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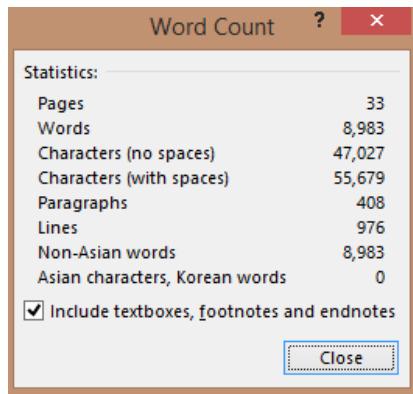
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Material and structural properties of waste-oil palm shell concrete incorporating ground granulated blast-furnace slag reinforced with low-volume steel fibres

Kim Hung MO^{1*}, Ting Seng CHIN¹, U. Johnson ALENGARAM¹, Mohd Zamin JUMAAT¹

¹ Department of Civil Engineering, Faculty of Engineering, University of Malaya, 50603 Kuala Lumpur, Malaysia

Abstract

This paper presents the utilization of low-volume steel fibres to improve the performance of concrete containing waste oil palm shell as aggregate and ground granulated blast furnace slag (GGBS) as partial cement replacement material. The experimental results showed that although the increased GGBS replacement level caused a lowering of the concrete properties, the addition of low-volume steel fibres improved the material properties, such as the mechanical properties, stress-strain behaviour and flexural toughness of the oil palm shell concrete (OPSC). In terms of these properties, it was found that the combination of 20% GGBS as partial cement replacement and 0.6% steel fibres achieved the best results among the concrete mixtures tested. The mix was then used for the investigation of the structural behaviours (bond and flexural behaviours) in comparison with conventional concrete and plain OPSC. The results showed that the OPSC containing 0.6% steel fibres enhanced the structural performance compared to the corresponding OPSC without fibres as well as the ready-mixed grade 30 normal weight concrete.

Keywords: oil palm shell waste; steel fibres; slag; mechanical properties; toughness; structural properties

*Corresponding author. Tel: +60172119378 (Kim Hung Mo)

Email address: khmo890815@gmail.com (Kim Hung Mo)

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