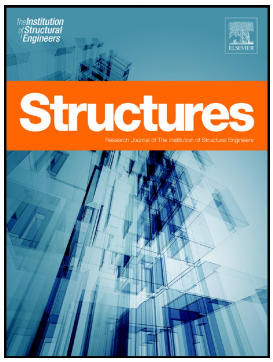

Behaviour of Concrete-filled Double-skin Short Columns Under Compression Through Finite Element Modelling: SHS Outer and SHS Inner Tubes

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Behaviour of concrete-filled double-skin short columns under compression through finite element modelling: SHS outer and SHS inner tubes

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Abstract

Concrete-filled double-skin tubular (CFDST) columns are formed by sandwiching concrete between two concentric hollow steel tubes. The result is a composite column with the benefits of both steel and concrete properties. When compared to a traditional concrete-filled steel tube (consisting of a single hollow steel tube instead of two), CFDST column is found to have greater axial, flexural and torsional strengths as well as improved strength-to-weight ratios. However, developments in CFDST column configurations can be made by altering the cross-section shape of the steel tubes, which is generally formed from square and circular ones. This paper considers the square CFDST short columns with inner square hollow sections (i.e. SHS outer and SHS inner tubes). This is because; in additional to their advantages shown above, they were seldom considered in literature especially by virtual testing. Accordingly, this paper is devoted for the finite element (FE) modelling of this type of composite columns by using ABAQUS program. Innovatively, this paper, rather than different investigations in literature, uses the most accurate constitutive models of both the