Performance of Timber-to-Steel Bolted Connections Exposed to Fire

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Summary:

This paper summarizes the experimental results from a series of tests that investigated the performance of timber-to-steel tensile connections exposed to fire. A series of fire-resistance tests were conducted on bolted wood-steelwood and steel-wood-steel connections loaded in tension. Each specimen had different cross-sectional area, fastener diameter, fastener spacing, edge distance, and tension load. The fire temperature profile produced by the furnace used both the standard time-temperature curve CAN/ULC-S101 and a non-standard time-temperature curve based on previous studies done at Carleton University. Results showed that the wood-steel-wood specimens had a longer time to failure than steel-wood-steel specimens with the same dimensions. The heat transfer and structural modeling portion of this research is currently underway using three-dimensional finite-element models.

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