

Experimental Investigations on Setting Behavior and Compressive Strength of Flyash Based Geopolymer

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Abstract : Concrete, a widely used building material, has cement as its main constituent. An excessive amount of emissions are released into the atmosphere during the manufacture of cement, which is detrimental to the environment. To minimize this problem, innovative materials like geopolymer mortar (GPM) seem to be a better alternative. By using fly ash-based geopolymer instead of standard cement mortar as a binding ingredient, this concept has been successfully applied to the building sector. The advancement of this technology significantly reduces greenhouse gas emissions and helps in source reduction, thereby minimizing pollution of the environment. In order to produce mortar and use this geopolymer mortar in the development of building materials, the current investigation is properly introducing this geopolymeric material, namely fly ash, as a binder in place of standard cement. In the domain of the building material industry, fly ash based geopolymer is a new and optimistic replacement for traditional binding materials because it is both environmentally sustainable and has good durability. The setting behaviour and strength characteristics of fly ash, when mixed with alkaline activator solution with varied concentration of sodium hydroxide solution, alkaline liquids mix ratio, and curing temperature, must be investigated, though, in order to determine its suitability and application in comparison with the traditional binding material, by activating the raw materials, which include various elements of silica and alumina, finer material known as geopolymer mortar is created. The concentration of the activator solution has an impact on the compressive strength of the geopolymer concrete formed. An experimental examination of compressive strength after 7, 14, and 28 days of fly ash-based geopolymer concrete is presented in this paper. Furthermore, the process of geopolymerization largely relies on the curing temperature. So, the setting time of Geopolymer mortar due to different curing temperatures has been studied and discussed in this paper.

Keywords : geopolymer mortar, setting time, flyash, compressive strength, binder material

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