



Short fatigue crack growth in aluminium alloy 6082-T6

T. Mann ^{a,*}, G. Härkegård ^a, K. Stärk ^b

^a Norwegian University of Science and Technology, Engineering Design and Materials, R. Birkelandsvei 2b, 7491 Trondheim, Norway

^b Alstom Ltd., Switzerland

Received 31 August 2006; received in revised form 3 January 2007; accepted 7 January 2007

Abstract

Fatigue crack growth tests on 6082-T6 aluminium specimens have been carried out. The single edge notched tension specimens had a spark eroded 0.2 mm deep starter notch. In order to measure the crack growth, a special direct current potential drop method was used. The experiments were carried out at four different stress ratios. The crack growth data validate the long crack growth data given in Eurocode 9 [CEN. ENV 1999-2: Eurocode 9: Design of aluminium structures. Part 2: Structures susceptible to fatigue. European Committee for Standardisation, 1998.] and some indication of accelerated crack growth for short cracks was found. An effective stress intensity factor, which is a generalisation of an approach proposed by El Haddad et al. [El Haddad MH, Topper TH, Smith KN. Prediction of non-propagating cracks. *Eng Fract Mech* 1979; 11:573–84], has been applied to correct for short crack growth behaviour. It has been shown that the potential drop technique can be successfully used to measure crack growth in aluminium specimens. The mean stress dependence was found to be less pronounced than for the 7075-T6 and 2024-T3 aluminium alloys.

© 2007 Elsevier Ltd. All rights reserved.

Keywords: Crack growth; Short cracks; Potential drop; Stress ratio; Mean stress; Fatigue; Aluminium alloy
