NON-LINEAR MODELLING OF CASTELLATED BEAMS IN BENDING

Radić, I.; Markulak, D. & Džeba, I.

Abstract: Contrary to the prenorm ENV 1993-1-1:2002/A2:2008 the final version of the European norm for the design of steel structures EN 1993-1-1:2005 does not afford special attention to castellated beams. Therefore, engineers should determine the resistance of castellated beams by application of the finite element method (§ 6.3.4.). Furthermore, determining the lateral-torsional buckling resistance of castellated beams is more complicated because appropriate buckling curves are not assigned in this norm. The non-linear modelling of castellated beams in bending according to recommendations given in EN 1993-1-1:2005 is shown in this paper. Moreover, while modelling this structural element geometrical and material non-linearity are taken into account. 3D models of beams are used and the design resistance to lateral-torsional buckling is determined by computer programme NISA II/DISPLAY. The cross-section, span and restraint conditions of the castellated beam matched the tested castellated beam in the laboratory.

Key words: castellated beam, lateral-torsional buckling, non-linear modelling, FEM.

Authors' data: Radić, I.[van], C. Eng, University of Osijek J. J. Strossmayer, Faculty of Civil Engineering, Drinska 16a, Osijek, Croatia, radic@gfos.hr; Prof. Markulak, D.[amir], Ph. D., C. Eng, University of Osijek "J. J. Strossmayer", Faculty of Civil Engineering, Drinska 16a, Osijek, Croatia, markulak@gfos.hr; Prof. Džeba, I.[vica], Ph. D., C.Eng, University of Zagreb, Faculty of Civil Engineering, Kačićeva 26, Zagreb, Croatia, ivci@gfos.hr.