

Accepted Manuscript

Fatigue Damage Assessment under Random and Variable Amplitude Multiaxial Loading Conditions in Structural Steels

V. Anes, J. Caxias, M. Freitas, L. Reis

PII: S0142-1123(16)30416-9

DOI: <http://dx.doi.org/10.1016/j.ijfatigue.2016.12.009>

Reference: JIJF 4160

To appear in: *International Journal of Fatigue*

Received Date: 5 October 2016

Revised Date: 25 November 2016

Accepted Date: 3 December 2016

Please cite this article as: Anes, V., Caxias, J., Freitas, M., Reis, L., Fatigue Damage Assessment under Random and Variable Amplitude Multiaxial Loading Conditions in Structural Steels, *International Journal of Fatigue* (2016), doi: <http://dx.doi.org/10.1016/j.ijfatigue.2016.12.009>

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.



FATIGUE DAMAGE ASSESSMENT UNDER RANDOM AND VARIABLE AMPLITUDE MULTIAXIAL LOADING CONDITIONS IN STRUCTURAL STEELS

V. Anes^{1,2}, J. Caxias³, M. Freitas¹ and L. Reis^{1,*}

¹IDMEC, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1, 1049-001, Lisbon, Portugal.

²GI-MOSM, Instituto Superior de Engenharia de Lisboa, Instituto Politécnico de Lisboa, Rua Conselheiro Emídio Navarro, 1, 1959-007, Lisbon, Portugal.

³Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1, 1049-001, Lisbon, Portugal.

(*)*Email: luis.g.reis@tecnico.ulisboa.pt*

ABSTRACT

Fatigue damage assessment of multiaxial random loadings is a complex issue and a subject of actual interest in mechanical design. In this work, the performance of the stress scale factor (SSF) criterion is evaluated under variable amplitude loading conditions, and damage accumulation approaches. This evaluation is performed by taking into account two types of loading spectra, namely the loading block spectra (where the loading pattern is well identified and repeated until rupture), and the random loading spectra (where the stochastic behaviour of the axial and shear loading components do not allow a direct identification of the loading pattern). Moreover, the validity of the hypothesis in which the SSF damage map remains valid for any high strength steel under variable amplitude loading conditions is also inspected by analysing fatigue life correlation of the 1050 QT steel and the 304L stainless steel under a multiaxial loading block.

KEYWORDS: Multiaxial fatigue, Variable amplitude loading, Multiaxial random loadings, Fatigue life, Fatigue damage accumulation.

NOMENCLATURE

SSF	Stress scale factor criterion
SAR	Stress amplitude ratio
N_f	Experimental fatigue life
σ	Normal stress amplitude

Download English Version:

<https://daneshyari.com/en/article/5015103>

Download Persian Version:

<https://daneshyari.com/article/5015103>

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