

Properties of Oil Palm Shell Lightweight Aggregate Concrete Containing Fly Ash as Partial Cement Replacement

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Abstract:

In Malaysia, the growing palm oil business and increasing energy consumption that pushes more coals supply for power generation at power plants generates by-products. A large amount of oil palm shell from palm oil mills and fly ash from coal power plant still disposed as waste. At the same time, the expanding cement and granite industry to cater the construction industry need also causes environmental degradation that requires solution. Thus, incorporation of the industrial solid wastes as alternative mixing ingredient in production of zero granite concrete production is seen as one of the viable approach to reduce waste thrown at landfill. The present research investigates the mechanical performance of palm oil waste lightweight aggregate concrete containing fly ash as supplementary cementitious material. Five concrete mixes were prepared by varying the quantity of fly ash added that is 0%, 10%, 20%, 30% and 40% by the weight of cement. All specimens were air cured until the testing age. Then, the specimens were tested to determine compressive strength and flexural strength up to 28 days. The finding shows that integration of fly ash up to 30% produces concrete that is suitable for load bearing application. Conclusively, approach of integrating fly ash in lightweight aggregate concrete would reduce cement consumption and fly ash disposal.

Keywords : Palm Oil Mills; Power Plant; Mechanical Performance; Fly Ash

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