

Accepted Manuscript

A generalized mean stress correction model based on distortional strain energy

Ayhan Ince

PII: S0142-1123(17)30319-5

DOI: <http://dx.doi.org/10.1016/j.ijfatigue.2017.07.023>

Reference: JIJF 4419

To appear in: *International Journal of Fatigue*

Received Date: 12 November 2016

Revised Date: 13 July 2017

Accepted Date: 19 July 2017



Please cite this article as: Ince, A., A generalized mean stress correction model based on distortional strain energy, *International Journal of Fatigue* (2017), doi: <http://dx.doi.org/10.1016/j.ijfatigue.2017.07.023>

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.

Submitted to the SI: FDSM XI of International Journal of Fatigue, November 2016

A generalized mean stress correction model based on distortional strain energy

Ayhan Ince^{1,2},

¹Purdue Polytechnic Institute, Purdue University, West Lafayette, Indiana, 47906, USA

²Department of Mechanical, Industrial & Aerospace Engineering, Concordia University, Montreal, Quebec, Canada H3G 1M8

Abstract

A new fatigue damage model based on the distortional strain energy is presented and discussed to account for the mean stress effects on fatigue life. The proposed model is compared to the Morrow and the SWT mean stress correction models using experimental mean stress fatigue data for Incoloy 901 superalloy, 120-90-02 ductile cast iron and 7075-T561 aluminum alloy under tensile and compressive mean stress loadings. The proposed model and the SWT model are found to show similar fatigue predictions and show good agreement for positive mean stress data and moderate negative mean stress data. The proposed model shows reasonably good agreement while the SWT model is unable to correlate mean stress data under large compressive mean stress conditions. The Morrow model provides poor correlations for all fatigue data analyzed by yielding conservative results for compressive mean stresses and non-conservative results for tensile mean stresses.

Keywords: Fatigue life, mean stress correction, mean stress, SWT model, Morrow model.

Nomenclature

σ_a stress amplitude

σ_m mean stress

ϵ_a strain amplitude

$\epsilon_{a,eq}^e$ equivalent elastic strain amplitude

Download English Version:

<https://daneshyari.com/en/article/5015031>

Download Persian Version:

<https://daneshyari.com/article/5015031>

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