

Accepted Manuscript

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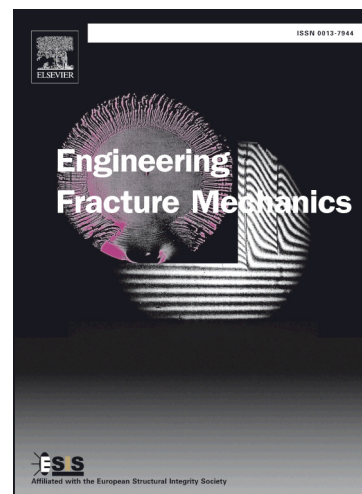
PII: S0013-7944(16)30692-0
DOI: <http://dx.doi.org/10.1016/j.engfracmech.2017.02.021>
Reference: EFM 5417

To appear in: *Engineering Fracture Mechanics*

Received Date: 4 December 2016
Revised Date: 21 February 2017
Accepted Date: 22 February 2017

Please cite this article as: He, J.Z., Wang, G.Z., Tu, S.T., Xuan, F.Z., Effect of constraint on creep crack initiation time in test specimens in ASTM-E1457 standard, *Engineering Fracture Mechanics* (2017), doi: <http://dx.doi.org/10.1016/j.engfracmech.2017.02.021>

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Effect of constraint on creep crack initiation time in test specimens in ASTM-E1457 standard

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Abstract

The creep crack initiation (CCI) time of six specimen geometries in ASTM E1457 standard has been predicted by using numerical simulations, and the constraint effect on CCI time was analyzed. The results show the specimens with different geometries, size ranges and side-grooves recommended by ASTM-E1457 produce different CCI time data due to different constraint levels. With increasing constraint levels in specimens, the CCI time is reduced. The quantitative correlation formulas of CCI time with creep constraint parameters have been established, and they may be applied in CCI life assessment of high-temperature components for accounting for constraint effect and improving accuracy.

Keywords: Constraint, Creep crack initiation, ASTM-E1457, Specimen geometry, Side groove

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