**Aaron Akotuah Ohene**

## Modelling the Fire Performance of Hybrid Steel-Timber Connections

In a building structure, wood can be used in conjunction with steel or concrete material to form what is known as a hybrid building system. A hybrid system combines the efficient properties of the different materials to achieve design requirements such as structural or fire safety.

In this research, a typical steel-timber hybrid system is considered. This steel-timber hybrid system consists of a glulam wooden beam connected to a steel column. The connection of the beam to the column is composed of three different types of shear tab connections: concealed, exposed and seated connections. These connections transfer vertical loads between the beams and columns in a hybrid structure. The fire resistance of these connections is evaluated using a finite element model and compared with the full-scale experimental fire resistance tests which had been conducted earlier in a separate project. The major parameters studied included load ratio, heat transfer, charring properties of wood, failure mode of the wood, and their influence on the time to failure of the connections.

The finite element model results were in good agreement with the observations made from the experimental tests. The variation between the test and the model results was within a ±11% envelope. In conclusion, the seated connection had a better fire resistance as compared to the concealed and exposed connections.

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**Supervisor(s):**

Professors Jeffrey Erochko and George V. Hadjisophocleous