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Study on the Properties of Alkaline Activated Flyash Based Geopolymer Composites

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Abstract: Cement and Concrete making not only consume significant amount of natural resources but also take responsibility of emitting considerable fraction of the totally generated carbon dioxide to the atmosphere through its cement production. Recent research is diverted to develop cement-free concrete from industrial waste and by products which are also quantitatively increasing day by day causing environmental and pollution problems. Geopolymer concrete is obtained by using an alkaline solution to activate the mixture of a source material like flyash with other constituents of like aggregates and admixtures, with a typical procedure slightly deviating from the conventional fabrication technology. In this study, the short term properties like consistency and setting time of geopolymer, strength of 1:3 mortars and concrete compressive and tensile strength of M40 grade and long term properties like water absorption and acid resistance are considered. Low calcium flyash, sodium hydroxide/sodium silicate based alkaline solution, river sand, granite aggregates are used. Hot oven curing at 65°C is adopted for GPC and pond curing for OPCC. It is observed by comparison with conventional concrete, the geopolymer technology can be a sustainable development in the concrete industries.

Keywords: Geopolymer, consistency, setting time, low calcium flyash, hot curing, compressive strength, durability.

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