

NON-LINEAR BEHAVIOUR OF THIN-WALLED HOLLOW CIRCULAR STEEL TUBES

K.Chithira¹ and K. Baskar^{2*}

¹Research Scholar, ²Associate Professor

National Institute of Technology, Tiruchirappalli.

**Communicating Author, e-mail: drkbaskar@yahoo.co.in*

Phone: 0091-431-2503161, Fax: 0091-431-2500133

ABSTRACT

This paper deals with a numerical investigation on Thin-walled Hollow Circular steel tubular columns under Axial load Condition. A finite element model is developed using the general purpose finite element software ANSYS and is used to carry out complete non-linear analysis. The proposed FE model is validated through the available experimental results reported by other researchers. In total, sixty six specimens with different D/t and L/D ratios have been considered in this present study. Analyses were carried out until collapse of specimen and the complete non-linear behaviour was studied. The numerically predicted values have been compared with Perry-Robertson and modified Perry-Robertson predictions and were found that those two equations predicted the ultimate load carrying capacity of column members to a higher accuracy for columns having a L/D ratio less than 30 and after a large difference was found between the numerically predicted values and the other two predictions. Based on the numerical results a new design equation has been proposed herein in view of predicting the ultimate load carrying capacity of hollow circular steel tubular columns which were having larger L/D ratios until 75. The proposed design equation has been verified through available experimental results reported by other researchers and found to be more reliable. This paper presents the complete procedure involved in the numerical analysis and the proposed design equations.

Keywords: *Hollow Steel Tube; Circular Hollow Section; CFT; FEM; Buckling*