

NUMERICAL INVESTIGATION INTO NET-SECTION RESISTANCES OF HIGH STRENGTH STEEL BOLTED CONNECTIONS

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ABSTRACT

This article presents a numerical investigation of the net section resistance of 30 bolted connections made of high strength steel (HSS) and mild steel (MS) using finite element method. Three types of steel were investigated, namely, S275, Q690 and Q960. All the connections were equipped with four bolts with double lap plates. The failure mode of the specimens was net section fracture. The connection efficiency, the ratio of the test ultimate load to the ultimate net section resistance (A_{netfu}), was also analysed. The connection efficiency of the specimens with S275, Q690 and Q960 steels varied between 1.03 and 1.09, 1.04 and 1.12, and 1.05 and 1.12, respectively. It can be concluded from the analysis results that the examined HSS bolted connections are able to reach the ultimate net section resistance (A_{netfu}) at failure even though the ratio of tensile strength to yield strength and the ductility of HSS material are relatively much lower than those of normal structural steel.