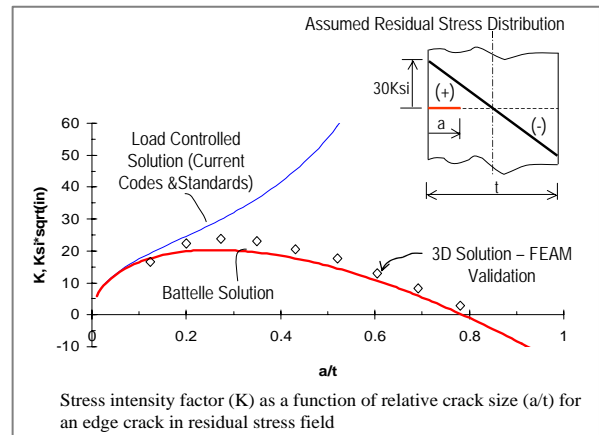


Fitness for Service Method Incorporating Residual Stresses

Welded Structures

Your Challenge

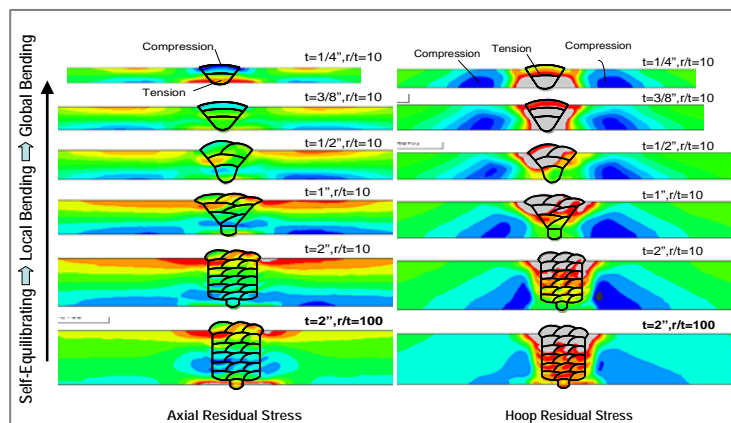
Welding-induced residual stress distributions are required as a priori in performing fracture mechanics based fitness-for-service assessment of welded components. Unfortunately, residuals stress prescriptions in current Codes and Standards are not only very limited and overly conservative, but also significantly inconsistent from one Code to another. In addition, almost all FFS procedures in treating weld residual stresses do not consider the residual stress



redistributions in fracture mechanics parameter calculation, resulting in a gross over-estimation of residuals stress effects on structural integrity. To obtain a reasonable residual stress estimate, the required computational and experimental analysis procedures can be too cost-prohibitive to be used in performing day to day FFS assessments.

Our Solution

Over the last several decades, Battelle's Center for Welded Structures Research has developed a unique suite of most advanced computational simulation tools to date. These tools have been used to develop comprehensive residual stress distributions for FFS



applications for many joint geometries and component types, validated by a large amount of detailed measurement data. With the unprecedented knowledge base on residual stresses, a unified residual stress description has been developed by capturing the most critical parameters that govern the through-thickness residual stress distributions for FFS purposes.

The Battelle Difference

Battelle's residual stress modeling and fracture mechanics treatment methods have been adopted by new revisions of API 579RP and ASME Div 2. Battelle's parametric residual stress descriptions and displacement controlled K solutions are currently being adopted by BS7910 in UK and FITNET (fitness for service network) in Europe. Battelle continues to advance the FFS technologies with a number of major Joint Industry Projects (JIP) sponsored both a large number of US and International organizations.

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