

Experimental Investigation on Residual Stresses in Welded Medium-Walled I-shaped Sections Fabricated from Q460GJ Structural Steel Plates

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Abstract : GJ steel is a new type of high-performance structural steel which has been increasingly adopted in practical engineering. Q460GJ structural steel has a nominal yield strength of 460 MPa, which does not decrease significantly with the increase of steel plate thickness like normal structural steel. Thus, Q460GJ structural steel is normally used in medium-walled welded sections. However, research works on the residual stress in GJ steel members are few though it is one of the vital factors that can affect the member and structural behavior. This article aims to investigate the residual stresses in welded I-shaped sections fabricated from Q460GJ structural steel plates by experimental tests. A total of four full scale welded medium-walled I-shaped sections were tested by sectioning method. Both circular curve correction method and straightening measurement method were adopted in this study to obtain the final magnitude and distribution of the longitudinal residual stresses. In addition, this paper also explores the interaction between flanges and webs. And based on the statistical evaluation of the experimental data, a multilayer residual stress model is proposed.

Keywords : Q460GJ structural steel, residual stresses, sectioning method, welded medium-walled I-shaped sections

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