

High Performance Fibre Reinforced Alkali Activated Slag Concrete

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Abstract : The main objective of the study is focused in producing slag based geopolymer concrete obtained with the addition of alkali activator. Test results indicated that the reaction of silicates in slag is based on the reaction potential of sodium hydroxide and the formation of alumino-silicates. The study also comprises on the evaluation of the efficiency of polymer reaction in terms of the strength gain properties for different geopolymer mixtures. Geopolymer mixture proportions were designed for different binder to total aggregate ratio (0.3 & 0.45) and fine to coarse aggregate ratio (0.4 & 0.8). Geopolymer concrete specimens casted with normal curing conditions reported a maximum 28 days compressive strength of 54.75 MPa. The addition of glued steel fibres at 1.0% Vf in geopolymer concrete showed reasonable improvements on the compressive strength, split tensile strength and flexural properties of different geopolymer mixtures. Further, comparative assessment was made for different geopolymer mixtures and the reinforcing effects of steel fibres were investigated in different concrete matrix.

Keywords : accelerators, alkali activators, geopolymer, hot air oven curing, polypropylene fibres, slag, steam curing, steel fibres

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