Investigation of Damage in Glass Subjected to Static Indentation Using Continuum Damage Mechanics

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Abstract : In this work, a combined approach of continuum damage mechanics (CDM) and fracture mechanics is applied to model a glass plate behavior under static indentation. A spherical indenter is used and a CDM based constitutive model with an anisotropic damage tensor was selected and implemented into a finite element code to study the damage of glass. Various regions with critical damage values were predicted in good agreement with the experimental observations in the literature. In these regions, the directions of crack propagation, including both cracks initiating on the surface as well as in the bulk, were predicted using the strain energy density factor.