ABSTRACT

This thesis studies the fire behaviour of Cross Laminated Timber (CLT) panels in partially protected rooms. A one-dimensional heat transfer model was developed to determine the fire resistance of CLT floor and wall panels. During this study, three room fire tests were conducted at Carleton University Fire Research Laboratory to determine the maximum percentage of unprotected CLT surface area that will yield similar results to that of a fully protected room. The rooms had a single opening and were constructed entirely using 3-ply, 105 mm thick CLT panels. A non-standard, parametric fire using furniture and clothing as fuel was used and 2 layers of gypsum board were used to cover the ceiling and the protected walls. The Heat Release Rate, temperature, charring rate and gypsum falloff time of each test was collected. The results obtained from the room test were then compared to the numerical heat transfer model to evaluate its accuracy.