

PRELIMINARY TESTS ON BLOCK SHEAR FAILURE OF BOLTED HIGH STRENGTH STEEL ANGLES

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ABSTRACT

This paper presents the preliminary test results of block shear strength and behaviour of bolted angles of high strength steel (HSS). Five full-scale bolted steel angles were tested, including four angles of high strength steel (Q690) and one angle of normal structural steel (S275) for comparison. Besides, comparisons between the test results and the predictions according to the design equations stipulated in AISC-2016, Eurocode 3, CSA S16-14, and the design methods proposed by Teh and Yazici [11] and Topkaya [6] were made to examine the applicability of these design equations to evaluate the block shear capacity of HSS bolted angles. The test results show that all the specimens failed in block shear failure mode. Fracture first occurred at the tensile plane, followed by the fracture of the shear plane with further increase of member elongation. The design equations of AISC-2016 and Eurocode 3 give conservative predictions of the block shear capacities of the HSS test specimens, while design equations of CSA S16-14 and Topkaya [6] overestimate the block shear capacities. Moreover, the design equation proposed by Teh and Yazici [11] provides good predictions of block shear capacities of the HSS bolted angle specimens.