

Effect of Curing Regimes on Metakaolin Geopolymer Pastes Produced from Geopolymer Powder

Abstract

The properties of metakaolin geopolymer paste are affected by the alkali concentration, the initial raw materials, solidification process, and amount of mixing water as well as the curing conditions. This study aimed to investigate the effect of curing temperature (room temperature, 40°C, 60°C, 80°C and 100°C) and curing time (6h, 12h, 24h, 48h and 72h) on the geopolymer pastes produced from geopolymer powder. The results showed that curing at room temperature was unfeasible. Heat was required for the geopolymerization process, where strength increased as the curing temperature was increased. Moderate elevated curing temperature favored the strength development of geopolymer pastes in comparison with those treated with extreme elevated curing temperature. When geopolymer paste was subjected to extreme elevated curing temperature, shorter curing time should be used to avoid deterioration in strength gain. Similarly, longer curing time was recommended for moderate elevated curing temperature. The microstructure of geopolymer paste cured at moderate curing temperature showed obvious densification of structure. In contrast, the structure formed was weak and less compact at very high elevated curing temperature.

Keywords: Curing Regime, Geopolymer, Metakaolin (MK), Microstructure, Setting Time, Strength