



Compartment Fire Testing For Exposed Wood in Tall Timber Structures

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TWB Ad Hoc Objectives

TWB identified performance objectives to be met:

1. No collapse & complete burn-out of fuel (even ignoring sprinklers!)
2. No undue radiation exposure to adjoining properties
3. Check adverse response to radiation from adjacent properties
4. Fire department accessibility
5. Egress systems protect building occupants during design escape time
6. Enhanced fire suppression system reliability



TWB Committee

The TWB Committee created fire test scenarios to study and validate their code change proposals

- Large test structure (multi-story)
- 30' x 30' interior dimensions
- Fuel load of 570 MJ/m² ; 85th percentile for residential
- Tests 2 & 3: Exposed mass timber on ceiling and walls
 - Exposed areas targeted safe levels based on materials available at the time
 - Code limits were established based on these tests
 - However, materials have evolved since the tests, and exhibit better fire performance now



Question: Can increased areas be justified, given improved fire performance?

Testing and Research at RISE

Funded by USDA grant

Similar to compartment tests in 2018, EXCEPT:

- Using PRG 320-18 compliant CLT
 - Enhanced fire performance
- Increased areas of exposed mass timber

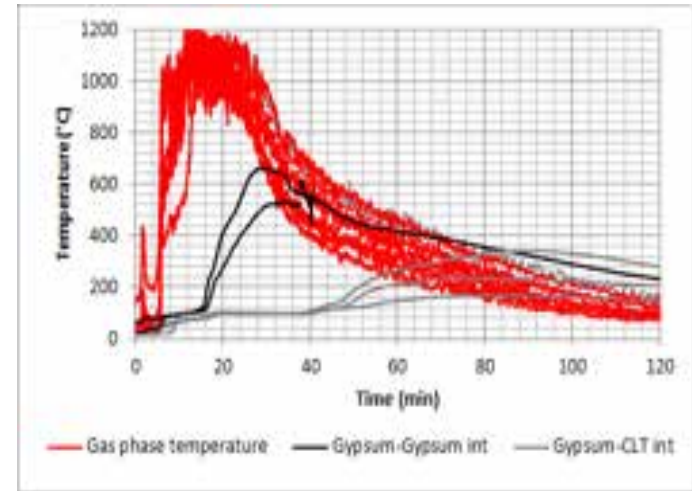


Testing and Research at RISE

Objective:

- Determine whether increased areas of exposed mass timber are justifiable using CLT compliant with PRG 320-18

Test results currently under analysis



Testing and Research at RISE

Test Number	Description	Result
Test 1	Two openings; ceiling exposed	No fire re-growth; "passing" criteria met
Test 2	Two openings; ceiling and two opposing walls exposed	No fire re-growth; "passing" criteria met
Test 3	Two openings; ceiling, two opposing walls, and front walls exposed (protection only on back wall)	Fire re-growth at 3.5 hours; "passing" criteria not met
Test 4	Six openings; ceiling, two opposing walls, and front walls exposed (protection only on back wall)	No fire re-growth; "passing" criteria met
Test 5	Repeat of Test 3, but with small, strategically placed areas of protection on walls	No fire re-growth; "passing" criteria met





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