SM4L_12021

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Damage Field Identification using Full-Field Displacement Measurements

Damien Claire[(1)], **François Hild**[(1)], Stéphane Roux[(2)]

(1) *LMT-Cachan, Cachan Cedex, France*
(2) *SVI UMR SG/CNRS, Aubervilliers Cedex, France*

An identification procedure is developed to identify damage fields by using kinematic fields. A non-standard finite element formulation is derived in which the nodal displacements are known and the elastic properties (or the damage field) are unknown. The latter are assumed to remain uniform over each element, but vary from element to element. A linear (over-determined) system is obtained. When artificial measurements are used, a comparison can be performed with an a priori prescribed damage field. Less than a few percents relative error is obtained for all the many tested configurations. When some additional noise is considered, the error does not change significantly. Different local error indicators are proposed, and of those, a family can be used when the exact solution is unknown. The example of a cross-shaped specimen loaded along two perpendicular directions allows one to analyze the multiple point inception of macrocracks.

View the extended summary