1. **Fire performance of cold-formed steel sections**

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Thin-walled cold-formed steel (CFS) has exhibited inherent structural and architectural advantages over other constructional materials, such as high strength-to-weight ratio, ease of fabrication, economy in transportation and the flexibility of sectional profiles. They have been increasingly used as intermediate members and load-bearing components in low- and mid-rise buildings. However, since CFS members are always relatively thin (thickness normally from 0.9 to 8 mm), open cross-section, and have great flexural rigidity difference between the two axes within the cross-section, the members are susceptible to various buckling modes which usually govern their ultimate failure. Furthermore, using CFS members in building structures has been facing challenges due to the lack of knowledge about their performance at elevated temperatures and the lack of fire design guidelines. Therefore, this project has the aim of providing better understanding of the buckling performance of CFS channel members at elevated temperatures. The primary objective is to provide a reliable research method to investigate the buckling performance of CFS members under non-uniform temperatures, particularly the aspects of pre-buckling stress distribution, elastic buckling and nonlinear ultimate failure behaviour. The Finite Strip Method (FSM) has been used to develop a Matlab program to investigate the elastic buckling behaviour of CFS members at elevated temperatures. The Finite Element Method (FEM) is used to carry out heat transfer analysis to get the temperature distributions, and to conduct nonlinear analysis to investigate the ultimate failure of CFS beams in fire.