

Forestry Graduate Student Research Poster Competition Registration Form

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Title of Poster

Performance of a Deconstructable Grout-Reinforced Hybrid Shear Connection for Tall Mass Timber Buildings

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Abstract

No more than 250 words. Both the abstract and the poster will be published on the Forestry website.

As the National Building Code of Canada (NBCC) allows for taller timber buildings, there is a need for systems that meet the performance-based code requirements, novel connection solutions appropriate for the large demands on tall timber buildings, and deconstructable and reusable assemblies to reduce the impact on the forestry sector and increase life-span. This research presents a new hybrid shear connection for tall mass timber buildings that allows for easy construction, deconstruction, and reuse of the structural elements. The connection consists of a threaded steel rod reinforced with a layer of epoxy grout and embedded into a CLT panel. The structural performance of shear connections with varying rod diameter, grout thickness, and CLT grade is analyzed. An insight into the behaviour under quasi-static monotonic incremental loads is given based on a comprehensive experimental campaign, with a total of 84 push-out tests performed on squared cross-laminated timber (CLT) specimens. Experiments show the grout layer provides a smooth transfer of internal forces from the steel to the wood, reducing local normal stresses in the CLT and stiffening the steel rod. Observed failure modes suggest that load-carrying capacity and stiffness models, as per common wood bolted connections, can be developed. This high-performance shear connection has great potential for deconstruction and reuse and supports prefabricated hybrid CLT-based structural solutions for large-scale building construction.