."

Even in Europe, where CLT took hold earlier, it remains a niche product. But it's perhaps telling that the incumbent industries that supply material for high-rise construction are paying attention.

The National Ready Mixed Concrete Association has pushed back against cross-laminated timber, opposing subsidies to develop the industry and casting doubt on CLT's ability to resist fire and rot.

It fought off a Washington state bill that would have given tax incentives to producers of CLT products, and it ominously quoted the National Association of State Fire Marshals in press releases.

Contacted by The Oregonian/OregonLive, the fire marshals group said it didn't want to be seen as promoting one material over another.

"We just want to make sure that we're considering the safety factors and that we have a clear understanding of how this material will react under fire conditions," said Jon Narva, that group's spokesman. "We want to ensure the safety of the occupants and the firefighters who have to go into the building if there is a fire."

More testing has occurred since the concrete group weighed in, with promising results.

Lech Muszynski, an associate professor at Oregon State University's forestry school, was once a doubter for different reasons.

"My first thought was, 'This is a terrible use of timber,'" he said.

Then the technology evolved. Muszynski spent a sabbatical touring Europe to visit large and small CLT manufacturing plants. About 80 percent of all CLT is currently produced in a section of Alpine Europe that fits inside the square footage of Oregon. With the size of the state and the amount of wood on hand, he saw an easy sell.

Oregon has 30 million acres of forest land and a rich history in the timber trade and several mills still in production. Most of that is off limits to logging, but lush harvestable forests are filled with softwood trees perfect for CLT. And, the state has been looking for ways to boost the lagging rural economy.

Timber, once a main driver in the Pacific Northwest, once employed more than 80,000 in Oregon. But numbers began to dwindle in the 1980s. By 2012, employment had fallen to 30,000 according to the Oregon Office of Economic Analysis.

Unemployment in onetime timber-dependent counties is significantly higher than the rest of the state. While Oregon's unemployment rate sits at 3.8 percent, and the nation's at 4.5 percent, most of those counties still have jobless rates above 5 percent.

"For the first time in Oregon history, there is a tech venture Oregon is excited about and rural Oregon is in the perfect position to deliver," Muszynski said.

The state of Oregon, too, is sold on the idea, and it has devoted thousands of dollars to building an industry around CLT.

"We're ramping up quite a bit," said Nathan Buehler, the spokesman for state economic development agency Business Oregon. "We see it as a win for rural Oregon. There's opportunity to really grow in those communities and create jobs."

D.R. Johnson received an Oregon BEST grant of \$150,000, which helped build a manufacturing line. In May 2014, the company produced its first panel. By September, the first panels were installed at Western Oregon University in Monmouth.

At the University of Oregon, architecture students are designing projects with CLT and helping test their performance. Oregon State University, meanwhile, has formed a research center, the TallWood Design Institute around advanced wood technologies.

Thomas Maness, dean of OSU's forestry school, wanted a "value-added product" to reorient the school around -- something that makes the existing harvest more lucrative. He doubts the state's timber harvest will ever increase significantly, so students must learn new technical skills to boost their wages in the timber industry.

"I think it makes practicing forestry a higher value profession," Maness said.

Maness also hopes CLT will create jobs in the rural communities where many of his students grew up -- a goal long shared by state officials.

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Even on a weekday, it's hard to tell if the string of businesses that make up downtown Riddle are open or closed.

Nestled in one of the historic "hundred valleys of the Umpqua River" with plumes of white smoke rising around it in every direction from lumber plants, the town, with its patchwork of houses and trailers, a truck in each yard and a library open only two days a week, resembles the Appalachian towns with long-abandoned coal mines.

Here, more than 22 percent of families lived below the poverty line in 2015, a steep increase from 8.7 percent five years before.

Johnson, the mill operator, hopes cross-laminated timber will change all that.

"We're really convinced this is a real market," Johnson said.

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