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UTILIZATION OF OIL-CONTAMINATED CLAYS AS CONSTRUCTION MATERIALS

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Abstract

The objective of this study is to manufacture a geopolymer by replacing part of the metakaolinite by calcined oil-contaminated clay (OCC) and investigate its properties. The effects of the calcination temperature, the mix design of the alkali activator, and the degree of calcined OCC replacement on the properties of the geopolymer were studied. Evaluation of pozzolanic activity and compressive strength as well as micro structure observation by SEM and XRD were performed in this study. The results indicate the best strength activity index (SAI) was obtained that when OCC was calcined at 850°C. The concentration of alkali activator needed to manufacture the geopolymer decreased with increasing degrees of calcined OCC replacement. It was found that 25% calcined OCC replacement could efficiently improve the early compressive strength of geopolymer specimens. However, with more than 75% calcined OCC replacement, the late strength of the geopolymer specimens decreased. Microstructural observation showed similar results in that the amount of silicon was not sufficient for polymerization and the chemical bonding was reduced at greater degrees of calcined OCC replacement. As a result, the late compressive strength of geopolymer specimens was insufficiently developed.

Key words: compressive strength, geopolymer, oil contaminated clay, strength activity index

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