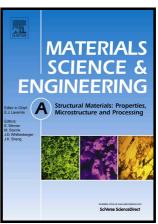
Author's Accepted Manuscript

Studies on creep-fatigue interaction behaviour of Alloy 617M

Sunil Goyal, K. Mariappan, Vani Shankar, R. Sandhya, K. Laha, A.K. Bhaduri



www.elsevier.com/locate/msea

PII: S0921-5093(18)30687-7

DOI: https://doi.org/10.1016/j.msea.2018.05.037

Reference: MSA36475

To appear in: Materials Science & Engineering A

Received date: 5 April 2018 Accepted date: 10 May 2018

Cite this article as: Sunil Goyal, K. Mariappan, Vani Shankar, R. Sandhya, K. Laha and A.K. Bhaduri, Studies on creep-fatigue interaction behaviour of Alloy 6 1 7 M , *Materials Science & Engineering A*, https://doi.org/10.1016/j.msea.2018.05.037

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 galley proof before it is published in its final citable 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.

ACCEPTED MANUSCRIPT

Studies on creep-fatigue interaction behaviour of Alloy 617M

Sunil Goyal*1, K. Mariappan1, Vani Shankar1, R. Sandhya1, K. Laha2, A. K. Bhaduri1

¹Indira Gandhi Centre for Atomic Research, Kalpakkam- 603 102, India ²Mission Directorate, A-USC Project, India

*Corresponding Author: Tel: +91 44 27480118; fax: +91 44 27480075, goyal@igcar.gov.in

Abstract

In this investigation, response of Alloy 617M to creep-fatigue interaction loading has been studied. The creep-fatigue interaction tests were conducted in air environment at a constant strain rate of 3×10^{-3} s⁻¹ and strain amplitude of $\pm 0.4\%$ with hold periods of 1 min, 10 min and 30 min at peak tension or compression at 973 K. The material showed initial hardening to a saturation followed by reduction in stress initiated by crack nucleation, propagation and final failure. The fatigue life decreased in presence of hold period. The decrease in fatigue life was more in tensile hold than in compressive hold. The fatigue life showed saturating trend for higher hold periods. Fractographic studies revealed significant intergranular creep cavitation under tensile hold whereas compressive hold exhibited transgranular fatigue striations in association with intergranular creep cavitation. Significant stress relaxation was found to take place during hold and was more in compressive hold than under tensile hold. The creep and fatigue damage have been assessed based on linear damage summation rule. Creep damage fraction was assessed from the stress relaxation considering the average stress, minimum stress and integrated stress over the relaxation curve. The creepfatigue damage assessment considering integration of creep damage during stress relaxation showed most conservative compared to the other two approaches.

Keywords: Creep-fatigue interaction; Alloy 617M; Stress relaxation; Mean stress; Creep-fatigue damage assessment

Download English Version:

https://daneshyari.com/en/article/7971726

Download Persian Version:

https://daneshyari.com/article/7971726

Daneshyari.com