

Accepted Manuscript

Non-propagating fatigue cracks in austenitic steels with a micro-notch: Effects of dynamic strain aging, martensitic transformation, and microstructural hardness heterogeneity

Yuri Nishikura, Motomichi Koyama, Yusuke Yamamura, Takuro Ogawa, Kaneaki Tsuzaki, Hiroshi Noguchi

PII: S0142-1123(18)30165-8
DOI: <https://doi.org/10.1016/j.ijfatigue.2018.04.027>
Reference: JIJF 4666

To appear in: *International Journal of Fatigue*

Received Date: 22 February 2018
Revised Date: 12 April 2018
Accepted Date: 25 April 2018

Please cite this article as: Nishikura, Y., Koyama, M., Yamamura, Y., Ogawa, T., Tsuzaki, K., Noguchi, H., Non-propagating fatigue cracks in austenitic steels with a micro-notch: Effects of dynamic strain aging, martensitic transformation, and microstructural hardness heterogeneity, *International Journal of Fatigue* (2018), doi: <https://doi.org/10.1016/j.ijfatigue.2018.04.027>

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.



Non-propagating fatigue cracks in austenitic steels with a micro-notch: Effects of dynamic strain aging, martensitic transformation, and microstructural hardness heterogeneity

Yuri Nishikura^a, Motomichi Koyama^{a*}, Yusuke Yamamura^a, Takuro Ogawa^a, Kaneaki Tsuzaki^a, and Hiroshi Noguchi^a

Kyushu University, Motoooka 744, Nishi-ku, Fukuoka, Fukuoka, 819-0395 Japan

Corresponding author: Motomichi Koyama, e-mail: koyama@mech.kyushu-u.ac.jp

Abstract

The non-propagation limit of a microstructurally small fatigue crack was investigated with respect to dynamic strain aging (DSA), martensitic transformation, and microstructural hardness heterogeneity. In this study, we selected four model alloys: Fe-19Cr-8Ni-0.05C, Fe-19Cr-8Ni-0.14C, Fe-23Mn-0.5C, and as-hot-rolled Fe-30Mn-3Si-3Al steels. Transformation-induced cyclic hardening results in the most significant improvement of the non-propagation limit, i.e., in the case of the Fe-19Cr-8Ni-0.05C steel. Within different contexts, DSA, transformation-induced crack closure, and hardness-heterogeneity-enhanced plasticity-induced crack closure could also realize superior non-propagation limits. The effects of DSA and hardness heterogeneity can be combined with the effects of transformation, which is expected to create a new venue of material design and selection in terms of the crack non-propagation limit.

Keywords: Non-propagating fatigue crack; austenitic steel; high cycle fatigue; martensitic transformation; dynamic strain aging

Download English Version:

<https://daneshyari.com/en/article/7171412>

Download Persian Version:

<https://daneshyari.com/article/7171412>

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