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3D model for axially loaded square concrete steel tubular columns subjected to fire

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Concrete filled steel tubular column exhibits various advantages over steel and reinforced concrete columns. Nevertheless, it is difficult to predict its fire resistance properties due to non-linear behaviour of steel and concrete at elevated temperatures. In this study, a 3D numerical model was developed by using finite element software, ABAQUS 6.12, to predict the thermal and structural behaviour of axially loaded square concrete filled steel tubular column subjected to fire. The range of specimens is limited to dimensions of cross-section, type of concrete (plain or bar-reinforced), steel tube thickness, as well as thickness of fire protection. Our results demonstrated numerically predicted temperature development across the column's cross-section and fire resistance. It corroborated with those reported by previous researchers and Eurocode 4 simplified calculation model. In fact, proposed 3D numerical model proved to be capable of providing better fire resistance predictions than Eurocode 4 calculation model. Therefore, the verified 3D numerical model was used as an alternative to conduct an in-depth study of the fire behaviour of axially loaded steel tubular column filled with concrete.

Biography

Mahmood Md Tahir is currently working as a professor in the department of Structures and Materials at UTM (*University Technologi Malaysia*). His Research interest includes Light Steel Flaming, Column Sections in Multi-Storey, Un-braced Steel Frame Design and Advanced Design of Steel Structures. He had published many articles in the reputed Journals.

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Notes:

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