UQ Fire Project #2019.09

FIRE PERFORMANCE OF LAMINATED VENEER LUMBER (LVL) STRUCTURES

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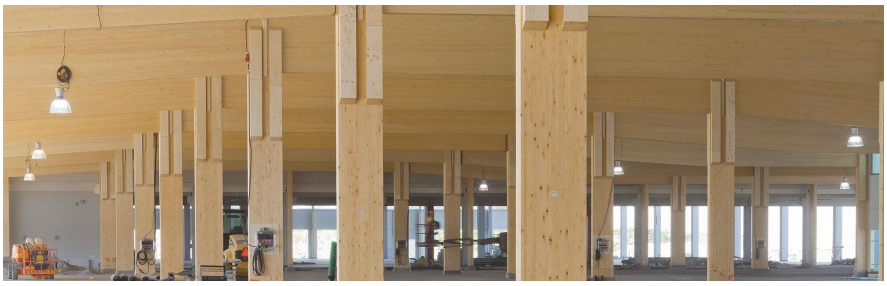
Keywords
Timber, LVL, structural analysis, heat transfer, fire performance

Background and motivation

Laminated Veneer Lumber (LVL) is a high-strength engineered wood product made from veneers bonded together under heat and pressure. LVL is comparable in strength to solid timber, concrete and steel and is manufactured by bonding together rotary peeled or sliced thin wood veneers under heat and pressure. LVL provides a cost-effective and sustainable building material, delivering high structural reliability and strength. LVL portal frames can be used for structural applications for commercial and industrial buildings whose functions necessitate long spans and open interiors. LVL portal frames offer a strong, sound and superior structure. Structural action is usually achieved through rigid connections between column and rafter at the knees, and between the individual rafter members at the ridge. The structural fire performance of LVL portal frames must be understood before these can be used with the confidence, we use other building construction materials



https://www.metsawood.com/global/news-media/references/Pages/DB-Schenker.aspx

Research objectives

This research will investigate into models (first analytical and then numerical) that can describe the behaviour of LVL portal frames during fire and after fire. Data from ongoing experimental tests will be used as input for models and validation. The student will be invited (non-mandatory) to participate in experimental testing and data analysis.

Methodology

This project will be conducted in the following stages:

1. Understanding load-bearing structural systems using LVL and details of their design.
2. Generate the basis for modelling LVL during and after fire (thermal and mechanical response); potential model and input data used.
3. Develop a model (first analytical and then numerical) to compare against experimental data.

Recommended literature

[1] Smith T et al. (2012). The Demountability, Relocation and Re-use of a High Performance Timber Building. Proceedings of the *9th Pacific Conference on Earthquake Engineering Building an Earthquake-Resilient Society*, 14-16 April, 2011, Auckland, New Zealand. **[link]**