LONG TERM INVESTIGATION ON SULPHATE RESISTANCE OF AERATED CONCRETE CONTAINING PALM OIL FUEL ASH

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ABSTRACT

The increasing demand for natural sand supply by concrete industry and rising quantity of palm oil fuel ash, an environmentally polluting solid waste disposed by Malaysian palm oil industry has led to the innovation of aerated concrete containing palm oil fuel ash as partial sand replacement material. This lightweight concrete exhibits improvement in the compressive strength with the incorporation of 30% palm oil fuel ash. However, the long term experimental result of the strength and durability performance of this modified concrete is unavailable. This paper reports the one year result on strength performance of aerated concrete containing palm oil fuel ash when subjected to different curing method and behavior of this material upon exposure to long term sulphate attack. Comparisons are made between behavior of plain aerated concrete mix as control specimen and another mix, aerated concrete with 30% palm oil fuel ash as partial sand replacement. Compressive strength performance of the specimens were observed by placing it in two types of curing regime, water curing and air curing. Durability of the mixes were assessed by exposing the specimens in Sodium sulphate environment. Findings indicate that water curing promotes better pozzolanic reaction in aerated concrete containing palm oil fuel ash, that leads to formation of larger amount of C-S-H gel resulting it to be stronger than control specimen. Integration of palm oil fuel ash consumes calcium hydroxide which is vulnerable to sulphate attack and produces secondary C-S-H gel making the concrete more compact thus enhancing its durability against sulphate attack.

Keywords: Aerated concrete · Palm oil fuel ash · Different curing method · Compressive strength · Sulphate attack