A viscous cohesive model to analyze rate-dependent fracture in concrete

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ABSTRACT

We develop a simple viscous cohesive model to analyze the rate-dependent process in high strength concrete. The model is first demostrated through an analylic model in a three-point-bend configuration, assuming a single cohesive crack propagating along the interface between two rigid sections. The specific fracture energy is assumed to be a local function of the CMOD (crack mouth opening displacement) rate, thus the viscous opening process at each point is described locally as well. The anlytical model fits very well with the experimental peak-loads and the measured work of fracture at different loading rates except the initial stage of the load-displacement curve. The viscous model is subsequently implemented in a 2D model developed in [1,3]. The numerical results are compared with experimental observations. The influence of loading effect on the fracture behavior in high strength concrete is discussed.

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