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ABSTRACT

The operational and plant assessment experience indicates that in the majority of cases where high temperature failure occurs, defects predominate in the vicinity of weldments. Cracking occurs in service due to reduced creep ductility of HAZ and weld metal in service, combined with the action of multi-axial stress fields that reduce the creep ductility further.

The structural integrity and residual life assessment of high temperature components require defects detected or assumed to exist through minimum allowable limits of detectable flaws. It relies on information obtained from the material's high temperature tensile, uniaxial creep, crack initiation and growth properties. The information derived from experiments needs to be validated and harmonised following a Code of Practice (CoP) that data variability between different institutions can be reduced to a minimum. Similar and dissimilar weld behaviour and assessment of components at high temperatures is reviewed. Experimental crack growth data is presented supported with metallographic damage assessment.

An overview is presented on the developments in high temperature weld design, characterisation and defect assessment including current European projects.