Détermination expérimentalement et numériquement des paramètres de rupture à l'aide de la technique de corrélation d'image digitales DIC et l'analyse FEM

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Abstract: For the purpose of determining the critical fracture parameters of materials such as the critical energy restitution rate GIc, the stress intensity factor KIc, the maximum fracture load and the critical crack opening CTOD where ?c numerous approaches are used in the literature. One of the approaches is based on experimental tests assisted by numerical methods such as Digital Images Correlation DIC and FEM finite element analysis. A FEM finite element analysis under a computation code (ABAQUS) allows to simulate the rupture tests, through numerical models in elasticity or elasto-plasticity allows to extract the values of the different components of the displacement and deformation field, the latter are confronted with the same parameters obtained experimentally. And finally, the calculation of the energy restitution rate and the stress intensity factor as well as the critical opening of the CTOD cracks.

Keywords : Critical failure parameter, The critical energy release rate GIc, The stress intensity factor KIc, The maximum breaking load