Self-Extinguishment of Cross-Laminated Timber

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Summary:

Cross-laminated timber, or CLT, is receiving attention for its potential use in tall buildings. As a combustible material, one of the challenges for the construction of these buildings is the fire risk that results from its use in the structure. Unprotected CLT can burn along with the fuel load present in a compartment. Irrespective of its fire resistance rating, it is uncertain whether the structure will be totally consumed in the event of a complete burnout, or whether a fire would decay by self-extinguishment. Self-extinguishment of CLT was investigated by first creating a theoretical model that determined the conditions under which it could be achieved. Two series of experiments were subsequently conducted to quantify these conditions. Based on these experiments it was concluded that there is a potential for self-extinguishment of CLT if: delamination and falloff of charred layers are prevented by applying sufficiently thick lamellae; the heat flux on the CLT during smouldering is below 5 to 6 kW/m2; and the airflow over the CLT surface during smouldering is limited to a speed of 0,5 m/s at heat flux exposures below 6 kW/m2.

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