

Residual Stresses and Stress Intensity Factor Calculations in T-Welded Joints

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Abstract

In welded joint, the residual stresses effect can be considered using the residual stress intensity factor (K_{res}). In this study, K_{res} is calculated using the analytic weight function method (WFM) and the polynomial distribution of residual stresses (σ_{res}). The different residual stress distributions have been used analytically. It is to be emphasized that the current approach is little investigated. This is because the weight function has already been developed to calculate K for a crack that had already existed, and hence to calculate the stress distribution and stress intensity factor over the crack face. Therefore, the current approach calculates K_{res} with σ_{res} consideration for the crack which initiates and propagates until failure. The validity to use the proposed weight function has been shown. The results of K_{res} have been compared with those obtained from FEM.