

Effect of Fly Ash Fineness on Sorption Properties of Geopolymers Based on Liquid Glass

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Abstract : Fly ash (FA) thanks to the significant presence of SiO₂ and Al₂O₃ as the main components is a potential raw material for geopolymers production. Mechanical activation is a method for improving FA reactivity and also the porosity of final mixture; those parameters can be analysed through sorption properties. They have direct impact on the durability of fly ash based geopolymer mortars. In the paper, effect of FA fineness on sorption properties of geopolymers based on sodium silicate, as well as relationship between fly ash fineness and apparent density, compressive and flexural strength of geopolymers are presented. The best results in the evaluated area reached the sample H1, which contents the highest portion of particle under 20µm (100% of GFA). The interdependence of individual tested properties was confirmed for geopolymer mixtures corresponding to those in the cement based mixtures: higher is portion of fine particles < 20µm, higher is strength, density and lower are sorption properties. The compressive strength as well as sorption parameters of the geopolymer can be reasonably controlled by grinding process and also ensured by the higher share of fine particle (to 20µm) in total mass of the material.

Keywords : alkali activation, geopolymers, fly ash, particle fineness

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