



The Schweitzer Mountain Resort-Hotel in Idaho features cross-laminated timber, glulam beams, and glulam columns from Vaagen Timbers. Courtesy photo by Vaagen Timbers.

# Lumber Drying Technology Helps Produce Mass Timber and Reduce Wildfire

Expanding the range of wood available to produce mass timber is at the heart of a thriving business model in the Pacific Northwest that is also delivering big picture benefits like reducing wildfire risk and mitigating climate change. The U.S. Department of Agriculture (USDA), Forest Service Wood Innovations Program helped Vaagen Timbers in Colville, WA, invest in a kiln with the capability to dry lumber produced from low-value, small-diameter logs. These logs are the byproducts of forest management activities that create healthier, resilient forests, and, once sawn, make them suitable for manufacturing mass timber.

Mass timber is manufactured by binding wood together with adhesives to form a composite material like a structural beam. Cross-laminated timber (CLT) is a popular form of mass timber that is made by bonding layers of wood together to form an exceptionally strong alternative to carbon-intensive steel or concrete. Vaagen Timbers uses lumber from small- and medium-sized trees to produce more sustainable engineered building products such as CLT panels and glued laminated (glulam) beams.

Vaagen's use of normally overlooked small-diameter trees helps the Forest Service manage healthy forests. Once the trees are thinned to an acceptable density, controlled burning becomes an effective method to manage vegetation that fuels wildfires. Forest Service estimates show a price differential for wildfire mitigation of \$200 per acre to manage thinned forests versus about \$1,000 per acre to manage forests that have not been thinned.



The University of Washington's Standard is a premier off-campus housing community that includes cross-laminated timber and glulam from Vaagen Timbers. Courtesy photo by Vaagen Timbers.

"One of our big goals is to reduce fire danger by harvesting small trees for lumber. Lowering the concentration of smaller trees in forests promotes forest health and decreases the ability of wildfires to spread. Our new kiln, which we purchased in part with a Wood Innovations grant, is key to our process," says Russ Vaagen, CEO of Vaagen Timbers.

### STATE-OF-THE-ART KILN DRIES LUMBER FROM SMALL-DIAMETER LOGS

Vaagen Timbers is using a state-of-the-art kiln, from Maine-based Nyle, to dry lumber produced from small-diameter logs to the right moisture content to produce high-quality mass timber. Drying the lumber in the kiln helps to minimize any twisting, warping, or cracking that would render it unusable for mass timber.

In kiln drying, lumber is stacked in a chamber where airflow, temperature, and humidity are controlled to provide as rapid drying as can be tolerated by the lumber without increasing defects. A dehumidification kiln, like the one at Vaagen Timbers, uses a heat pump system to remove the water from lumber. One primary advantage of this type of system is that it recycles heat continuously instead of venting away heated air, like a conventional kiln does.

### MASS TIMBER DELIVERS LOWER GREENHOUSE GAS EMISSIONS

Vaagen Timbers' production of structural floor systems using CLT results in lower greenhouse gas (GHG) emissions from production, material sourcing, transportation, and floor design when

compared with GHG emissions from concrete-slab flooring, slab-on-metal deck flooring, and wooden-joint flooring models. Vaagen Timbers' CLT structural floor systems have a GHG footprint of 35 kilograms of carbon dioxide equivalent (CO<sub>2</sub>e) per meter squared of flooring, according to an environmental impact report from Boundless Impact Research & Analytics.

"By relying on locally sourced lumber, we are able to reduce GHG emissions from the production and transportation of cement and metal while at the same time we're supporting the responsible use of sustainable local forest products," says Vaagen.

### More Information

Terrie Jarrell, Wood Innovation Coordinator  
503-808-2513, [terrie.jarrell@usda.gov](mailto:terrie.jarrell@usda.gov)

Adrian Kiser, Regional Biomass and Wood Innovation Specialist  
USDA Forest Service Region 6, Portland, OR  
503-808-2934, [adrian.kiser@usda.gov](mailto:adrian.kiser@usda.gov)

## FAST FACTS

- Mass timber is manufactured by binding wood together with adhesives to form a composite material like a structural beam
- Cross-laminated timber (CLT) is a popular form of mass timber
- Once trees are thinned it makes it easier to repeatedly return and apply controlled burning to manage vegetation



Vaagen Timbers uses lumber from small-diameter logs like this to produce mass timber, supporting forest restoration. Courtesy photo by Vaagen Timbers.