

## Accepted Manuscript

Artificial neural network for random fatigue loading analysis including the effect of mean stress

JF Durodola, S Ramachandra, S Gerguri, NA Fellows

PII: S0142-1123(18)30049-5  
DOI: <https://doi.org/10.1016/j.ijfatigue.2018.02.007>  
Reference: JIJF 4572

To appear in: *International Journal of Fatigue*

Received Date: 6 October 2017  
Revised Date: 6 February 2018  
Accepted Date: 7 February 2018

Please cite this article as: Durodola, J., Ramachandra, S., Gerguri, S., Fellows, N., Artificial neural network for random fatigue loading analysis including the effect of mean stress, *International Journal of Fatigue* (2018), doi: <https://doi.org/10.1016/j.ijfatigue.2018.02.007>

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.



# Artificial neural network for random fatigue loading analysis including the effect of mean stress

J F Durodola\*, S Ramachandra, S Gerguri and N A Fellows

Oxford Brookes University, Faculty of Technology, Design and Environment, Wheatley  
Campus, Oxford OX33 1HX, UK.

## Abstract

The effect of mean stress is a significant factor in design for fatigue, especially under high cycle service conditions. The incorporation of mean stress effect in random loading fatigue problems using the frequency domain method is still a challenge. The problem is due to the fact that all cycle by cycle mean stress effects are aggregated during the Fourier transform process into a single zero frequency content. Artificial neural network (ANN) has great scope for non-linear generalization. This paper presents artificial neural network methods for including the effect of mean stress in the frequency domain approach for predicting fatigue damage. The materials considered in this work are metallic alloys. The results obtained present the ANN method as a viable approach to make fatigue damage predictions including the effect of mean stress. Greater resolution was obtained with the ANN method than with other available methods.

**Keywords** random fatigue, frequency, time domain, artificial neural networks, Dirlik, mean stress.

\*Corresponding author, email: [jdurodola@brookes.ac.uk](mailto:jdurodola@brookes.ac.uk); Tel: + 44 (0)1865 483501.

Download English Version:

<https://daneshyari.com/en/article/7171537>

Download Persian Version:

<https://daneshyari.com/article/7171537>

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