Palm oil fuel ash as the future supplementary cementitious material in concrete

Abstract

The use of Palm Oil Fuel Ash (POFA) as a pozzolanic material for partial cement replacement in concrete reduces the cost of concrete as well as cuts down the number of landfill area required for disposing the ash. This paper presents a comprehensive review of the engineering properties and durability aspects of blended cement concrete incorporating POFA as a partial replacement of ordinary Portland cement (OPC). An Ordinary Portland Cement concrete mix termed P0 and two POFA concrete mixes with different fineness termed (POFA 45 and POFA 10) at 20% replacement level by weight of cement were considered in the study. Acid solution was found to be the most destructive under the applied exposure conditions on P0. The loss of mass and the resistance to chloride penetration were found to be depended on the degree of fineness of POFA to which the specimens were exposed. As for the values obtained from compressive strength test, P0 specimens were found to be the lowest compared with specimen consisting POFA. On the other hand, POFA 10 exhibited better resistance against acid than POFA 45. Conclusively, integration of POFA as partial cement replacement, especially very fine POFA increases the resistance of high strength POFA concrete towards both chloride attack and acid attack.