

## Accepted Manuscript

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PII: S0013-7944(15)00012-0

DOI: <http://dx.doi.org/10.1016/j.engfracmech.2015.01.011>

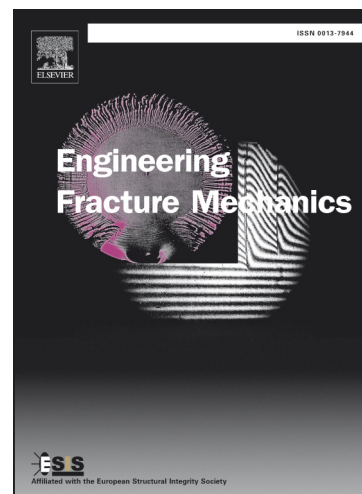
Reference: EFM 4467

To appear in: *Engineering Fracture Mechanics*

Received Date: 21 March 2014

Revised Date: 9 January 2015

Accepted Date: 10 January 2015



Please cite this article as: Ding, Z., Gao, Z., Wang, X., Jiang, Y., Modeling of fatigue crack growth in a pressure vessel steel Q345R, *Engineering Fracture Mechanics* (2015), doi: <http://dx.doi.org/10.1016/j.engfracmech.2015.01.011>

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Submitted to *Engineering Fracture Mechanics* March 2014  
EFM-S-14-00137, Revised October, 2014

### **Modeling of fatigue crack growth in a pressure vessel steel Q345R**

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#### **ABSTRACT**

An approach developed earlier is used to predict the crack growth behavior of a pressure vessel steel. The approach consists of elastic-plastic finite element stress-strain analysis of a cracked component and application of a multiaxial fatigue damage criterion to access the crack growth. The computer simulations capture the experimentally observed insensitivity of crack growth to the  $R$ -ratio. In particular, the models properly simulate the experimentally observed acceleration and retardation. Discussions are made to relate the characteristics of the crack growth behavior of the material to the cyclic deformation of the material and to the contact of cracked surfaces.

**Keywords:** Multiaxial fatigue criterion, crack growth rate, mean stress relaxation, Q345R steel

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