

A Stress Intensity Function for FCG Analyses in Metals

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March 3, 2021

Abstract

This paper presents a damaging stress intensity function K_d for analyses of R-ratio effects on fatigue crack growth (FCG) in metals. The proposed formulation is based on the sum of strain and complementary energy and its role in FCG rate behavior in threshold and Paris region at R-ratios ranging from -2 to 0.97. It doesn't invoke a crack closure assumption or fitting parameters for $R < 0.5-0.6$. For a high $R > 0.7$ it utilizes an experimentally determined correction factor, which accounts for excessive plastic dissipation in the monotonic plastic zone (MPZ).

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SIF function for FCG analysis.pdf available at <https://authorea.com/users/399365/articles/511923-a-stress-intensity-function-for-fcg-analyses-in-metals>