

Accepted Manuscript

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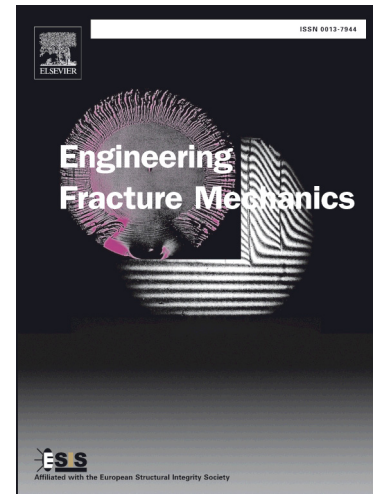
PII: S0013-7944(15)00004-1
DOI: <http://dx.doi.org/10.1016/j.engfracmech.2015.01.003>
Reference: EFM 4459

To appear in: *Engineering Fracture Mechanics*

Received Date: 21 August 2014
Revised Date: 30 December 2014
Accepted Date: 5 January 2015

Please cite this article as: Fukumura, N., Suzuki, T., Hamada, S., Tsuzaki, K., Noguchi, H., Mechanical examination of crack length dependency and material dependency on threshold stress intensity factor range with dugdale model, *Engineering Fracture Mechanics* (2015), doi: <http://dx.doi.org/10.1016/j.engfracmech.2015.01.003>

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Mechanical Examination of Crack Length Dependency and Material Dependency on Threshold Stress Intensity Factor Range with Dugdale Model

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Abstract

The threshold stress intensity factor range ΔK_{th} was analytically calculated under stress control conditions using the plasticity-induced crack closure analysis with the Dugdale model. Before obtaining ΔK_{th} , the accuracy of the method was verified. The characteristics of the crack closure behavior were discussed by specifying the small-scale yielding (SSY) and large-scale yielding (LSY). The analysis results of ΔK_{th} were discussed systematically by non-dimensionalizing them with the Dugdale model. Under the SSY condition, ΔK_{th} was dependent on Young's modulus and Poisson's ratio. Under the LSY condition, ΔK_{th} increased when the initial crack length or yield strain increased.

Key Words:

Fatigue crack growth, crack closure, cohesive zone modeling, short cracks, crack growth threshold

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