Measuring the effect of strengthened concrete on the fracture characteristics of notched concrete beams through a three-point beam test

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Abstrak

This study explores the effect of increased concrete strength on the behavior of concrete failure. Experimental testing using a three-point bend (TPB) test proposed by RILEM was carried out to calculate the value of fracture energy (GF), stress intensity factor (KIC), and characteristic length (lch) of the concrete. The values of GF and lch, which are proportional to the fracture process zone based on the fictitious crack model, were employed to determine the effect of concrete strength on the concrete's fracture characteristic. KIC was engaged to describe the initial crack in the concrete. Four different concrete strengths of 40, 47, 53, and 100 MPa—were manufactured to produce notched beam specimens with single-sized notches 25 mm deep. Results revealed that the values of GF and KIC increased in the stronger concretes. However, the value of lch decreased significantly as concrete strength increased.