

Pozzolanic activity assessment of a various palm oil fuel ash via lime consumption test

ABSTRACT

Palm oil fuel ash (POFA) is a conceivable cement substitute that could promote the strength and durability of cement-based products. However, the inconsistent burning conditions in mills result in POFA with different compositions. Therefore, the current study aims to evaluate the pozzolanic activity of POFA using the lime consumption test (LC). Five POFA'ss from different mills were designated as POFA1, POFA2, POFA3, POFA4 and POFA5. In the LC test, the hydroxide ion concentration of the saturated lime-POFA suspension was calculated by acid-base titration after 1, 3, 7 and 28 days of curing. The compressive strength of mortar with a mix design with a binder to sand weight ratio of 1:2.75 was carried out after 28 days of curing age to calculate the strength activity index (SAI). The results show that the LC for POFA1 was highest after 1, 3, 7 and 28 days compared to the other POFA samples. The mortar POFA1 also has the highest SAI value of 93.8% compared to the other mortars. The study has clearly shown that POFA from various sources has different pozzolanic performance due to inconsistent of chemical composition. The study suggests that POFA1 has higher pozzolanic activity than other POFAs due to its high reactivity with calcium hydroxide in the pozzolanic reaction.