ADVANCED WOOD PRODUCTS
OREGON LEADS INNOVATIVE MASS TIMBER MOVEMENT

Oregon Forest Resources Institute

FOREST TO FRAME

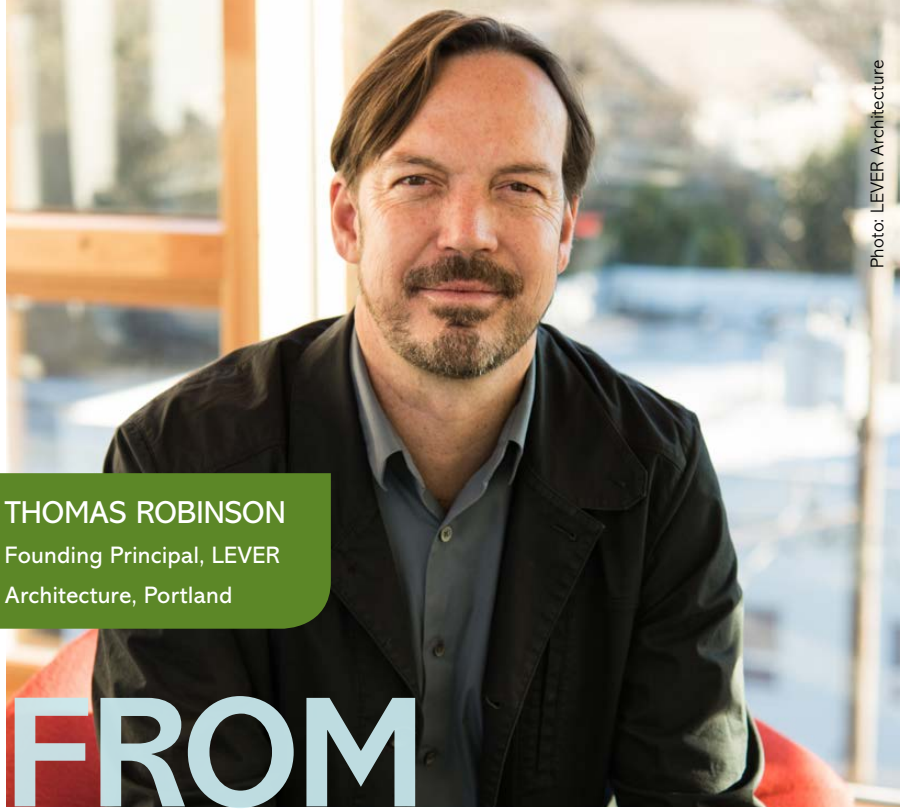


Photo: LEVER Architecture

THOMAS ROBINSON
Founding Principal, LEVER Architecture, Portland

FROM FOREST TO FRAME

Designing sustainable wood buildings

When I first started out in architecture, I primarily worked on museums and other institutional projects built with concrete and steel. After moving to Portland, I became interested in designing more structures using wood, the Pacific Northwest's iconic building material.

For a retail development in downtown Portland called Union Way, my firm collaborated with Collins, a Portland-based wood products company. We worked with the owner of the forest where the timber for the project was harvested, and oversaw the wood's purchase and milling. Each part of the process took place in Oregon.

Connecting directly with the people who were making the materials for a project resonated with me in the same way the farm-to-table movement has changed how we relate to our food. As a firm, we are very much driven by the ingredients – the materials – that go into constructing buildings. This "forest to frame" approach, as we call it, has led us to seek projects that are reshaping how people think about wood construction, including a planned 12-story timber tower in Portland.

The idea of harnessing the full potential of a renewable resource that helps sustain jobs in rural Oregon communities makes sense for many reasons. Wood is the only major building material that stores carbon, which is removed from the atmosphere during a tree's growth. Because of this, wood buildings serve as massive carbon storage units, helping combat carbon emissions that are accelerating climate change.

In Oregon, our forests produce some of the world's best timber, renowned for its beauty and strength. That timber comes from sustainably managed forests that are required by law to be replanted, so by building with wood we're really capturing its environmental benefits.

Some people are surprised by the movement to construct more apartments, hotels, condominiums and offices with wood. But using a natural material that sequesters carbon is merely an extension of a longstanding commitment among the architecture, engineering and construction communities to produce truly sustainable buildings.

Photo: Mackenzie

Photo: OFRI

RESHAPING SKYLINES

The promise of mass timber

MASS TIMBER CONSTRUCTION

Advanced wood products are expanding the possibilities for wood construction, to include multistory office buildings such as Clay Creative, left, and Karuna West in Portland.

When Emily Dawson first learned about cross-laminated timber (CLT), she knew it was perfect for the cantilevered wooden roof she'd envisioned for a visitor building at the Oregon Zoo.

"Once I realized what it was, I was even more interested in using a structural material that was, at that point, novel to Oregon," says Dawson, a senior associate with Portland-based architecture firm SRG Partnership Inc. "The product is so intuitive, so simple. It was a no-brainer."

CLT and other advanced wood products make it possible to construct mid-rise and even high-rise structures almost entirely with wood, with less environmental impact than traditional building methods. This use of wood for building also supports mill jobs in rural timber towns in Oregon and throughout the Pacific Northwest.

"The economic story is really compelling," Dawson says. "There's a really strong community here that's built up around wood, and it spans all the way from foresters to builders. I can't think of another material that does that."

Mass timber buildings are also just as safe as those constructed with concrete and steel, have a lower carbon footprint, and can be built more quickly and less expensively.

"Now, with wood, you can deliver a seven- or eight-story building for less cost," says Agustín Enríquez, an architect with Portland-based GBD Architects. "That's a game-changer."

While working for Vancouver, Wash.-based developer Killian Pacific, Noel Johnson, now a principal with Portland-based Cairn Pacific, led the development of several mass timber office buildings in the Portland area. He cites sustainability, economics and aesthetics among the reasons for choosing wood construction.

"Mass timber is an answer to multiple questions," he says. "That's why it's successful."

WHAT IS CROSS-LAMINATED TIMBER?

Cross-laminated timber, or CLT, is a type of advanced wood product made by layering lumber in alternating directions and bonding it together into large panels several layers thick. Currently, the largest CLT panels produced in the world are about 65 feet long and 20 feet wide. CLT panels typically range in thickness from 5 to 16 inches and are used to build walls, floors and roofs. Individual panels can be prefabricated with cutouts for windows, plumbing, electric and ventilation before being assembled into multistory buildings that otherwise might be built with steel and concrete.

Framework

Project: A 12-story high-rise containing retail space, offices and affordable housing

Location: 430 NW 10th Ave., Portland

Anticipated construction start date: Summer 2017

Anticipated construction completion date: Fall 2018

Developer: project^

Co-developer: Home Forward

Architect: LEVER Architecture

General contractor: Walsh Construction Co.

Structural engineer: KPFF Consulting Engineers

Fire, acoustic and sustainability engineer: Arup

Mass timber consultant: StructureCraft Builders Inc.

Construction: CLT resilient rocking wall core, glulam post-and-beam frame and CLT diaphragm

Rendering: LEVER Architecture

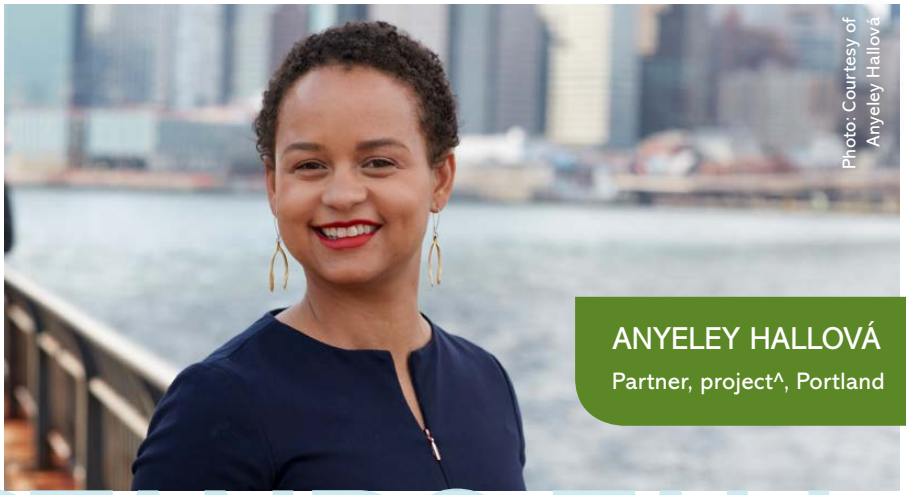
Rendering: LEVER Architecture

WOOD STANDS TALL

Socially and environmentally minded development

An overarching goal to produce a socially and environmentally responsible building is the driving force behind plans to construct the first high-rise in the United States made from wood.

Portland-based developer project^ conceived the Framework development to reflect the business ethos of Beneficial State Bank, owner of the property in Portland's Pearl District where the 12-story CLT building will be constructed. The bank works to promote social equity, economic opportunity and environmental responsibility.



ANYELEY HALLOVÁ
Partner, project^, Portland

"We explored how we could incorporate those values into a physical form," says Anyeley Hallová, a partner with project^. "The great part about using wood for its environmental value is that it also has economic benefits. We understand the connection between a low-carbon building material and the creation of new local wood products jobs."

When leaders at project^ began considering using CLT for the mixed-use building, the product was still relatively unknown in the United States. Just about the time they'd ruled CLT out because the tests to prove its safety in fires and earthquakes would be too costly, the U.S. Department of Agriculture, the Softwood Lumber Board and the Binational Softwood Lumber Council launched the U.S. Tall Wood Building Prize Competition. The national competition offered grant funding to aid the development of tall wood demonstration projects.

In 2015, competition judges selected Framework as one of two winning projects to each receive a $1.5 million award. The other winner was in New York City. The funding, earmarked for the research and testing required to obtain building permits, made it possible to reconsider CLT, Hallová says.

One aspect of the Framework proposal that gave it a winning edge was the aim to support rural economic development. Equally important was demonstrating how the building would be a climate change solution, Hallová says.

"We focused on the low-carbon story because the building sequesters carbon," she explains.

Her experience with Framework makes Hallová confident that CLT construction will take off. A stipulation of the Tall Wood grant requiring the testing results be made public will ease the path for developers to get future mass timber buildings designed, approved and built.

"That's the beauty – other projects will benefit from our work," she says.

EFFICIENT CONSTRUCTION

Prefabrication expedites the building process

Photo: OFRI

AARON BLAKE
Principal, Reworks, Portland

Aaron Blake has experienced firsthand how fast a CLT and glue-laminated timber (glulam) building goes up.

He's a principal with Portland-based design-build firm Reworks, the developer and contractor for Albina Yard. The four-story retail and creative office building in north Portland's Mississippi District is the first project in the United States to use domestically fabricated CLT for a building-wide structural system. Since completing Albina Yard in the fall of 2016, Blake says he has no regrets about deciding early in the planning process to use mass timber construction for the project.

"Everything went together really quickly," he says. "The mass timber frame lived up to the expectation of providing a very efficient building system."

Even though no one on Albina Yard's construction crew had ever worked with CLT, there wasn't a steep learning curve, Blake says. The CLT panels for the first floor took four hours to set in place, and by the time the crew was putting together the second, third and fourth floors, the same process took only two hours.

That kind of efficiency was the result of prefabricating each CLT panel, as well as the glulam posts and beams, specifically for Albina Yard. Computer modeling by Portland company Cut My Timber allowed the CLT supplier, Riddle, Ore.-based D.R. Johnson Wood Innovations, to custom-mill each individual panel. The panels were then labeled according to where they would go in the structure and loaded onto a flatbed truck at the mill in Riddle in reverse order of how they were to be installed.

Photo: LEVER Architecture

Photo: OFRI

Once the custom-made panels arrived at the project site in Portland, for the most part all the construction crew had to do was set them into place with a crane.

"We saved a lot of time by having everything pre-cut," Blake says.

LEVER Architecture, the Portland firm that's designing Framework, also designed Albina Yard. Constructing the smaller-scale office building first made it a perfect test case for the 12-story CLT high-rise, according to LEVER founding principal Thomas Robinson. "We've learned a lot," he says. "The details we developed for Albina Yard are helpful for Framework."

Albina Yard leased quickly with tenants who like the mass timber aesthetic and the use of locally made materials. One of those tenants is LEVER Architecture.

"We've been doing a lot of work with CLT and mass timber, and we wanted to be in a space where we could show people what that is," Robinson says. "We're having people visit from all over the country and the world."

Photo: Courtesy of Noel Johnson

BUILDING WITH MASS TIMBER

Kyle Warren, a senior project manager with Portland-based Turner Construction Co., admits constructing a mass timber building for the first time takes a bit of adjusting. But since helping oversee construction of Clay Creative, a mass timber office building in Portland's Central Eastside, he's a convert.

"As a contractor, we love wood. It has a nice feel to it, it's readily available and it's local."

Warren, who has since worked on other mass timber office projects in the Portland-metro area, says any initial hesitation general contractors may have about working with advanced wood products is easily overcome. Some advantages include expediting construction by installing mass timber panels instead of individual pieces of lumber.

"Time is money to a job," he says. "We're showing increased productivity in how fast we can erect a floor. The faster you can get a structure up, the faster you can get a roof on."

Warren finds it particularly rewarding to see people's reactions to the unique beauty of mass timber buildings. "The interior aesthetic quality, it just doesn't exist in the market. It's nice to have folks really enjoy their workplace."

Photo: LEVER Architecture

INSTALLING CLT During construction of the Albina Yard creative office building in Portland (far left), the crew finished installing prefabricated CLT panels for an entire floor in as little as two hours (center and right).

Photo: LEVER Architecture

Albina Yard

Project: A four-story office building with ground-floor retail space

Location: 4713 N. Albina Ave., Portland

Developer/general contractor: Reworks

Architect: LEVER Architecture

Structural engineer: KPFF Consulting Engineers

CLT prefabrication consultant: Cut My Timber

CLT manufacturer: D.R. Johnson Wood Innovations

Construction: Glulam post-and-beam frame with CLT diaphragm and wood-and-steel shear walls

OREGON LEADS THE WAY WITH ADVANCED WOOD PRODUCTS

When it comes to advanced wood products manufacturing and mass timber construction, Oregon is setting the pace for the nation.

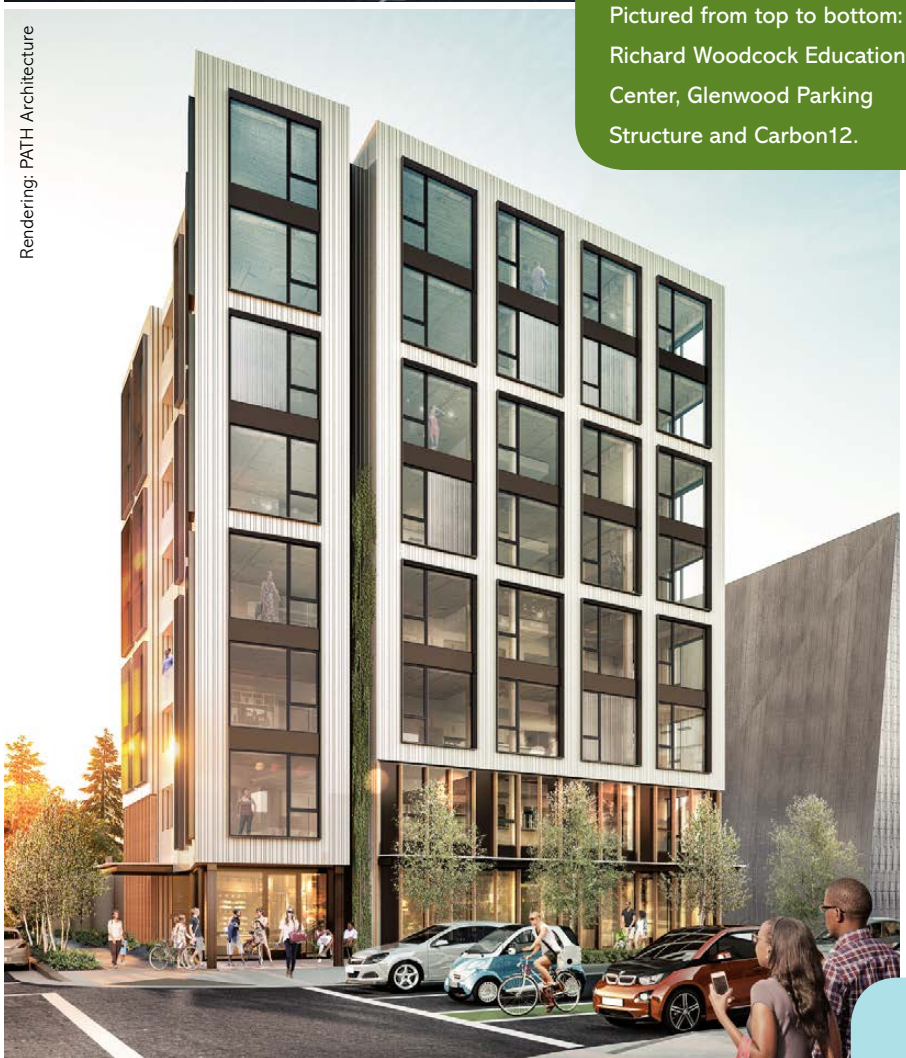
With the help of research at Oregon State University and financial assistance from Oregon BEST, a state-funded nonprofit that supports clean technology innovation, D.R. Johnson Wood Innovations became the first mill in the country to manufacture structural CLT panels certified for use in construction. There are also a growing number of public and private mass timber projects that are in development, are under construction or have been completed in the state. Among them is the Richard Woodcock Education Center at Western Oregon University in Monmouth, which opened in the fall of 2016 and is one of the first multistory buildings in the state to be built with CLT.

Officials with the state of Oregon have shown a keen interest in ramping up manufacturing of advanced wood products to support jobs in the state's rural timber towns. The Governor's office, through Business Oregon and other state agencies, actively supports the development of advanced wood products markets and manufacturing. The Oregon Building Codes Division has been instrumental in getting mass timber buildings permitted.

In the summer of 2016, Oregon BEST and the TallWood Design Institute, a collaboration between OSU and the University of Oregon, sponsored a statewide CLT Design Contest. The Glenwood Parking Structure, a proposed four-story CLT parking garage in Springfield designed by Portland-based SRG Partnership Inc., won first place in the contest, earning prize money for research and performance testing. The runner-up in the contest was Carbon12, an eight-story CLT and glulam condominium project in Portland designed and developed by Portland-based PATH Architecture and Kaiser Group Inc. The project broke ground in November 2016 and is expected to be completed in late 2017.

Photo: Western Oregon University

Rendering: SRG Partnership Inc.



Rendering: PATH Architecture

Pictured from top to bottom: Richard Woodcock Education Center, Glenwood Parking Structure and Carbon12.

Photos: OFRI

RESEARCHERS

Left to right: Peter Dusicka, Associate Professor of Civil and Environmental Engineering, Portland State University; Lech Muszynski, Associate Professor; and Mariapaola Riggio, Assistant Professor, Department of Wood Science and Engineering, Oregon State University

BUILDING PERFORMANCE

Testing the safety and durability of mass timber

Heat radiates from the 10-by-10-foot furnace as a CLT wall panel approaches the flames.

"Five, four, three, two, one," a technician at Western Fire Center in Kelso, Wash., counts down before clamping the panel into place for a two-hour fire test.

Watching the test closely with the help of a thermal camera and other temperature monitoring instruments is Lech Muszynski, an associate professor with the Oregon State University Department of Wood Science and Engineering. Controlled flame tests such as this one are proving that CLT can meet fire safety requirements under U.S. building codes.

The results of tests on domestically produced Douglas-fir and spruce-pine-fir CLT floor and wall assemblies are extremely promising, Muszynski says.

"They survived two hours of fire conditions with flying colors," he says. "That makes us very happy."

The OSU-led fire tests join other groundbreaking research by Oregon universities showing that buildings constructed with CLT and other mass timber products are as safe as those built using traditional methods and materials. Along with fire testing, researchers are conducting seismic safety tests and looking into the best ways to design durable mass timber buildings.

BUILDING CODES AND CLT

The next major revision to the International Building Code that is likely to include prescriptive language about CLT won't happen until 2021, but Oregon's unique building code system provides a path for the use of innovative building materials even in the absence of prescriptive code standards.

Oregon statute provides support for emerging technologies such as CLT so that building codes are not a barrier to the use of innovative designs. The state also provides regulatory options to developers who want to use innovative products or designs. This includes the option to request services from the Oregon Building Codes Division as some CLT projects such as Albina Yard and Framework have done.

"This is new technology being validated," says Peter Dusicka, an associate professor of civil and environmental engineering at Portland State University. "Because there are no prescriptive design guidelines for mid- to high-rise mass timber structures in national building codes, the only way you can get them permitted and built is through performance-based design."

With the help of a three-year, $400,000 grant from the National Science Foundation, he hopes to develop a seismically resilient structural system for mass timber buildings. Such a system would allow the structures to be re-occupied with only minor repairs following an earthquake.

Dusicka has also led tests at PSU using equipment that mimics seismic shaking to demonstrate that the Framework project's beam-column connections can withstand a major earthquake. This research joins other tests of the project's seismic safety led by OSU, including a CLT panel performance test where the product was subjected to extreme loads.

The idea behind CLT research is to help architects and engineers design mass timber buildings that are not only safe, but also resilient and high-performing, says Mariapaola Riggio, an assistant professor with OSU's Department of Wood Science and Engineering.

"This is the first step in developing an optimal procedure for monitoring the overall performance of mass timber buildings," she says. "In this way, we can learn from current projects to help improve future projects."

CLT HIGH-RISE PASSES FIRE TESTS

In the fall of 2016, the mass timber components that will be used to build the 12-story Framework development were the first in the world to pass two-hour fire tests demonstrating their safety for high-rise construction.

Because of the building's height, the design team had to demonstrate that the structural components could be in a fire for two hours without losing their load-bearing capacity. This is a standard requirement for high-rises, to give occupants enough time to evacuate in the event of a fire and allow for fire-department intervention.

David Barber, a principal with Arup, the firm serving as the project's fire, acoustic and sustainability engineer, says the main fire safety concern for Framework was ensuring that the steel connections between columns and beams would remain structurally sound when exposed to fire for two hours. To avoid a connection failure that would cause the building to collapse, the design team protected the steel with an extra layer of wood, which burns at a predictable rate and is a good insulator.

CLT and other mass timber products perform well in fire because of their sheer size. Mass timber building components are so thick that in a fire an insulating char layer forms, allowing them to retain their structural integrity much longer than traditional stick-frame construction. Barber likens it to the way older, larger trees tend to survive wildfires while younger, spindly trees are more likely to be consumed. "It's a process where the wood protects itself from fire, and it's no different from what you see in a forest fire," he says.

Photo: OFRI

FIRE TEST A CLT wall panel is subjected to fire inside a furnace to test its performance under this extreme condition.

ULTIMATE GREEN BUILDING MATERIAL

MICHAEL GREEN
Principal, MGA,
Vancouver, B.C.

Wood and sustainable design

Canadian architect Michael Green's work with the Oregon State University College of Forestry will further advance a cause he is passionate about: the use of wood as a sustainable building material for projects ranging from low-rises to skyscrapers.

Green's Vancouver, B.C.-based architecture firm, MGA, is the lead architect for the Oregon Forest Science Complex. The 85,000-square-foot complex replaces Peavy Hall on OSU's main campus in Corvallis and will serve as the new home for the College of Forestry. The project will showcase innovative uses of wood for building construction and design, including demonstrating a range of uses for CLT, laminated veneer lumber and other engineered wood products manufactured in Oregon and the Pacific Northwest. It will also feature a state-of-the-art seismic design, allowing the structure to snap back into place following an earthquake, Green says.

"The building itself is a teacher, both during construction and after it's completed," he says.

Green has long been a keen advocate for constructing taller buildings with wood, and has designed a number of prominent mass timber projects throughout North America and abroad. He's pleased to see OSU help move Oregon to the forefront of a mass timber construction movement that's gaining momentum in the United States. In response to the growing number of mass timber projects in the state, his firm recently opened a Portland office.

There are many great reasons to use wood for more commercial and multifamily projects, especially as more people move to cities and our urban areas become denser, Green says. One of the most compelling arguments for wood is its environmental benefits.

"It replaces concrete and steel, which are both really carbon-intensive," he says. "It moves us to a material that stores carbon. It allows us to source products from regional economies that are much more natural. These are all fundamental to the future of building sustainably."

Rendering: MGA

Oregon Forest Science Complex

Project: A two-building complex replacing Peavy Hall on the Oregon State University campus that will house the College of Forestry, TallWood Design Institute and an advanced wood products laboratory

Location: Oregon State University, Corvallis

Construction start date: Spring 2017

Anticipated construction completion date: Winter 2018

Architect: MGA

Structural engineer: Equilibrium Consulting Inc.

General contractor: Andersen Construction

Construction:
New Peavy Hall – locally sourced glulam post-and-beam frame with resilient rocking CLT shear walls and a laminated veneer lumber roof diaphragm

A.A. "Red" Emmerson Advanced Wood Products Laboratory – glulam post-and-beam frame with mass timber panel shear walls

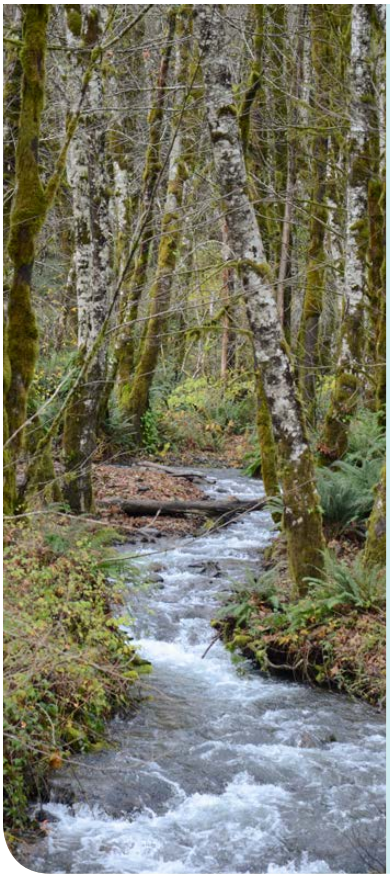
Rendering: MGA

OREGON UNIVERSITIES TEAM UP ON WOOD RESEARCH CENTER

In a unique collaboration, Oregon State University and the University of Oregon have jointly launched the TallWood Design Institute. The applied research center will focus on developing innovative wood products and building components capable of being produced in Oregon.

The institute brings together expertise in architecture, wood science and engineering from both universities to help position Oregon as a leader in emerging global markets for new wood products, and a hub for expertise in innovative wood building design.

A signature feature of the institute's new home in the Oregon Forest Science Complex at OSU will be the A.A. "Red" Emmerson Advanced Wood Products Laboratory, a 15,000-square-foot facility with computer-controlled and robotic manufacturing systems and a large structural testing facility.



WHAT MAKES WOOD SO GREEN?

Increasingly, wood is being recognized in the architecture, engineering and construction communities as a green building product with important environmental advantages over other building materials:

- Wood is the only major building material derived from a resource that is both sustainable and renewable.
- Trees remove carbon from the atmosphere and store it in wood. As a result, about half the dry weight of wood is carbon, which remains sequestered in wood products used to construct buildings, and helps offset carbon dioxide emissions – a major contributor to global warming.
- About 99 percent of each log processed winds up in a usable product, reducing waste to near zero.
- Wood requires less energy and water to produce than other construction materials. Life-cycle assessment studies consistently show wood to be better for the environment than steel or concrete in terms of embodied energy, air and water pollution, and greenhouse gas emissions.
- Oregon wood products are made from timber that's harvested sustainably. State forest protection laws mandate prompt replanting after harvest and require landowners to protect wildlife habitat and water quality, ensuring sustainable forests in perpetuity.
- An independent third-party audit commissioned by the Oregon Department of Forestry found that wood from Oregon forestland regulated by the state's forest protection laws qualifies as responsibly sourced under the internationally recognized American Society of Testing Materials (ASTM) D7612 standard. Wood that meets this standard can count toward the Leadership in Energy & Environmental Design (LEED) credit for wood use in sustainable building projects.

ENVIRONMENTAL BENEFITS OF WOOD

In addition to storing carbon, wood products require less energy – and therefore fewer carbon dioxide emissions – to produce than other building materials. By specifying timber for a project, a design team will reduce the overall carbon footprint of a building through carbon storage and by substituting wood for more energy-intensive materials.

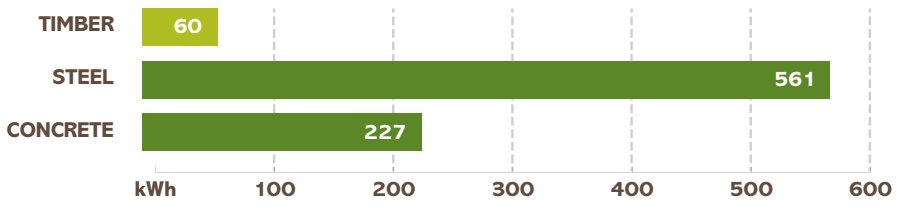
Replacing concrete and steel with wood can offset decades of carbon emissions from heating, cooling and powering the building. As advances in technology make it possible to build increasingly efficient buildings, using wood could result in a negative carbon footprint over the life of the structure.

Carbon storage

One cubic meter of wood stores nearly a metric ton, about 2,200 pounds, of CO_2.

Energy savings

Energy requirements in kilowatt hours for producing a 3-meter-tall column (equivalent to 9.8 feet) carrying the same load.



Source: "Systems in Timber Engineering," Josef Kolb, 2008

THE APPEAL OF WOOD

Celebrating the Pacific Northwest aesthetic

Photo: OFRI

MURRAY JENKINS
Executive Vice President, Ankrom Moisan Architects Inc., Portland

While searching for the best place to relocate the Portland headquarters of Ankrom Moisan Architects Inc., firm leaders toured more than two dozen potential office spaces.

The most desirable ones were creative offices with open floor plans in converted industrial spaces, but those kept getting snatched up by other companies, Ankrom Moisan Executive Vice President Murray Jenkins says. So Ankrom Moisan staff decided to put their architecture and interior design skills to work and create their own office, occupying nearly three floors of 38 Davis, a new mixed-use building the firm was designing in Portland's Old Town Chinatown neighborhood.

"We love those old warehouse buildings," Jenkins says of the decision to construct most of the six-story building using mass timber. The exposed wood ceilings and beams lend a sense of warmth to the space, he adds. "It's such a great, active ceiling."

As firm staffers collaborated on designing their ideal office, the use of mass timber construction resonated because the structure of the building could remain exposed. This eliminated the need for drop ceilings and gave the space a much more authentic, handcrafted feel, Jenkins says.

The office design harkens back to a long tradition of wood construction in Portland and the surrounding region, he says. "It's a Pacific Northwest aesthetic."

Wood is especially appealing in architecture when it's mixed with other materials, he says. Along with wood, Ankrom Moisan's new office features a variety of other construction materials. Different wings in the new office pay homage to concrete, metal and glass. A mix of materials greets visitors in the lobby, and the timber ceilings are offset by the white of the walls.

"I like the contrast," Jenkins says as he shows off the office space. "Smooth gypsum walls next to wood really makes the wood pop."

BIOPHILIC DESIGN

The warm, inviting feel that wood evokes for many may be tied to "biophilia," a term that refers to the innate attraction humans have to nature.

Biophilic design concepts seek to allow people to connect to the outdoors while inside a building. Exposed wood and other natural materials help evoke a sense of nature in interior spaces.

Architectural designs that incorporate natural materials and offer exposure to daylight and visual access to nature have a positive impact on the well-being of building occupants. Numerous studies show spaces designed with biophilia in mind can help office workers be more productive by stimulating brain activity and keeping people alert. In schools and hospitals, it can help students learn and patients heal faster.

©Ankrom Moisan Architects.
Photo: Casey Braunger

38 Davis

Project: A six-story, mixed-use building containing retail, housing and offices

Location: 38 NW Davis St., Portland

Developer: Gerding Edlen

Architect: Ankrom Moisan Architects Inc.

General contractor: Andersen Construction

Construction: Five stories of heavy timber construction, including glulam posts and beams, a concrete podium and a structural diaphragm consisting of 3-by-6-inch tongue-and-groove decking with a 3-inch concrete slab overlay

Photo: OFRI

For the love of wood

When asked what they love about timber construction, Oregon architects, engineers, contractors and developers are quick to praise wood's aesthetic appeal and environmental story.

Here are some of their thoughts on the beauty of wood:

"It's just beautiful construction. The sustainable side of it is beautiful too."

– Gene Archibek, senior project manager, Andersen Construction

"What appeals to me is it's beautiful and it's also a local material, and the carbon footprint is amazing. The opportunity to make more of a building out of a carbon-neutral, sustainable material is too good to pass up."

– Emily Dawson, associate, SRG Partnership Inc.

"Wood is just beautiful. There is a real affinity to the warmth and textural quality of wood."

– Agustín Enríquez, architect, GBD Architects

"Almost no human being chooses to live in a concrete and steel box. We like wood. Wood is cozy and comfortable."

– Noel Johnson, principal, Cairn Pacific

"For me personally, it feels right. There are enough positives about it. I'm an Oregonian. A lot of our culture is tied to the timber industry."

– Josh McDowell, principal and director of structural engineering, Mackenzie

"The material is sustainable and sequesters carbon. It goes in quickly and quietly, weighs less than concrete, and it's also beautiful."

– Judith Sheine, department head, University of Oregon School of Architecture and Allied Arts

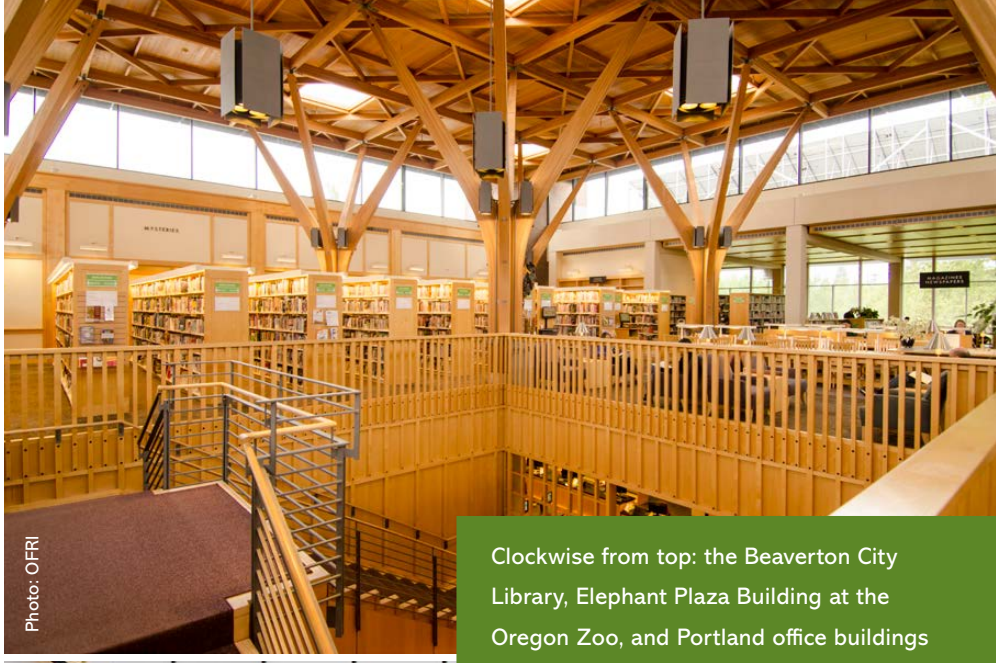


Photo: OFRI

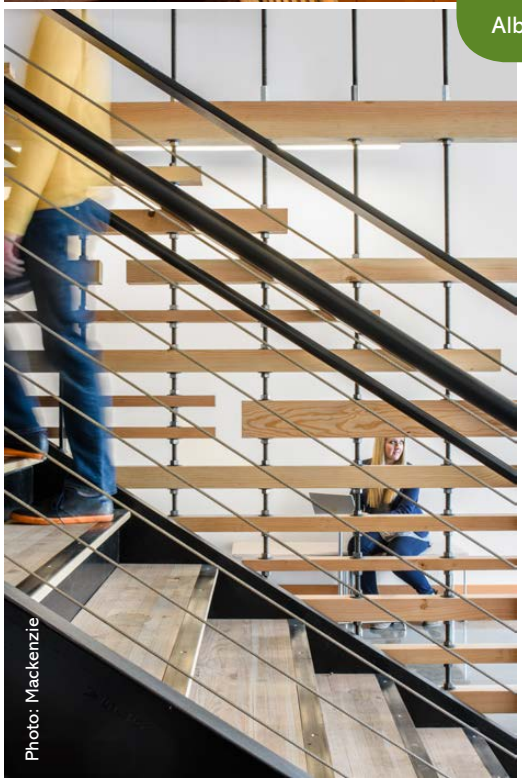


Photo: Mackenzie

Photo: SRG Partnership Inc.

Clockwise from top: the Beaverton City Library, Elephant Plaza Building at the Oregon Zoo, and Portland office buildings Albina Yard and Clay Creative.

Photo: OFRI

Photo: OFRI

TYLER FRERES
Vice President, Freres Lumber Co., Lyons

RURAL ECONOMIES

Advanced wood products create opportunity

Freres Lumber Co. Vice President Tyler Freres is paying close attention to the growing interest in CLT and mass timber construction in Oregon and across the country.

Inspired by the mass timber movement, the family-owned company based in Lyons, a small timber town in the foothills of Oregon's Cascade Mountains, is developing its own veneer-based advanced wood product. When it hits the market in late 2017, the beefed-up version of plywood known as "mass plywood panel," or "MPP," will have applications similar to CLT.

The plan is to construct a plant in Lyons that will use softwood veneer the company already produces to manufacture mass plywood panels with dimensions up to 12 feet wide, 48 feet long and 24 inches thick, Freres says.

"The beauty of it is we're taking this standard veneer that we've been using to make traditional products and making an entirely new advanced wood product," he says.

Other Oregon companies are also considering expanding their existing facilities to produce advanced wood products in rural timber communities that have struggled economically. Freres Lumber's expansion plans follow the success of D.R. Johnson Wood Innovations in adding a CLT manufacturing component to a glulam beam plant that's been

Photo: D.R. Johnson Wood Innovations

SUPPORTING RURAL ECONOMIC DEVELOPMENT

A number of federal and state rural economic development initiatives have focused on promoting the use of wood in commercial construction and supporting the expansion of advanced wood products manufacturing in Oregon.

This includes early-stage funding from Oregon BEST for research at Oregon State University that helped D.R. Johnson Wood Innovations start manufacturing CLT.

On the federal level, the U.S. Department of Agriculture has awarded funding to projects

Photo: OFRI

operating for close to 50 years in Riddle. The southwestern Oregon town is nestled among abundant forests that have made timber a longstanding economic driver in the region. In 2016, D.R. Johnson President Valerie Johnson announced the company was adding staff to keep up with high demand for the advanced wood product.

Researchers at Oregon State University's Department of Wood Science and Engineering helped D.R. Johnson launch its CLT line. They also have been instrumental in developing Freres Lumber's mass plywood panel and testing the product's strength and engineering values.

Freres says the product's introduction will mean more jobs at the company's veneer and plywood plants, located in the towns of Lyons and Mill City. The new product will also bring the forest to the city by showcasing wood as a sustainable building product for urban structures.

"We hope to revitalize rural communities with an innovative wood product that shows the responsible use of a vital renewable resource in Oregon – our actively managed forests," he says.

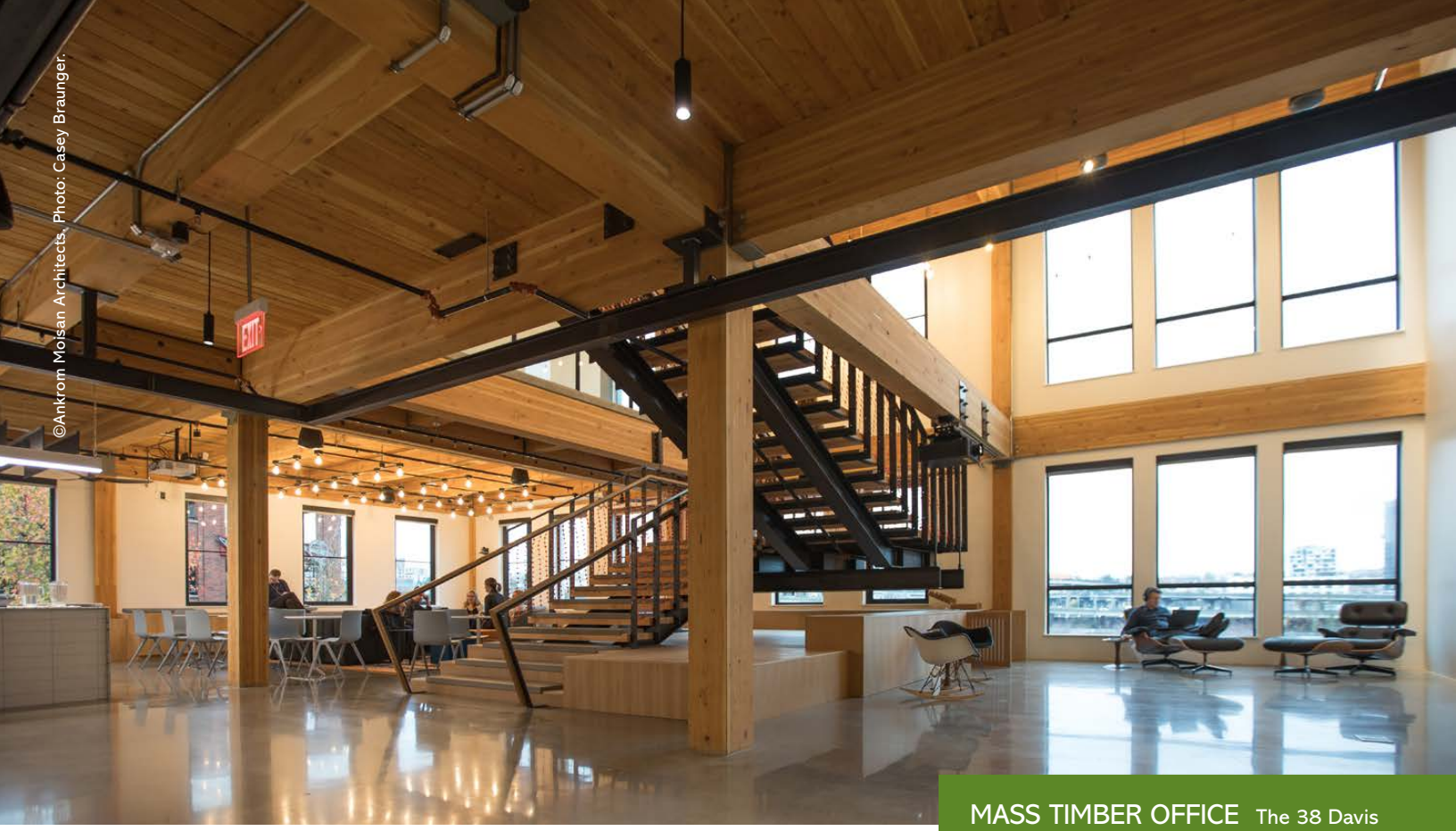
RURAL JOBS

Advanced wood products have the potential to create more economic opportunities for Oregon's rural timber towns.

and initiatives in Oregon through its Wood Innovations Grants program. The grants are aimed at accelerating technologies and strategies that promote the use of wood in commercial construction. Oregon grant winners include OSU and Carbon12, an eight-story CLT building being constructed in Portland.

Another USDA initiative, the U.S. Tall Wood Building Prize Competition, brought national attention to Oregon when Framework was named one of the winners. The competition, launched in partnership with the Softwood Lumber Board and the Binational Softwood Lumber Council, aimed to support jobs in rural America by helping increase the demand for wood as a sustainable building material for multistory structures.

The U.S. Economic Development Administration has also supported the expansion of advanced wood products manufacturing in Oregon, including providing grant funding to the TallWood Design Institute. A second EDA grant helped fund an Oregon BEST feasibility study, done in collaboration with nine other partners, that investigates the potential economic impact increased advanced wood products manufacturing could have on the state's rural communities. The study is scheduled to be completed in the spring of 2017.



©Ankrom Moisan Architects. Photo: Casey Braunger.

MASS TIMBER OFFICE The 38 Davis building in Portland houses tenants that include the building's architect, Ankrom Moisan Architects Inc., and the University of Oregon. It is among a growing number of mixed-use developments in the city that use mass timber construction.

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The Oregon Legislature created the Oregon Forest Resources Institute in 1991 to advance public understanding of forests, forest management and forest products and to encourage sound forestry through landowner education. A 13-member board of directors governs OFRI. It is funded by a portion of the forest products harvest tax.

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