# Mass Timber

Standing out for its exceptional structural performance, adaptability, and sustainability.

## TECHNOLOGY

**What is Mass Timber?** Short for "massive timber," mass timber uses state-of-the-art technology to glue, nail, or dowel wood products together in layers. The results are large structural panels, posts, and beams. These exceptionally strong and versatile products are known as mass timber. Many architects and engineers believe that we are now in the "beginning of the timber age" where "plyscrapers" will soon be dotting city skylines all over the world.

### MASS TIMBER PRODUCTS

Cross-Laminated Timber (**CLT**) • Glued-Laminated Timber (**Glulam or GLT**)
Laminated Veneer Lumber (**LVL**) • Parallel Strand Lumber (**PSL**)
Nail-Laminated Timber (**NLT**) • Structural Composite Lumber (**SCL**)
Laminated Strand Lumber (**LSL**) • Dowel Laminated Timber (**DLT**)

## DEVELOPMENT

**The Maine Mass Timber Commercialization Center**, based at the University of Maine, unites various collaborators to boost and diversify the state's forest-based economy through innovative mass timber manufacturing. The initiative aims to promote the establishment of mass timber facilities, suggest incentives for widespread adoption, and advocate or demonstration projects, fostering positive economic impacts in local and regional areas, especially in Maine's rural economies.

## ADVANTAGES OF MASS TIMBER

### Environmental

Mass timber products use renewable and sustainable resources replacing higher fossil fuel intensive materials. This equates to a lighter carbon footprint.

### Construction

Construction using CLT offers a rapid construction advantage through its panelized construction method, outpacing traditional steel and concrete structures.

### Performance

The combination of alternating grains and the lightweight nature of CLT enhances its strength and overall performance, making it well-suited for the construction of buildings up to 18 stories.

### Fire Performance

Mass timber provides inherent fire resistance due to the nature of thick timber to char slowly, at a predictable rate, allowing these systems to maintain their structural integrity for significant time durations.

Meeting the challenges of climate change, **mass timber** is reshaping construction and design landscapes with **low-carbon solutions** and high-level performance.

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# CROSS LAMINATED TIMBER RESEARCH

## Cross-Laminated Timber (CLT)

is the focal point of the ASCC's research due to its variety of applications, performance, and widescale use. With strength, dimensional stability, and rigidity, CLT is ideal for mid- and high-rise buildings. Access to spruce-pine-fir-south lumber is crucial for CLT production, and Maine, in the Northeast, stands out for its abundant spruce-fir and red pine sawlogs.

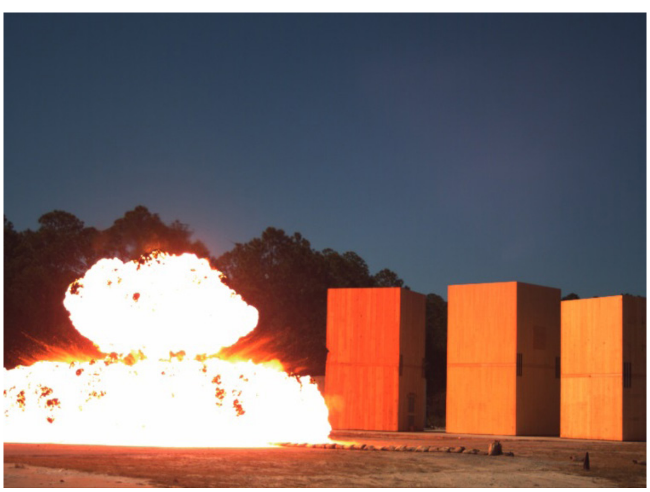
### Structural Performance of Hybrid CLT

The ASCC tests on lumber from Northeastern U.S. forests and laminated strand lumber (LSL) as hybrid CLT. Findings suggest designing CLT panels with different wood products can optimize laminae attributes, thereby enhancing mechanical and physical properties. Specifically, using LSL as cross-ply material increased perpendicular-to-grain shear strength, significantly boosting panel capacity.

**CLT transforms wood that is not usable by itself into sustainable and durable wood building materials.**

### Qualification of 2 New CLT Grades

UMaine researchers qualified two new CLT grades—"E21" and "E21M1" using SPF-S lumber. E21 employs 1650f-1.5E SPF-S MSR lumber in longitudinal layers, while E21M1 uses 2100f-1.8E SPF-S MSR lumber. E21M1 boasts the highest bending properties in the longitudinal direction among PRG 320-listed CLT grades. E21 is comparable to the stiffness and strength of "E2" grade CLT, introducing competitiveness for CLT manufacturers in Maine and New England globally.



### Blast Testing of CLT

In 2016, WoodWorks conducted a series of live blast tests on three two-story CLT structures at Tyndall Air Force Base to demonstrate the effectiveness of CLT over a spectrum of blast loads. The University of Maine supported the project by conducting static/quasi-static testing and data analyses and aiding in the design and on-site execution of dynamic blasting.

### Effect of Gaps

Research at the ASCC investigated the effect of gaps between the inner layers on the mechanical properties of CLT. Secondary objectives include the development of modeling techniques applicable to a range of gap sizes to predict said effects, and the determination of whether significant reductions in CLT shear and creep performance, due to the existence of edge gaps of CLT manufactured with lumber, can be mitigated with alternate materials such as SCL.

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