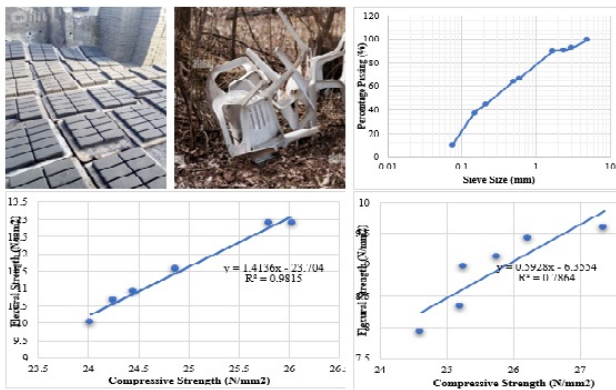


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Research Paper

Strength Characteristics of Concrete with Waste Polypropylene as Modifier for Pavement Construction

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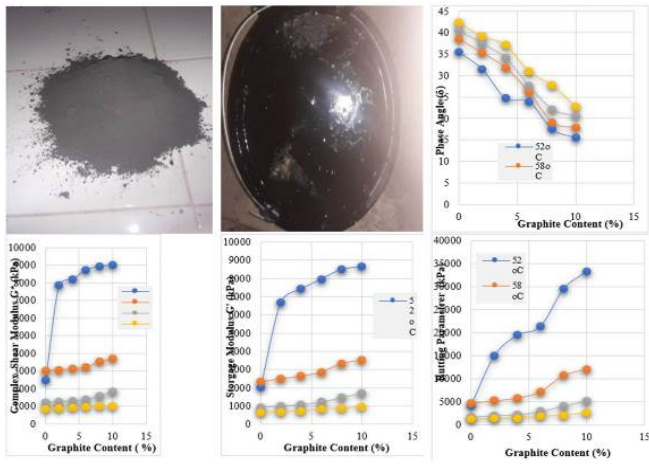
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Abstract

The demand for a better performing pavement and the need to convert the ever-growing polymer waste into beneficial use necessitated the need to develop and characterize a polypropylene modified concrete for use in pavement construction. This research focuses on characterizing the strength of concrete produced with waste polypropylene waste as modifiers for pavement construction. The materials used in this research are fine and coarse aggregates, cement and polypropylene waste chairs (PWC). Tests were performed on the aggregate and fresh concrete to determine their suitability and characteristics for use in concrete for pavement. Two concrete grades 1:2:4 and 1:3:6 was produced into 200 mm, 400 mm and 500 mm long paving stones on which compressive and flexural tests were performed. Results obtained showed that 400 mm 1:2:4 grade concrete has the highest compressive strength of 27.36 N/mm² at 10% polypropylene composition. The 200 mm 1:2:4 concrete grade paving stone with 10% polypropylene composition has the highest flexural strength of 12.90 N/mm². The 200 mm at 10% polypropylene composition correlation coefficient has that the highest value of 0.98 which better explains the compression-flexural strength relationship and validates the 200 mm length at 10% polypropylene composition paving stone as the most adequate length of paving stone for pavement construction. It was concluded that the 200 mm long 1:2:4 concrete grade paving stone at 10% polypropylene composition is the best length of paving stone that can give an adequate flexural strength which is the most important requirement in concrete pavement requirement.

Keywords: Waste Polypropylene, Concrete, Compressive Strength, Flexural Strength, Paving Stones, Pavement

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