

Mechanical performances of fly ash geopolymer bricks

Abstract

Geopolymer is a new class of three-dimensionally networked amorphous to semi-crystalline alumino-silicate materials, and first developed by Professor Davidovits in 1978. Geopolymers can be synthesized by mixing alumino-silicate reactive materials in strong alkaline solutions (mixture of sodium silicate and NaOH or KOH). The properties of geopolymeric material depend on type of source material, type of activator, heat treatment temperature, and heat treatment duration. In this experimental investigation, fly ash geopolymeric bricks were produced by using class C fly ash, sodium silicate, sodium hydroxide solution and natural sand. The bricks were treated at 60 °C for 24 hours. The compressive strength of class C fly ash geopolymer brick was determined at the ages of 1 day. Test results have revealed that the compressive strength values of fly ash geopolymer bricks ranged between 5 and 15 MPa. It has been found that the effect of fly ash/sand ratio and fly ash/alkaline activator ratio to the strength of fly ash geopolymer bricks was not significant. The fly ash geopolymer bricks also have lower water absorption.

Keywords

Alkaline activator; Brick; Compressive strength; Fly ash; Geopolymer