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Fire Tests for Cross-Laminated Timber

A government research facility tries to burn test apartments and finds the timber assemblies resist the spread of flames

POSTED ON JUL 27 2017 BY SCOTT GIBSON



CLT components seemed to fare well in fire tests conducted at a government laboratory. An International Code Council committee is currently gathering data on mass timber components.

Tests at a federal laboratory suggest that cross-laminated timber (CLT) components used in a multi-story apartment building would perform well in the event of a fire.

[A post at the Woodworking Network](#) described a variety of tests conducted at the U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Fire Research Laboratory for a committee of the International Code Council. Results appear to show that buildings constructed of CLT components would resist the spread of fire.

The results are of interest to an ICC ad hoc committee that will recommend building code changes later in the year, Stephen DiGiovanni, the committee chairman, told the Woodworking Network. "These tests are an important part of the extensive research data the committee has reviewed to validate the performance of tall wood buildings," he said.

Tests evaluated flame spread

The tests involved two 1-bedroom apartments constructed as if they were in a multi-story apartment building. Scenarios included different arrangements in which some timber surfaces were exposed directly to flames and others were protected.



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Here's how the post described some of the tests:

With the timber structure fully protected by gypsum wallboard, a "large furnishings and contents fire" was halted after three hours "without significant charring on the protected wood surfaces" of the apartment. In another test, some timber walls were left exposed. Once the furnishings and contents of the apartment had been consumed by fire, a protective layer of char formed on the CLT and "the mass timber surfaces essentially self-extinguished."

With all mass timber surfaces left exposed, a single sprinkler "easily contained" the fire. In a related test, the fire was allowed to grow for 23 minutes before the water was turned on, "which quickly controlled the fire."

Finally, with roughly 30% of the CLT ceiling area in the living room and bedroom exposed, the fire essentially put itself out once the furnishings and contents of the room had been consumed by fire. The underlying wood was protected by a layer of char during the four-hour test.

Mass timber buildings, made with heavy panels of cross-laminated wood, are an alternative to more conventional steel and concrete high-rise structures. A few large commercial buildings have been constructed in the U.S. and elsewhere with CLT components, as well as a house in southern Canada described in an ongoing blog series at GBA (see [Wolfe Island Passive House](#)).

Proponents point to a number of advantages of mass timber buildings, including faster construction schedules, lower cost, and a smaller carbon footprint. But the approach has yet to be used widely, in part because mass timber construction is still being evaluated by code officials.

Separately, the Woodworking Network said a two-story [CLT building is being tested](#) on a special shake table at the University of California San Diego to see how it would handle forces produced by a 6.7 magnitude earthquake, the same as the 1994 Northridge quake in the Los Angeles area. The test, led by the Colorado School of Mines, will help engineers determine whether quake-resistant CLT buildings could be as tall as 20 stories, the website said.



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