

EXPERIMENTAL INVESTIGATION INTO STUB COLUMN BEHAVIOUR OF HIGH STRENGTH STEEL OCTAGONAL HOLLOW SECTIONS

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Abstract. An experimental investigation into the stub column behaviour of high strength steel octagonal hollow sections (OctHSs) is presented in this paper. A total of 16 specimens, covering a wide range of side length to thickness ratio (b/t) from 10.3 to 32.3, were tested. The hollow section specimens were fabricated by welding two cold-formed half-sections. Flat coupons extracted from virgin plates and flat portions of the hollow tubes, and corner coupons taken from the corner portions were examined to obtain the steel material properties. The cross-sectional resistance (peak axial load), axial load-axial shortening curves and failure modes of the stub column tests were presented. Finite element models (FEMs) were established and validated against the test results generated in this paper. FEMs with corner strength enhancement extended to a width of t offer the best agreement with test results. The validated FEMs were then used to conduct comprehensive parametric studies to supplement the test data. Based on the results from tests and FEM simulations, the cross-section slenderness limits and cross-sectional capacities specified in current design methods were evaluated.