

Experimental Study on Static Strength of Tubular Y-Joints

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Summary

A typical Y-joint is made up of a chord member and a brace member. In this structure, the brace member is usually subjected to axial load, and so the chord is always subjected to radial load which is transferred from the brace member. As the stiffness of the chord in the radial direction is usually much smaller than that of the brace in the axial direction, failure often occurs near the weld toe on the chord surface. Increasing the thickness of the chord near the weld toe can enlarge the radial stiffness of the chord, and thus it can improve the static strength of the joint. In this paper, experimental tests on 2 un-reinforced and 2 reinforced typical circular tubular Y-joints specimens subjected to brace axial compressive loading are tested. It is found from experimental measurements that the static strength of a tubular Y-joint can be greatly improved by increasing the chord thickness locally near the brace/chord intersection. Additionally, the failure mode of the Y-joint with reinforced chord may be different when the local chord thickness is reinforced to an enough extent. Local buckling around the weld toe, which is the most failure mode for an un-reinforced tubular Y-joint, can be avoided in the above case for the corresponding reinforced model.

