

عنوان مقاله:

Synergistic Effects of Recycled PET Particles and Silica Fume on the Fresh, Hardened and Durability Performance of Roller Compacted Concrete

محل انتشار:

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خلاصه مقاله:

Roller Compacted Concrete (RCC) has garnered significant attention in the road and infrastructure sectors due to its economic and technical advantages. The integration of specific particles to bolster its strength without compromising workability is garnering increasing focus. This research provides an experimental assessment of the effects of polyethylene terephthalate (PET) particles — derived from recycled beverage bottles and plastic bags — and silica fume on the fresh and hardened properties of RCC. PET particle replacement by coarse aggregate was studied at increments of 0.5 to 2 % by volume or 5, 10, 15, and 20 kg per cubic meter. The fresh properties of RCC were evaluated using the Vebe consistency time test. Hardened characteristics were determined through measures like compressive strength, splitting tensile strength and flexural strength over varied durations. Additionally, water absorption and electrical resistivity tests were conducted to provide insights into durability. Initial results indicate an optimal PET particle concentration of 5 Kg/m³ for balanced fresh and hardened RCC properties. Nonetheless, it's essential to highlight that a rise in PET particle dosage corresponded with a slight reduction in compressive strength. This investigation furnishes crucial perspectives for industry experts pursuing sustainable and efficacious enhancements for RCC applications.

کلمات کلیدی:

Roller-compacting concrete, fresh properties, Mechanical Properties of Concrete, Recycled Polyethylene Terephthalate (PET), Durability

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