INVESTIGATION OF EFFECTS OF RECYCLED AGGREGATES AND BLAST FURNACE SLAG ON PROPERTIES OF SELF-COMPACTING CONCRETE

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Abstract:
The effects of simultaneous use of recycled aggregates and ground blast furnace slag as a percentage of cement-constituting materials on different properties of fresh self-compacting concrete (SCC) are investigated in this study. To this end, three series of SCC mixtures with a fixed volume of cement paste equalling 380 ltr/m³ (2.36 gal/ft³) and the replacement ratio of coarse aggregates (fifty percent and one hundred percent) and total aggregates (zero percent, fifty percent and one hundred percent) were prepared. The water content ratios in the first, second and third series were 0.4, 0.45, and 0.5, respectively. The results of the compressive strength tests for 7-day, 14-day and 28-day cubic specimens and compressive strength and Brazilian test results for 28-day cylindrical specimens were used as control parameters governing the SCC resistive quality. The results of fresh SCC tests (including slump-flow and T50 tests, V-funnel test, and L-box test) showed that the negative effect of recycled fine aggregates on fresh SCC properties is significantly more than that of recycled coarse aggregate. However, recycled SCC with acceptable properties can be obtained with a slight increase in the amount of superplasticisers used in the presence of slag.

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