

Effect of Tube Thickness on the Face Bending for Blind-Bolted Connection to Concrete Filled Tubular Structures

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Abstract : In this paper, experimental testing and numerical analysis were used to investigate the effect of tube thickness on the face bending for concrete filled hollow sections connected to other structural members using Extended Hollobolts. Six samples were tested experimentally by applying pull-out load on the bolts. These samples were designed to fail by column face bending. The main variable in all tests is the column face thickness. Finite element analyses were also performed using ABAQUS 6.11 to extend the experimental results and to quantify the effect of column face thickness. Results show that, the column face thickness has a clear impact on the connection strength and stiffness. However, the amount of improvement in the connection stiffness by changing the column face thickness from 5 mm to 6.3 mm seems to be higher than that when increasing it from 6.3 mm to 8 mm. The displacement at which the bolts start pulling-out from their holes increased with the use of thinner column face due to the high flexibility of the section. At the ultimate strength, the yielding of the column face propagated to the column corner and there was no yielding in its walls. After the ultimate resistance is reached, the propagation of the yielding was mainly in the column face with a minor yielding in the walls.

Keywords : anchored bolted connection, Extended Hollobolt, column faces bending, concrete filled hollow sections

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