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**EARLY FRETTING CRACK ORIENTATION BY USING THE CRITICAL PLANE APPROACH**

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**ABSTRACT**

In the present paper, the novel critical direction method by Araújo et al. and the multiaxial critical plane-based criterion by Carpinteri et al. are combined together to estimate early crack orientation in configurations involving high stress gradients, as fretting fatigue configurations. More precisely, the first method is used to compute the input data for the second one, in terms of normal and shear stresses over a line with a characteristic length. The experimental data herein analysed are related to an Al7050 T7451 aluminium alloy, the fretting tests related to a cylinder-on-plane configuration being performed by the Research Group of Fatigue, Fracture and Materials at the University of

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