

Comparative Study of Numerical and Analytical Buckling Analysis of a Steel Column with Various Slenderness Ratios

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Abstract : This scientific paper explores the comparison between the ultimate buckling load obtained through the Eurocode 3 methodology and the ultimate buckling load obtained through finite element simulations for steel columns under compression. The study aims to provide insights into the adequacy of the design rules proposed in Eurocode 3 for different slenderness ratios. The finite element simulations with the Ansys commercial program involve a geometrical and material non-linear analysis of the columns with imperfections. The loss of equilibrium is generally caused by the geometrically nonlinear effects where the column begins to buckle and lose its stability when the load reaches a certain critical value. The linear buckling analysis predicts the theoretical buckling strength of an elastic structure but the nonlinear one is more accurate with taking into account the initial imperfection.

Keywords : Ansys, linear buckling, eigen value, nonlinear buckling, slenderness ratio, Eurocode 3

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