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Development of Concrete Paving Blocks Prepared from Waste Materials with Partial Portland Cement

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Abstract: *This experiment used three types of waste materials: calcium carbide residue, fly ash, and recycled concrete aggregate to develop concrete paving blocks. The blocks had calcium carbide residue and fly ash as a binder without ordinary Portland cement (OPC) and combined with 100 % of recycled concrete aggregate. The concrete paving blocks were 10 × 10 × 20 cm and were formed using a pressure of 6 or 8 MPa. The binder-to-aggregate ratio was held constant at 1:3 by weight, while the water-to-binder ratios were 0.30, 0.35, and 0.40. The effects of the water-to-binder ratios and fineness of the binder on the compressive strength, flexural strength, abrasion resistance, and water absorption of the concrete paving blocks were determined and compared with those of TIS 827 and ASTM C1319 standards. The results revealed that by applying this procedure, we were able to produce an excellent concrete paving block without using OPC. The compressive strength of the concrete paving blocks made from these waste materials was 41.4 MPaat 28 days. Therefore, these waste materials can be used as raw materials to manufacture concrete paving blocks without OPC that meet the requirements of 40 MPa and 35 MPa specified by the TIS 827 and ASTM C1319 standards, respectively.*

Keywords: Calcium Carbide Residue, Recycled Concrete Aggregate, Concrete Paving Block, Waste Material, Compressive Strength

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