Abstract

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Prognoses the Residual Stresses in Steel T-Beams Using Acoustic Emission Method

Poor welding technique is considered to be one of the most common causes of residual stresses during the fabrication of metallic structures. The severe thermal gradient in the welding process and uneven cooling that follows, results in residual stresses and distortion. The aim of this paper is to predict experimentally the formation of residual stresses in T-section beams using Acoustic Emission (AE) technique. Series of laboratory bending tests were carried out on four welded T-section beams with four different welding sequences and different values of residual stresses were evaluated and characterized. The AE energy measured was directly proportional to the amount of the residual stresses locked into the structure. The testing showed promising results, which indicate that AE technique could be used as a screening mechanism for monitoring residual stresses. However, further study and investigation on different specimens with different materials and dimensions should be performed.