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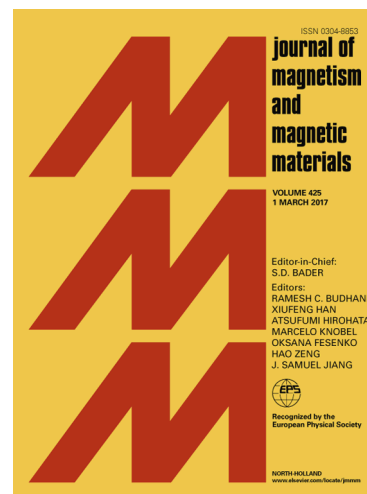
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Crack propagation analysis and fatigue life prediction for structural alloy steel based on
metal magnetic memory testing

Chen Ni^{1,2}, Lin Hua^{2,3,*}, Xiaokai Wang^{2,3}

¹School of Materials Science and Engineering, Wuhan University of Technology,
Wuhan 430070, China

²Hubei Key Laboratory of Advanced Technology for Automotive Components (Wuhan
University of Technology), Wuhan 430070, China

³Hubei Collaborative Innovation Center for Automotive Components Technology,
Wuhan 430070, China

Abstract:

To monitor the crack propagation and predict the fatigue life of ferromagnetic material, the metal magnetic memory (MMM) testing was carried out to the single edge notched specimen made from structural alloy steel under three-point bending fatigue experiment in this paper. The variation of magnetic memory signal $H_p(y)$ in process of fatigue crack propagation was investigated. The gradient K of $H_p(y)$ was investigated and compared with the stress of specimen obtained by finite element analysis. It indicated that the gradient K can qualitatively reflect the distribution and variation of stress. The maximum gradient K_{max} and crack size showed a good linear relationship, which indicated that the crack propagation can be estimated by MMM testing. Furthermore, the damage model represented by magnetic memory characteristic was created and a fatigue life prediction method was developed. The fatigue life can be evaluated by the

* Corresponding author: Lin Hua

E-mail address: hualinnc@163.com

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