

Abstract

This thesis describes a series of 5 tests that were conducted at Carleton University Fire Research Laboratory to assess the contribution of Cross Laminated Timber (CLT) panels to the development, duration and intensity of room fires. The tests were conducted in rooms constructed from 105 mm thick 3-Ply CLT panels and measured 3.5m wide by 4.5 m long by 2.5 m high. Propane and furniture fires were used with the CLT panels in protected and unprotected configurations. Data was collected on Heat Release Rate (HRR), room temperatures and charring rates. In protected configurations, no noticeable contribution was observed from the CLT panels, however in unprotected configurations, the CLT panels contributed to the fire load and increased fire growth rates and energy release rates. When charring advanced to the interface between the CLT layers, the polyurethane based adhesive failed resulting in delamination. Delaminated members contributed to the fire load and exposed uncharred timber which increased the intensity and duration of the fire. When delamination occurred, the fire in unprotected rooms continued to burn at high intensity well after the combustible contents in the room were consumed by the fire. These fires were extinguished as they could have resulted in structural failure of the test rooms.