EFFECT OF ALKALI-ACTIVATION ON SETTING CHARACTERISTICS OF BINARY AND TERNARY BLENDED GEOPOLYMER MORTAR

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ABSTRACT

To achieve sustainability, efforts have been made to eliminate the problem connected with cement usage and production by completely replacing cement with an environmentally benign binder. This study investigates the impact of alkali activation on the setting properties of three precursors (Metakaolin, Cassava Peel Ash, and Rice Husk Ash) combined for binary and ternary geopolymer mortar. The fresh properties of geopolymer mortars, including flowability, setting time, and strength, were studied. For each test, a binary mortar mix ratio of CPA/MK, MK/RHA, and CPA/RHA, such as 100/0, 0/100, 75/25, 50/50, and 25/75, was assessed, as well as a ternary mortar mix ratio of MK/CPA/RHA, such as 100/100/100, 50/25/25, 25/50/25, and 25/25/50, and 100%PC (Control). As activators for geopolymer mortar mixture, 6M, 9M, and 12M concentrations of Na_2SiO_3/NaOH solutions were utilized. The results demonstrated that the control mortar containing 100%PC flowed less than the binary and ternary mortars. Mixtures with a greater proportion of CPA cure faster than those containing a greater proportion of MK or RHA. In addition, the water-to-binder absorption rate of RHA is greater than that of MK and CPA. On the basis of its soundness features, the 100%PC (control) exhibits less expansion than the binary and ternary blended geopolymer mixtures. As an environmentally friendly building material, geopolymer mortar has shown great feasibility and application potential, according to the current study.

Keywords: Alkaline Activation, Cassava peel ash, Geopolymer, Metakaolin, Rice husk ash