

State of Mass Timber in WI

About Mass Timber

Mass timber is a type of building system that uses panelized solid wood for structural applications in construction. Cross laminated timber (CLT) panels are comprised of lumber or composite layers stacked perpendicular to one another and glued together. CLT was invented in early 1990s in central Europe and is now considered an alternative construction material for mid- and high-rise buildings across the globe.

Wisconsin's red and jack pine, spruce and fir are already permitted in the construction of CLT panels. However, other species are currently not permitted in CLT, which is especially impactful given Wisconsin's vast hardwood resource. Efforts are underway at Michigan Technological University and other research institutions to examine the feasibility of utilizing hardwoods in CLT panels, but they have not yet been adequately proofed for use in large-scale projects. While CLT markets have been, thus far, largely concentrated in the Pacific northwest and the southeastern US, there is movement to expand those markets. Sterling Solutions in Phoenix, IL is the closest CLT manufacturer which now produces panels for use in buildings. This is a departure from their earlier production, which was entirely focused on providing ground protection and site access mats for construction, utility, and other infrastructure projects.

Mass timber is growing in popularity throughout the United States, with the tallest mass timber building in North America—the Ascent building—recently completed in Milwaukee. The CLT structure is 25 stories high and contains more than 250 living units. CLT, which was once primarily utilized in central European countries, has taken hold in the US in a profound way over the last decade. To date, there are 16 manufacturers of CLT panels and many more facilities that produce other mass timber products, such as glulam beams, nail-laminated timber and dowel-laminated timber.

Opportunities for Mass Timber

There are many ecological and economic benefits of using mass timber. Wood is a renewable resource which comes from sustainably managed forests. In Wisconsin, the annual growth of timber has outpaced the harvest volume for decades. Additionally, wood products store carbon and are less energy intensive to manufacture, which can also reduce the overall cost of a project due to efficiency gains during construction. CLT panels are strong like reinforced concrete, can effectively meet code requirements for fire and seismic performance, and can even outperform substitutes because wood chars at slow and predictable rates when compared to other materials. Most people consider wood surfaces to be aesthetically pleasing and wood in construction has even been shown to improve mental well-being and productivity.

Challenges for Mass Timber

Currently, mass timber in Wisconsin is often more expensive than steel or concrete due to the lack of nearby processing facilities. If more facilities were equipped to handle the processing of CLT panels, the cost would decrease significantly. There is often a higher initial cost to transport CLT panels when compared to concrete and steel, since CLT panels are shipped intact (and can be very long) and only a

few places US firms produce them. However, there is still substantial cost and time savings at the construction site, due to the relative ease and speed of construction. The current regulations in Wisconsin allow for mass timber to be the primary structural element for up to 6 stories; projects exceeding six stories require a variance request.

Future of Mass Timber in Wisconsin

Currently, there are 23 mass timber buildings in Wisconsin started or built, with another 22 in the design phase. In addition to the Ascent project in Milwaukee, Promega in Madison, a mixture of CLT and glulam, and Barracuda, a condominium complex in Madison that utilizes glulam for its floors/ceilings, are fine examples of mass timber construction in Wisconsin.

In addition to standard CLT panels, several hardwood species are being explored as alternatives to the softwood species currently used in production, since the American structural performance standards are designed around softwood lumber use. Michigan Technological University in Houghton, MI recently completed a study of hardwoods in CLT panel production, as well as hybrid panels composed of both hardwoods and softwoods. The results were encouraging, which bodes well for Wisconsin, given the state's significant hardwood resource.

Wisconsin-grown wood is a feasible alternative to species from other regions in mass timber applications. In the future, it would be beneficial to be able to build CLT panels created wholly or partially with Wisconsin-grown species and include glulam components constructed with Wisconsin-grown species. The policies in Wisconsin should be updated to allow more construction and use of mass timber. The Commercial Building Code Council has multiple options that would allow for expanded use of mass timber products.

In April 2022, the Wisconsin DNR sent two Forest Products Specialists to the International Mass Timber Conference in Portland, OR which was the largest gathering of mass timber experts and users in the world. This event explored mass timber products and addressed building challenges and solutions, along with supply chain issues and a myriad of other mass timber-specific issues. Nearly 2,000 experts from 28 countries attended this year's conference, including mass timber manufacturers, architects, developers, construction companies, code officials, university researchers, and public forestry organizations. Wisconsin's presence was vital at the International Mass Timber Conference because other Midwestern states were present, working to establish mass timber in the region. At the 2022 conference, Michigan had a contingency of 55 people in attendance, which included construction and project management employees, university researchers, engineers, and more. It would be beneficial for Wisconsin to have a larger presence at future events.

Wisconsin is working to position itself well for growth in the mass timber industry. In addition to housing one mass timber producer (Timber Technologies in Colfax, WI produces custom glulam beams, but has already produced beams large enough to be used as floor panels for the Barracuda building in Madison), the state is currently working to update its building codes to adopt the newest International Building Codes (currently, Wisconsin operates under the 2018 IBC, but is slated to adopt the 2021 or newer IBC) that will make mass timber utilization simpler and more attractive to potential builders and developers.