World Academy of Science, Engineering and Technology
International Journal of Civil and Architectural Engineering
Vol:11, No:11, 2017

Lateral Torsional Buckling Investigation on Welded Q460GJ Structural Steel Unrestrained Beams under a Point Load

Authors : Yue Zhang, Bo Yang, Gang Xiong, Mohamed Elchalakanic, Shidong Nie

Abstract : This study aims to investigate the lateral torsional buckling of I-shaped cross-section beams fabricated from Q460GJ structural steel plates. Both experimental and numerical simulation results are presented in this paper. A total of eight specimens were tested under a three-point bending, and the corresponding numerical models were established to conduct parametric studies. The effects of some key parameters such as the non-dimensional member slenderness and the height-to-width ratio, were investigated based on the verified numerical models. Also, the results obtained from the parametric studies were compared with the predictions calculated by different design codes including the Chinese design code (GB50017-2003, 2003), the new draft version of Chinese design code (GB50017-201X, 2012), Eurocode 3 (EC3, 2005) and the North America design code (ANSI/AISC360-10, 2010). These comparisons indicated that the sectional height-to-width ratio does not play an important role to influence the overall stability load-carrying capacity of Q460GJ structural steel beams with welded I-shaped cross-sections. It was also found that the design methods in GB50017-2003 and ANSI/AISC360-10 overestimate the overall stability and load-carrying capacity of Q460GJ welded I-shaped cross-section beams.

Keywords : experimental study, finite element analysis, global stability, lateral torsional buckling, Q460GJ structural steel
Conference Title : ICCEA 2017 : International Conference on Civil Engineering and Architecture
Conference Location : Bangkok, Thailand
Conference Dates : November 29-30, 2017