

Interface thermal behaviour of Composite sections with the Finite Element Method

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Concrete filled steel tube(CFT) and concrete filled double skin steel tube(CFDST) sections are called composite construction sections, which contains steel tubes and concrete cores. Composite construction sections have been widely used as columns, especially in high-rise building structures and bridge piers. After the 911 attack event, fire resistance is the major factor that needs to be considered in steel structures. An extensive thermal study is conducted at the interface on both CFT and CFDST sections under compressive loading with the Finite Element Method. One unheated section will be simulated for comparison. The contact thermal property and material thermal properties will be involved in this paper. Based on parametric analysis outcomes, the influence of the heating time, interface types and types of composite sections on the mechanical behaviour are considered. Test results indicate that the time length of fire exposure has a significant impact on the interface between steel tubes and concrete cores; also, the mechanical behaviour of CFT sections and CFDST sections are quite different under a fire condition. Further compared results of composite sections under a fire condition are investigated in this paper.