

Connection Behavior in Contemporary Canadian Buildings Subjected to Real Fires

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In structural performance-based fire design (Pbfd), engineers design a structure to resist realistic fire scenarios demonstrating the desired performance goals analytically. Pbfd currently sees varying levels of adoption throughout the world, with its inclusion in projects typically depending on the complexity of the project itself, the construction of the building, and the regulatory environment in which that project exists. This study outlines the Pbfd of a contemporary Canadian building that was assessed for a range of realistic design fires including travelling fires, which is a severe and probable fire event in contemporary structures which has received little research attention in Canada. In particular, the paper focuses on the behavior of the connections in the composite steel structure when whole building response is considered. Connections in these real fire scenarios experience very large axial demand which must be considered during design, the magnitude and duration of these axial demands differing greatly depending on the fire considered (standard, parametric and travelling). Regardless of the design approach for a building, understanding and being able to quantify the behavior of the connections for a range of fire scenarios is critical to ensure a resilient structure for extreme fire events.