

Fracture characteristics of plain and steel fibre reinforced rubberized concrete

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This study investigates the effect of recycled crumb rubber aggregates on the fracture characteristics of both plain concrete (PC) and steel fibre concrete (SFC) as a potential solution of the problem of discarded tires and due to the capacity of rubber aggregates to absorb high fracture energy. The variables considered in the experimental work are the concrete type (i.e., plain and steel fibre concrete) and the crumb rubber aggregate content as replacement ratios (i.e., 5%, 10%, 15%, 20%, and 25%) by volume of sand. The steel fibre used is a hooked-end fibre with an aspect ratio of 80 and a diameter of 0.75 mm with a constant volume of 0.5%. The mechanical properties, fracture energy, stress intensity factor, critical strain energy release rate, elasticplastic fracture toughness parameter, and characteristic length of plain and steel fibre reinforced rubberized concrete are considered herein. Results show enhanced fracture characteristics induced by the crumb rubber inclusion in plain concrete. Further enhancement was observed by combination of steel fibre and crumb rubber aggregate in concrete. In addition to promote healthy environment using recycling waste tires.