

Dynamic splitting-tensile test and numerical analysis for brittle materials

Abstract

This paper is concerned with the dynamic splitting-tensile test for brittle materials. An experiment on the dynamic splitting-tension has been performed on cylindrical concrete specimens by utilizing a Split Hopkinson Pressure Bar. To observe the stress distribution and detect the crack initiation, some specimens were instrumented with strain and crack gages. A numerical analysis was conducted, using LS-DYNA code, to verify the experimental data. The results of the stress distribution in the dynamic condition, with respect to the time, were almost identical to those in the static condition. The numerical analysis identifies the initial crack and generates the crack pattern on the concrete material. In addition, the result of the strain-rate sensitivity of concrete materials is presented.

Keywords — Dynamic-tensile test, initial crack, numerical simulation, strain rate