

# **Mixed mode fracture for concrete.**

**Mohamed Buchary Nooru-Mohamed**

Civil Engineering

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## **Abstract**

An experimental investigation into mode crack propagation in concrete was undertaken. Precast and cast in situ vertical and angular notched beams were used to obtain  $k - k$  interaction diagram. Mixed mode crack propagation theories such as strain energy density criterion (SEDC) and maximum stress criterion (MSC) were compared.

This study also included the possible uses of double cantilever beam (DCB) specimens for measurement of  $K$  parameter for concrete, a value not reported in Fracture Mechanics literature thus far.

The results obtained indicate a degree of uncertainty associated with using the SEDC or MSC for mixed mode fracture of concrete. Thus the need exists for development of a suitable alternative criterion to describe the mixed mode fracture phenomenon. A new empirical mixed mode fracture criterion for concrete is proposed in a  $V$ - $M$  space, which is described in terms of the shear force  $V$ , the bending moment  $M$ , the initial crack length  $a$ , and the compressive strength  $f$  from the above interaction diagram, the residual strength of a damaged concrete member can be predicted.