Modelling anisotropic damage and permeability of mortar under dynamic loads

W.CHEN, O.MAUREL, T.REESS, M.MATALLAH, A.DE FERRON, C.LA BORDERIE,

G.PIJAUDIER-CABOT

Abstract :

This paper deals with the development of a model for concrete subjected to dynamic loads. Shock waves are generated by Pulsed Arc Electro-hydraulic Discharges (PAED) in water and applied to mortar samples. A diphasic model (liquid water and vapour) is implemented in order to describe the electrical discharge and the propagation of shock waves in water. An anisotropic damage model is devised, which takes account of the strain rate effect and the crack closure effect. Coupling between anisotropic damage and permeability is proposed in order to assess the variation of material permeability due to shock waves. Comparisons with experiments show a good correlation between the experimental and the numerical results.