

عنوان مقاله:

Estimate optimization of compressive strength and durability by Geopolymer concrete Based on fuzzy probability analysis

محل انتشار:

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خلاصه مقاله:

The demand of cement concrete is increasing rapidly with the growth of civilization, which increase the production of Ordinary Portland Cement (OPC). Production of Ordinary Portland Cement degrades the environment by huge emission of carbon-di-oxide and by consuming so many natural resources. In modern era, it is required to develop sustainable concrete repairing material. The environmental impact of Ordinary Portland Cement (OPC) production has driven substantial interest in the development of new types of 'green' concrete, one of which is Geopolymer concrete. This research has focused on different parameters, which consist of ratio of Sodium Silicate to Sodium Hydroxide, molarity of Sodium Hydroxide and curing type. The results have been derived from some proportion of Ground Granulated Blast furnace Slag (GGBS) is replaced by Metakaolin (MK) and Zeolite (ZO) with seven mix design. The discussed effects on compressive strength and durability was observed and analyzed in Fuzzy Inference System (FIS) and optimized by this method. The concentration of Sodium Hydroxide was kept 4 M and the ratio of Sodium Hydroxide to Sodium Silicate solution was kept constant at 3. The ratio of alkali solution to GGBS was kept 0.45. The highest compressive strength was 48.5 MPa at 28 days where replacing 15% of GGBS by Zeolite. The highest durability was 66.6 MPa at 90 days when specimens immersed in 5% Magnesium Sulfate solution and when 15% GGBS was replaced by Metakaolin. Two fuzzy probability systems have been used and the output surfaces are derived. Optimization of compressive strength and durability for different proportional Ground Granulated Blast furnace Slag (GGBS) with Zeolite and Metakaolin was estimated by fuzzy probability systems.

کلمات کلیدی:

.Compressive Strength; Durability; Geopolymer Concrete; Fuzzy Inference System

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