

Buckling Performance of Irregular Section Cold-Formed Steel Columns under Axially Concentric Loading

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Abstract : This paper presents experimental investigation and finite element analysis on buckling behavior of irregular section cold-formed steel columns under axially concentric loading. For the experimental study, four different sections of columns were tested to investigate effect of stiffening and width-to-thickness ratio on buckling behavior. For each of the section, three lengths of 230, 950 and 1900 mm. were studied representing short, intermediate long and long columns, respectively. Then, nonlinear finite element analyses of the tested columns were performed. The comparisons in terms of load-deformation response and buckling mode show good agreement and hence the FEM models were validated. Parametric study of stiffening element and thickness of 1.0, 1.15, 1.2, 1.5, 1.6 and 2.0 mm. were analyzed. The test results showed that stiffening effect pays a large contribution to prevent distortional mode. The increase in wall thickness enhanced buckling stress beyond the yielding strength in short and intermediate columns, but not for the long columns.

Keywords : buckling behavior, irregular section, cold-formed steel, concentric loading

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