

Improvement of Buckling Behavior of Cold Formed Steel Uprights with Open Cross Section Used in Storage Rack Systems

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Abstract : In this paper, structural behavior and improvement of buckling behavior of cold formed steel uprights with open cross-section used storage rack system are studied. As a first step, in the case of a stiffener having an inclined part on the flange, experimental and nonlinear finite element analysis are carried out for three different upright lengths. In the uprights with long length, global buckling is observed while distortional buckling and local buckling are observed in the uprights with medium length and those with short length, respectively. After this point, the study is divided into two groups. One of these groups is the case where the stiffener on the flange is folded at 90°. For this case, four different distances of the stiffener from the web are taken into account. In the other group, the case where different depth of stiffener on the web is considered. Combining experimental and finite element results, the cross-section giving the ultimate critical buckling load is selected.

Keywords : steel, upright, buckling, modes, nonlinear finite element analysis, optimization

Conference Title : ICSE 2017 : International Conference on Structural Engineering

Conference Location : London, United Kingdom

Conference Dates : May 25-26, 2017