

Fracture properties of concrete specimens made from alkali activated binders

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Abstract. The aim of this paper is to quantify crack initiation and other fracture properties – effective fracture toughness and specific fracture energy – of two types of concrete with an alkali activated binder. The beam specimens with a stress concentrator were tested in a three-point bending test after 28, 90, and 365 days of maturing. Records of fracture tests in the form of load versus deflection ($P-d$) diagrams were evaluated using effective crack model and work-of-fracture method and load versus mouth crack opening displacement ($P-CMOD$) diagrams were evaluated using the Double- K fracture model. The initiation of cracks during the fracture tests for all ages was also monitored by the acoustic emission method. The higher value of monitored mechanical fracture parameters of concrete with alkali activated blast furnace slag were achieved with substitution blast furnace slag by low calcium fly ash in comparison with substitution by cement kiln dust.