

[PO-E1]Poster Session 1

Symposium E

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[P1-31]Componets of fracture response of alkali-activated slag mortars with steel fibers

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Knowledge of mechanical fracture parameters of composites based on brittle matrix is essential for the quantification of their resistance against crack initiation and propagation as well as for the definition of material models used to simulate the quasi-brittle behaviour of the structures or their parts made from this type of composites. The variability of results experimentally obtained from fracture tests of composites with different kind of fibres is much higher in comparison with composite without fibres due to the natural heterogeneity of composite containing fibres. Therefore, the main objective of this paper is to quantify the contribution of the matrix of alkali-activated slag mortars with steel fibres on their fracture response. First alkali-activated slag material was a reference without fibres; the other composites contain steel fibres in amount 5, 10, 15 and 20 % of weight of slag, respectively. The mechanical fracture parameters were determined using evaluation of fracture tests carried out on $40 \times 40 \times 160$ mm beam specimens with an initial central edge notch. The load vs. displacement (deflection in the middle of span length) and load vs. crack mouth opening displacement diagrams were recorded during the fracture tests. Each diagram was processed in order to obtain the component that corresponds to the structural response of the matrix of the composite consisting from alkali-activated slag and steel fibres reinforcing that matrix. The values of fracture parameters were determined using work-of-fracture method and double- K fracture model. This outcome has been achieved with the financial support of the Czech Science Foundation, project No. 16-00567S and the Ministry of Education, Youth and Sports of the Czech Republic under the “National Sustainability Programme I” (project No. LO1408 AdMaS UP).