

Accepted Manuscript

Plasticity-Induced Crack Closure from Surface to Deep Interior Locations – A Three-Dimensional Finite Element Study

Chien-Yuan Hou

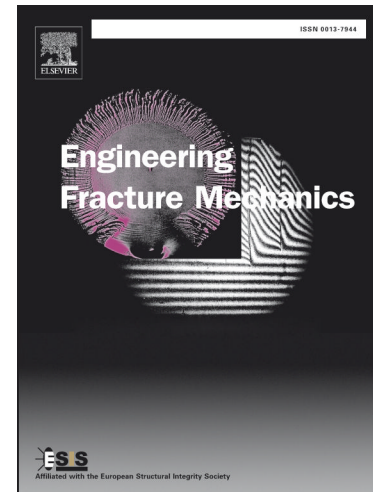
PII: S0013-7944(17)31266-3
DOI: <https://doi.org/10.1016/j.engfracmech.2018.04.012>
Reference: EFM 5938

To appear in: *Engineering Fracture Mechanics*

Received Date: 6 December 2017
Revised Date: 13 March 2018
Accepted Date: 7 April 2018

Please cite this article as: Hou, C-Y., Plasticity-Induced Crack Closure from Surface to Deep Interior Locations – A Three-Dimensional Finite Element Study, *Engineering Fracture Mechanics* (2018), doi: <https://doi.org/10.1016/j.engfracmech.2018.04.012>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Plasticity-Induced Crack Closure from Surface to Deep Interior Locations – A Three-Dimensional Finite Element Study

by

Chien-Yuan Hou

Department of Civil Engineering

National Chi Nan University, Puli, Taiwan, ROC

Abstract

The remeshing technique has been proved to be useful in saving numerous elements for two-dimensional finite element crack closure analysis. The computer code employing this technique was further developed for three-dimensional problems. Using this technique, the crack closure phenomenon of specimens with various thicknesses was studied, with emphases on the closure transition from specimen surface to deep interior locations. It was found that, at the specimen surface, the loading-direction stress distribution, and the crack tip plastic zone differ from those obtained under plane stress condition. However, the surface and the plane stress opening stresses are close. When a specimen is thick enough, the stress state, plastic zone and crack opening stresses at the deep interior locations are close to those under plane strain condition. The surface effects on crack opening behavior reach to a depth that is approximately 1.34 times of the Irwin's plane stress plastic zone size.

Keyword: crack growth; plasticity-induced crack closure; three-dimensional analysis; finite element method; remeshing

Download English Version:

<https://daneshyari.com/en/article/7168842>

Download Persian Version:

<https://daneshyari.com/article/7168842>

[Daneshyari.com](https://daneshyari.com)