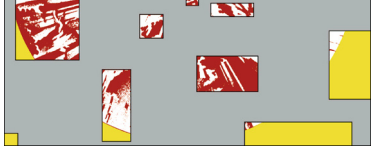
DOI: http://dx.doi.org/10.1016/j.tafmec.2017.05.005
Reference: TAFMEC 1856

To appear in: *Theoretical and Applied Fracture Mechanics*

Received Date: 12 December 2016
Revised Date: 10 April 2017
Accepted Date: 4 May 2017



Please cite this article as: J. Li, Z-p. Zhang, C-w. Li, Elastic-plastic stress-strain calculation at notch root under monotonic, uniaxial and multiaxial loadings, *Theoretical and Applied Fracture Mechanics* (2017), doi: http://dx.doi.org/10.1016/j.tafmec.2017.05.005

Elastic-plastic stress-strain calculation at notch root under monotonic, uniaxial and multiaxial loadings*

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Abstract: The equivalent strain energy density (ESED) method was originally suggested and is still widely used to calculate the stresses and strains at notch root. It is well recognized, however, that the ESED method tends to underestimate the notch-tip stresses and strains. In order to obtain better predictions, in the present paper, a factor $((1+\nu_e)/(1+\nu_{eff}))$ was introduced to modify the dissipated heat energy contained in the ESED method. A computational modeling technique coupling with Jiang-Sehitoglu plasticity model was also developed to calculate the multiaxial elastic-plastic notch-tip stress-strain responses of notched components. Extensive validations of the proposed method show that the calculated stresses and strains are in accord with experimental data and show reasonable accuracy.

Key words: Notch-tip stress-strain; Cyclic plasticity; ESED method; Multiaxial cyclic loading

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