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Thermal Resistivity of Chemically Activated Calcined Clays-Based Cements

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Abstract

The study investigated the effects of selected potential chemical activators on thermal resistivity of calcined clay based cement mortars. 0.5 M Na_2SO_4 and 0.5 M NaOH were used as activator solutions. The chemical composition of sampled clays was determined by use of X-Ray Florescence (XRF) technique. Clays were incinerated at a temperature of 800 °C for 4 h. The calcined clays obtained were blended with OPC at replacement level of 35 percent by mass of the OPC to make the test cement labeled PCC35. The PCC35 mortar prisms measuring 40 mmx40mmx160mm were cast with activator solutions and cured in water. Compressive strength was determined at the 28^{th} day of curing. As a control, OPC and PCC35 were similarly investigated without activator solutions. The 28 day cured mortars were exposed to a temperature of 700 °C for 2 h then cooled in water to room temperature and their compressive strengths determined. Chemically activated PCC35 and non-activated PCC35 exhibited lower loss in weight than OPC after exposure to the elevated temperatures. Chemically activated PCC35 and non-activated PCC35 exhibited higher residual compressive strength than OPC after exposure to the said temperatures. Na_2SO_4 activated mortars showed higher thermal resistance than NaOH activated mortars. Generally, chemically activated PCC35 exhibited the highest thermal resistance compared to non-activated PCC35 and commercial OPC mortars.

Keywords

Activators Blended cements Calcined clay Cement Compressive strength Thermal resistance