

Accepted Manuscript

Effects of lamella size and connectivity on fatigue crack resistance of TRIP-maraging steel

Z. Zhang, M. Koyama, M.M. Wang, K. Tsuzaki, C.C. Tasan, H. Noguchi

PII: S0142-1123(17)30159-7

DOI: <http://dx.doi.org/10.1016/j.ijfatigue.2017.03.040>

Reference: IJF 4303

To appear in: *International Journal of Fatigue*

Received Date: 13 February 2017

Revised Date: 24 March 2017

Accepted Date: 25 March 2017



Please cite this article as: Zhang, Z., Koyama, M., Wang, M.M., Tsuzaki, K., Tasan, C.C., Noguchi, H., Effects of lamella size and connectivity on fatigue crack resistance of TRIP-maraging steel, *International Journal of Fatigue* (2017), doi: <http://dx.doi.org/10.1016/j.ijfatigue.2017.03.040>

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.

Effects of lamella size and connectivity on fatigue crack resistance of TRIP-maraging steel

Z. Zhang¹, M. Koyama^{1*}, M. M. Wang^{2,3}, K. Tsuzaki¹, C. C. Tasan³, H. Noguchi¹¹Kyushu University, Motooka 744, 819-0395 Fukuoka, Japan²Max-Planck-Institut für Eisenforschung, Max-Planck-Straße 1, 40237 Düsseldorf, Germany³Department of Materials Science and Engineering, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, MA 02139 USA*Corresponding author: Motomichi Koyama, e-mail: koyama@mech.kyushu-u.ac.jp**Abstract**

The effect of austenitization time on the fatigue crack resistance of transformation-induced plasticity (TRIP)-maraging steel was investigated by observing the crack initiation site, propagation path and fracture surface. Our analyses show that austenitization for a longer time increases austenite/martensite lamella size and connectivity of austenite. Simultaneously, increasing lamella size leads to a reduction in austenite hardness; higher austenite connectivity accelerates crack propagation. In addition, remarkable roughness on the crack surface associated with the laminated structure was observed in both steels, which caused roughness-induced crack closure.

Keywords: Transformation-induced plasticity-maraging steel; Lamella; Crack growth rate; Crack closure; High cycle fatigue

ABBREVIATIONSZ. Zhang (Zhao Zhang), e-mail: zhangzhao2084@hotmail.comM. Koyama (Motomichi Koyama), e-mail: koyama@mech.kyushu-u.ac.jpM. M. Wang (Meimei Wang), e-mail: m.wang@mpie.deK. Tsuzaki (Kaneaki Tsuzaki), e-mail: tsuzaki.kaneaki.802@m.kyushu-u.ac.jpH. Noguchi (Hiroshi Noguchi), e-mail: noguchi.hiroshi.936@m.kyushu-u.ac.jpC. C. Tasan (Cemal Cem Tasan), e-mail: tasan@mit.edu

Download English Version:

<https://daneshyari.com/en/article/5015128>

Download Persian Version:

<https://daneshyari.com/article/5015128>

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