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Manufacturing of High-strength Lightweight Aggregate Concrete using Blended Coarse Lightweight Aggregates

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Abstract

Structural lightweight concrete plays an important role in the construction industry, especially for the high-rise buildings. It can only be produced using lightweight aggregates. Oil-palm-boiler clinker (OPBC) is a solid waste from the oil palm industry and could be used as lightweight aggregate in concrete mixture. However, the density of this lightweight aggregate is more than the density of the other types of natural and artificial lightweight aggregate. Therefore, the density of concrete was made of this lightweight aggregate is relatively high and is in the range of semi-lightweight concrete. In the current study, OPBC was partially substituted with a lighter lightweight aggregate namely oil palm shell (OPS) in a OPBC semi-lightweight concrete with high strength to further reduce the density of the concrete. To this end, OPBC was replaced by OPS with 0, 20, 40 and 60% by volume. Test results show that contribution of OPS in OPBC concrete reduces the density, while all the mechanical properties were also reduced. This occurs due to smooth surface texture of OPC and its lower density compared to OPBC. It was, however, found that OPBC semi-lightweight concrete containing more than

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