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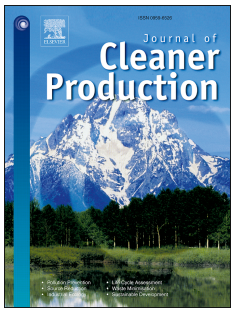

Engineering properties of lightweight aggregate concrete containing binary and ternary blended cement

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Engineering properties of lightweight aggregate concrete containing binary and ternary blended cement

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ABSTRACT

Lightweight concrete (LAWC) has numerous advantages over normal weight concrete (NWC), such as less dead load and construction costs. Using lightweight aggregates (LWA) is one of the most typical methods of fabricating structural LWAC. This paper studies the possibility of LAWC production by agricultural solid waste, specifically oil palm shell (OPS) and also by replacing ordinary Portland cement (OPC) with rice husk ash (RHA) and fly ash (FA) up to 50%. The effect of cement replacement with 0%, 10%, 20% and 30% of RHA (binary blended cement) and with 15%FA/15%RHA and 25%FA/25%RHA (ternary blended cement) on several engineering properties (workability, density, compressive strength, flexural strength, water absorption, drying shrinkage and ultrasonic pulse velocity) of OPS concrete was analyzed. The impact of 2, 4, and 6 days of water curing on 28-day compressive strength was examined as well. This study proved the possibility of fabricating sustainable LAWC made of high volume agricultural and industrial waste materials. Although the high amount of RHA in OPS Concrete caused reduction of compressive strength and workability, incorporating FA along with RHA addressed this issue. OPS concrete showed to be more sensitive to curing and only 4-day initial