Study of Eco-Processed Pozzolan Characterization as Partial Replacement of Cement

ABSTRACT

Eco-processed pozzolan (EPP) is a sustainable product recycled from spent bleaching earth (SBE). It is recently used as a blended cement. The pretreatment method of palm oil generates SBE as waste material in the refinery plant. Despite sending the SBE to the landfill, which can lead to environmental pollution, it is extracted to produce sustainable products. The physical, chemical, mineralogical, and microstructural characteristics of EPP were analysed. Furthermore, the conventional cement was substituted with 20% of EPP by cement mass in mortar. The compressive strength of mortar containing EPP was determined for the assessment of strength activity index (SAI) of EPP. EPP consists mainly of silica (SiO_2), and the value of SiO_2, aluminium oxide (Al_2O_3), and iron oxide (Fe_2O_3) combination was 68.98% which is more than 50%. According to the ASTM C618 standard, EPP could be categorised in the Class C pozzolan. The major crystalline phase of EPP was αquartz. Based on the micrograph image, EPP possesses some relatively spherical, irregular shaped, and agglomeration of its particles. At an early curing age, the compressive strength of the mortar was increased with the inclusion of 20% of EPP. A high value of SAI can be reached by mortar specimen with 20% of EPP.