



The two-story testing wall exposed to flaming at temperatures over 1600 °F. Courtesy photo by Erika Edwards.

Timberlab and Fire-Safe CLT Exterior Walls

Cross-Laminated Timber Exterior Walls Pass Fire Safety Test

The 2021 International Building Code (IBC) included exciting new provisions for tall wood buildings up to 18 stories. However, the language lacked clarity for the use of cross-laminated timber (CLT) for exterior walls above approximately four floors. Without clarification, this wonderful material could be at risk of underutilization and even misrepresentation.

With too much left open to interpretation in each local jurisdiction due to CLT’s combustibility and no existing National Fire Protection Association (NFPA) 285 tests for CLT wall assemblies to demonstrate performance, this situation was an opportunity to remove any barriers—real or perceived—for the use of this renewable and sustainable wood material. Besides being an excellent alternative to emission-heavy concrete and steel, CLT, like all mass timber products, stores carbon that has been absorbed from the atmosphere.

National Fire Protection Association 285:

This standard provides a test method for determining the fire propagation characteristics of exterior wall assemblies and panels used as components of curtain wall assemblies that are constructed using combustible materials or that incorporate combustible elements. A Wood Innovations grant was used to conduct CLT testing.



Charring is the result of flame and heat that provides the CLT's fire resistance. Courtesy photo by Erika Edwards.

Passing the Test

To clarify the 2021 IBC path to compliance for CLT exterior walls, Timberlab led a team of highly knowledgeable companies and their respective experts to win a \$102,000 U.S. Department of Agriculture (USDA), Forest Service Wood Innovations grant to help fund the costs involved. The project was supported with both materials for the fire testing and in-kind design and consulting time from the partners.

NFPA 285 is the national standard test to determine the fire safety for exterior walls and requires the construction of a two-story wall exposed to flaming at temperatures over 1,600 °F. The entire assembly must restrict the spread of fire above the “window” opening, signifying its ability to limit catastrophic fire spread outside highrise buildings.

In April 2022, Timberlab and its partners announced that the CLT-based exterior wall assembly had passed the fire-safe test. “Rigorous NFPA 285 testing success serves as evidence to allow CLT use for exterior walls in buildings greater than 40 feet that are designed to the International Building Code,” said Hans-Erik Blomgren, senior engineering manager at Timberlab. “These results provide a reference point to demonstrate more straightforward code compliance and provide design certainty for any tall wood buildings making the use of this celebrated material.”

Wood Serving the Greater Good

Easing the mass timber compliance path for all stakeholders, Timberlab will publish a report and communicate the project outcomes and all the relevant background information. The shared information will allow building officials, fire marshals, architects, engineers, mass timber contractors, and mass timber suppliers to understand the issues related to CLT exterior walls and provide them with useable solutions for future mass timber developments.

Facilitating the use of mass timber products like CLT serves the USDA Forest Service mission by reducing the risk of catastrophic wildfires through forest fuel reduction and creating beneficial expansion of wood markets and positive local economic development.

More Information

Adrian Kiser
Regional Wood Innovations Assistant
USDA Forest Service
adrian.kiser@usda.gov, p: 503-808-2934

FAST FACTS

Partners for the fire-safe testing with Timberlab:

- **Arup**—a sustainable development company with mass timber code consultancy expertise
- **Mithun**—a mass timber architecture firm
- **Rothoblaas**—producer of water-resistive barriers, sealing tapes, screws, and fasteners
- **Rockwool**—producer of highly insulative and fire-resistant mineral wool insulation



Pretesting setup acknowledging all partners in the effort. Courtesy photo by Erika Edwards.

The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service. USDA is an equal opportunity provider, employer, and lender.