

Enhancement of Mechanical Properties and Thermal Conductivity of Oil Palm Shell Lightweight Concrete Reinforced with High Performance Polypropylene Fibres

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Abstract : Oil palm shell (OPS) is the solid waste product from the palm oil sector of the agricultural industry and can be used as alternative coarse aggregates to substitute depleting conventional raw materials. This research aims to investigate the incorporation of various high-performance polypropylene (HPP) fibres with different geometry to enhance the mechanical properties and thermal conductivity of OPS lightweight concrete. The effect of different volume fractions (Vf) (0.05%, 0.10% and 0.15%) were studied for each fibre. The results reveal that the effectiveness of HPP fibres to increase the compressive strength at later ages was more pronounced than at early age. It is found that the use of HPP fibres reinforced OPS lightweight concrete (LWC) induced the advantageous of improving mechanical properties (compressive strength, flexural strength and splitting tensile strength) and thermal conductivity. Hence, this HPP fibres is a promising alternative solution to compensate lower mechanical properties as well as contribute to energy efficiency building material in the construction industry.

Keywords : oil palm shell, high performance polypropylene fibre, lightweight concrete, mechanical properties, thermal conductivity

Conference Title : ICCBME 2018 : International Conference on Chemical, Biological and Materials Engineering

Conference Location : Venice, Italy

Conference Dates : November 14-15, 2018