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Effect of steel fibres on fracture parameters of cementitious composites

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ABSTRACT

This study was aim to determine the influence of the type of steel fibres on fracture parameters of cementitious composites. Flexural strength test was performed on notched beams according to EN 14651. Both type of steel fibre; arched- and hooked-end-type were added 10, 30, 40, and 50 kg/m³ as volume fractions. Steel fibres bridged the cracks during loading to fibre-reinforced cementitious composites, and prevented fracture rapidly. The load-deflection curve was depended on the shape and the quantity of the used fibres. The fracture energy absorption behaviour of arched-type steel fibre cementitious composites (ASFRC) was evaluated by applying different approach with a variety of fracture parameters such as stress intensity factor (K_{IC}), energy release rate (G_{IC}), the unit work in destruction (J_{IC}), residual flexural tensile strength ($f_{R,j}$), equivalent flexural strength ($f_{eq,j}$), and fracture energy (G_F). As results, all fracture parameter was increased with fibre volume fraction up to 40kg/m³. And ASFRC had higher value for these values than reinforced with hooked-end-type steel fibre (HSFRC); i.e. G_F of ASFRC was 1.34~2.98 times higher compared to HSFRC.

Key words: *Arched-type, hooked-end-type, fibre reinforced, flexural, steel fibre, fracture energy*

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