

Mass Timber: Part of an Effective Wildfire Reduction Strategy

BY JENNIFER COVER

Mass timber is newsworthy for a lot of reasons. Its strength and dimensional stability make it a renewable, sustainable and carbon-friendly alternative for building applications—such as offices, hotels and high-rises—where wood isn't typically considered. Because of the unique structural and fire-resistance characteristics of large, solid wood members, the International Building Code also allows the use of mass timber in exposed applications, creating exciting opportunities for a modern wood aesthetic. However, beyond their innovative uses and visual appeal, products such as cross-laminated timber (CLT) are part of a needed strategy for improving forest health and reducing the frequency and severity of wildfires.

There's no need to give a forestry lesson to a readership of foresters, but wildfires are getting worse, and overly dense forests are part of the problem. In the west, for example, a paper published by the USDA Forest Service says that severe wildfires "have led to concerns about heavy surface fuel loading and the potential for high-intensity reburning. Ponderosa pine (*Pinus ponderosa*) forests, often overly dense from a century of fire suppression, are increasingly susceptible to large and severe wildfires especially given warmer and drier climate projections for the future."

Mass timber products create an opportunity for large, solid structural elements to be manufactured from relatively small-diameter trees as well as other traditionally low-value resources (such as forests affected by insects). This creates a market incentive for forest thinning and other landscape restoration efforts, which in turn helps to reduce the risk of fire. This, along with the need to reinvigorate rural economies, is part of the reason states



like Washington, Oregon, and California have developed policies or initiatives to accelerate markets for mass timber.

Growing the market

In the meantime, there are signs that mass timber is already becoming entrenched as a viable option for North American building designers.

Product Innovation and Supply. In 2011, when the first commercial CLT building was constructed in the US, the product came from Europe. That made sense; at the time, Europe had more than 20 years of mass timber history and North America's was just beginning. Since then, a casual reader of architectural news might have assumed that CLT is synonymous with mass timber. CLT is often included in taller wood buildings, here and internationally, so it garners a lot of press. However, there are many types of mass timber products—all now readily available in the US and Canada.

In addition to CLT, products in the mass timber family include nail-laminated timber (NLT or nail-lam), glued-laminated timber (glulam, or GLT when referring to panel products), and dowel-laminated timber (DLT). Product innovation is continuous, and a relative newcomer to this group is the mass plywood panel (MPP).

For CLT, an important nuance is whether a manufacturing plant has been certified to the *ANSI/APA PRG-320 Standard for Performance-Rated Cross-Laminated Timber*, which provides a basis for standardization of CLT quality, manufacturing, and structural properties for structural building applications in North America. Plants that are operational and certified to the standard for building applications include DR Johnson (Oregon), Nordic Engineered Wood (Quebec), SmartLAM (Montana), Structurlam (British Columbia), and KLH USA (Austria). Additional plants that have been announced and are in the process of being certified include International Beams (Alabama), Katterra (Washington), Vaagen Timbers (Washington), and Smartlam (north-east and southeast). There are also CLT plants such as Sterling Lumber that produce panels for rural roads and rigging mats, which don't require certification for building use.

Mass Timber Projects. The program I lead, WoodWorks, provides education and free project assistance related to the design, engineering, and construction of commercial and multi-family wood buildings. As such, we've had a unique opportunity not only to witness the evolution of the mass timber trend, but to help guide successful projects to fruition. In 2015, our technical staff provided assistance on a handful of buildings where the developer, architect, or engineer had an interest in using mass or heavy timber.



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At seven stories and 220,000 square feet, T3 Minneapolis demonstrated the feasibility of large timber projects in the US. There are now at least two 12-story wood buildings in design in the Pacific Northwest.

In 2017, the number of projects had grown to 158, and we expect to support close to 200 projects this year.

As part of our project support efforts, we also have been tracking mass timber projects; as of October 2018, our database included more than 400 mass timber buildings that are either completed, under construction, or in design. This includes 23 projects completed in California, 15 in Washington, and 14 in Oregon.

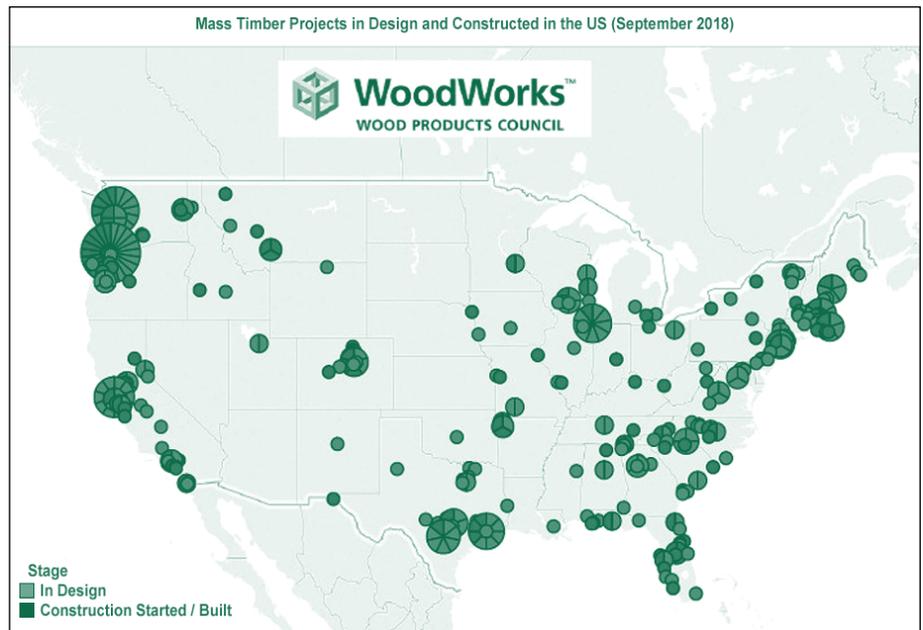
Availability of Experts. There is a symbiotic relationship between the design and building community's interest in developing mass timber expertise and the availability of education and resources to do so. Each drives the other, and the result is an ever-growing pool of professionals who understand the nuances of mass timber building design.

Since 2013, for example, WoodWorks has offered more than 460 mass timber education events. This has included national CLT and tall wood symposiums, Wood Solutions Fairs, the International Mass Timber Conference (co-produced with the Forest Business Network), webinars, workshops, lunch seminars, and lunch and learns presented in-house to design teams. WoodWorks has provided more than 50,000 tall wood and mass timber education hours to over 30,000 design and building professionals.

Governing influences

A discussion of the growing market for mass timber wouldn't be complete without recognizing the many factors that have made it possible—including an unprecedented amount of research.

For example, seismic testing of various mass timber diaphragms and connections has been performed at several US universities. Fire testing has been performed at a component level and an assembly level as required by code, and at the full-building scale—which is well beyond code requirements. This abundance of research, along with significant product testing, is the foundation of building code changes and government policies that are helping to facilitate the use of mass timber for a broader range of projects. Recent and pending changes to US building codes are discussed in the article, *Mass Timber Rises*, on page 4.



More than 400 mass timber projects have either been built or are in design across the US. California has the most completed projects (23), followed by Massachusetts (16), Washington (15), and Oregon (14).

CLT was prescriptively recognized in the 2015 *International Building Code* (IBC). In 2016, the International Code Council (ICC) appointed a committee of building officials, fire officials, architects, fire protection engineers, and industry experts to examine and propose appropriate code requirements for tall wood buildings. While ICC members voted on the proposals of the Ad Hoc Committee on Tall Wood Buildings in October and November, Oregon became the first state to approve them under its Statewide Alternate Method (SAM), allowing design professionals to prescriptively design mass timber buildings up to 18-stories in height. Washington is poised to adopt the proposals in July 2019.

For more information, the Think Wood Research Library (<http://research.thinkwood.com>) is a central resource for mass timber and other wood building-related research from around the world.

How you can help?

For some building types, it isn't common to consider wood—large university buildings, for example, or big box stores. If you hear about a major non-residential project being considered in your community, let us know. Connect us with the developer or design team if you know them. WoodWorks has a team of wood

design experts, including architects and engineers. As a non-profit US Forest Service partner, we can provide information on wood's performance capabilities based on the needs of the project, offer details on a code path, and respond to issues that arise throughout design and construction—all at no cost to the design and construction team. Email us at help@woodworks.org. ♦

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