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ABSTRACT**

Title of abstract:	Restrained Lateral-Torsional Buckling in Unprotected Steel I-Beams Under Fire Loading
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Abstract:	<p>Lateral-torsional buckling is a well-known phenomenon in the design of slender steel beams at ambient temperature, with a proliferation of design guidance in structural codes to prevent its premature occurrence. Slender I-beams without adequate lateral restraint usually buckle in a lateral-torsional mode before their plastic moment capacity is attained. Despite its significance in the design of steel I-beams at ambient temperature, research on the lateral-torsional buckling of slender steel beams at elevated temperature is scarce and most of this limited research has focused on the lateral-torsional buckling of laterally-unrestrained beams. In real steel framed buildings, the steel beams are likely to experience some degree of lateral restraint provided by the structural components they support. Because of this, it is important that the lateral buckling response of steel beams in fire is researched comprehensively, so that economical and safe fire designs can be achieved. The model presented herein considers elastic lateral-torsional buckling of an unprotected steel beam in a frame building, based on a Rayleigh-Ritz energy technique. The prebuckling analysis is derived from a closed-form solution, which enables the prebuckling in-plane stresses to be calculated accurately. It is recognised that critical thermal regimes, which participate in lateral-torsional buckling of the member, are greatly influenced by the levels of restraint afforded by the cooler adjacent portions of the frame in a compartment fire. The theory is demonstrated with a simple example.</p>