EFFECTIVE USE OF Q690 WELDED H-SECTIONS IN BUILDING CONSTRUCTION

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ABSTRACT

Owing to high strength to self-weight ratios in Q690 steel materials, there is a strong request from structural engineers to use these high strength steel materials in construction, especially to those heavily loaded and long spanning structures without the concern of seismic actions. This presentation reports a comprehensive experimental investigation on Q690-QT welded H-sections of various lengths under practical loading conditions, i.e. columns under i) compression, and ii) under combined compression and bending. Among a total of 15 column tests, all the columns failed in overall axial buckling with bending about minor axes while plastic local plate buckling was apparent in those sections with wide flanges. The design methods given in Structural Eurocode EN 1993-1-1 have been calibrated through the use of the test results. It is demonstrated that the design methods are structurally adequate as well as economical in designing columns of Q690 welded H-sections under practical loading conditions with properly selected parameters, especially when bending about minor axes of the cross-sections is involved.

Keywords: Welded H-sections, columns under compression, columns under combined compression and bending, column buckling design.