

# Initial cracking strength and initial fracture toughness from 3-p-b and WS concrete specimens

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## Abstract

A concept of initial cracking strength of concrete is elaborated in this study. A fracture model and associated methods for determining independent initial cracking strength and initial fracture toughness by using the three-point-bending (3-p-b) and wedge splitting (WS) concrete specimens are present. The initial cracking strength and initial fracture toughness can be simultaneously determined using a curve-fitting method from the proposed fracture model. All of the initial fracture curves can be obtained using the determined concrete materials. The initial loads of the 3-p-b and WS specimens can be predicted on the basis of the curves with  $\pm 15\%$  ranges. Furthermore, analytical functions are used to obtain and determine the initial cracking strength and the initial fracture toughness of concretes directly. The determined values with  $\pm 15\%$  ranges cover the most of initial loads of the 3-p-b and WS specimens.

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