# The crack extended resistance in concrete and the effect of material properties on it[*]

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### ABSTRACT

The extended crack resistance of concrete is necessary in the desisn of nonlinear behavior of structural It can be described through the intensity stress factor and the critical crack opening under maximum force. The length of the crack is necessary for calculating intensity stress factor and the critical crack opening under maximum force.

The aim of this work is to conehede the relations between intensity stress factor and the critical crack opening under maximum force with the material properties of concrete such as paste volume, compressive strength and maximum aggregate diameter. The length of crack is calculated using the analytical model of Olesen that depends on bilinear softening, and the parameters of the softening curve were found using inverse analysis. The experimental results of three point bending test for beams with different sizes which are made from concretes with different compressive strengths are used in the inverse analysis.

It is found that intensity stress factor and the critical crack opening under maximum force depend on paste volume and they increase when F'c increases, while they are independent from maximum aggregate size.

**Key words:**Concrete, stress intensity factor, critical crack opening, bilinear softening curve.

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