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PROCEEDINGS

Fatigue Behaviors of Thick Cruciform Joints Made by Q355D Structural Steel Under Different Post-Welding Treatments

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ABSTRACT

Different post-welding treatments, such as TIG-Dressing, blinding, HFMI et.al are often used for steel welded joints in construction machinery manufacturing as an effective and reliable method for fatigue strength improvement. This paper investigates the fatigue performance of thick Q355D cruciform joints in heavy load-carrying steel structures under different treatments. Two TIG-Dressing treatments, blinding and HFMI for the full-penetration welded joints were used for fatigue tests. Experimental tests studied the fatigue strength of cruciform welded joints of Q355D structural steel under different treatments. The geometric parameters and relevant statistical analyses were performed by actual 3D optical measurement. Moreover, the stress concentration factors are calculated according to the actual geometrics of the welded joint. On the other hand, the effective notch stress and hot spot stress methods were employed to evaluate the fatigue data of Load-Carrying Welded joints (LCWJs) under different notch radius. The collected fatigue data from the literature was compared with the tested data by the above methods. The fatigue strength of LCWJs under different treatments are compared. The corresponding fatigue assessment has been evaluated according to some typical methods.

KEYWORDS

Fatigue strength; post-welding treatments; cruciform welded joint; notch stress

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