

Accepted Manuscript

Effect of surface mechanical attrition treatment on low cycle fatigue properties of an austenitic stainless steel

J. Zhou, Z. Sun, P. Kanouté, D. Restraint

PII: S0142-1123(17)30260-8

DOI: <http://dx.doi.org/10.1016/j.ijfatigue.2017.06.011>

Reference: IJF 4367

To appear in: *International Journal of Fatigue*

Received Date: 5 March 2017

Revised Date: 5 June 2017

Accepted Date: 7 June 2017



Please cite this article as: Zhou, J., Sun, Z., Kanouté, P., Restraint, D., Effect of surface mechanical attrition treatment on low cycle fatigue properties of an austenitic stainless steel, *International Journal of Fatigue* (2017), doi: <http://dx.doi.org/10.1016/j.ijfatigue.2017.06.011>

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.

Effect of surface mechanical attrition treatment on low cycle fatigue properties of an austenitic stainless steel

J. Zhou¹, Z. Sun¹, P. Kanouté^{1,2}, D. Reتراint^{1,*}

¹ ICD, P2MN, LASMIS, University of Technology of Troyes, UMR 6281, CNRS, Troyes, France

² ONERA, The French Aerospace Lab, 29 avenue de la Division Leclerc, 92322 Chatillon Cedex, France

*Corresponding author: delphine.retraint@utt.fr, Tel.: +33-3-25-71-56-68 / Fax: +33-3-25-71-56-75

Abstract

In order to study the influence of surface mechanical attrition treatment (SMAT) on low cycle fatigue (LCF) properties of an austenitic stainless steel AISI 316L, cyclic loading responses and fatigue lifetime are investigated using fully reversed tension-compression LCF tests under total strain control. The results reveal that SMATed material exhibits higher cyclic stress amplitude due to higher strength of the SMAT affected region. During cyclic loading, untreated material is hardened under high strain amplitude ($\pm 0.8\%$, $\pm 1.25\%$), but softened under low strain amplitude ($\pm 0.5\%$). In contrast, SMAT affected region undergoes cyclic softening. Furthermore, SMAT mainly affects cyclic behavior of the early stage of LCF, and its effect is gradually reduced as cyclic loading goes on. Fatigue lifetime analysis indicates that SMAT could decrease the fatigue lifetime of material under cyclic loading with high strain amplitude ($\pm 1.25\%$). Based on analysis using Coffin-Manson law and energy dissipation theory, this lifetime decrease is considered to be due to the decrease of ductility and fatigue damage capacity.

Keywords: SMAT, Nanocrystalline materials, Low cycle fatigue, Material characterization, Stainless steel

Download English Version:

<https://daneshyari.com/en/article/5014963>

Download Persian Version:

<https://daneshyari.com/article/5014963>

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