

Caractérisation des paramètres de fissuration en mode d'ouverture par corrélation d'images et éléments finis d'un alliage d'aluminium 2xxx

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Abstract: In this work, a problem of fracture and crack resistance is studied, the 2000 aluminum alloy series available in market is chosen, in this context of fracture mechanics the structural durability and integrity of materials is investigated. Couple techniques are used, an experimental characterization assisted by the digital image correlation technique and finite elements based numerical simulations, the aim is to study the mechanical behavior in presence of cracks and determine the fracture toughness. Making use of theoretical notions, analytical formulas, experimental tests coupled by the recent digital image correlation technique and numerical simulations constitute an efficient protocol to characterize materials to resist against cracks. At the end of our work, the study was done to know the crack propagation in opening mode (mode I) and the stress evolution on the crack paths by the X-FEM extended finite element method.

Keywords : failure in mode I, stress intensity factor (SIF), Cracking, Correlation of digital images (CDI), FEM finite elements, Abaqus, Integral J, Extended finite element method (XFEM)