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Behaviour of single laced columns versus double laced columns

Hasheela, Pamwenafye Fillemon.

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ABSTRACT

This study discusses the behaviour of built-up single columns versus double laced columns.

Finite Element Analyses was applied to evaluate buckling load, torsion resistance and modes of buckling. All simulations are performed using ABAQUS Version 6.8 (Dessault Systems, Inc.). An eight-node shell element was used for the nonlinear solution. To ensure the finite element solution was valid, a convergence study was concluded. The parametric study has considered different column widths, end supports and types of brace configuration. The behaviour has been analysed at varied load ratio. Two cases of different end supports have been investigated.

The results show less variability within different bracing configurations. The X-configuration showed best performance by 3-10% and 1-8% for single and double laced column respectively. A buckling load variation of 15%-25**%** and 1%-3% for single and double laced columns respectively was observed. A combination of maximum critical load and minimum degree of torsion is achieved at load ratio close to one.