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Eco-Friendly Bricks: A Sustainable Solution with High-Density Polyethylene HDPE

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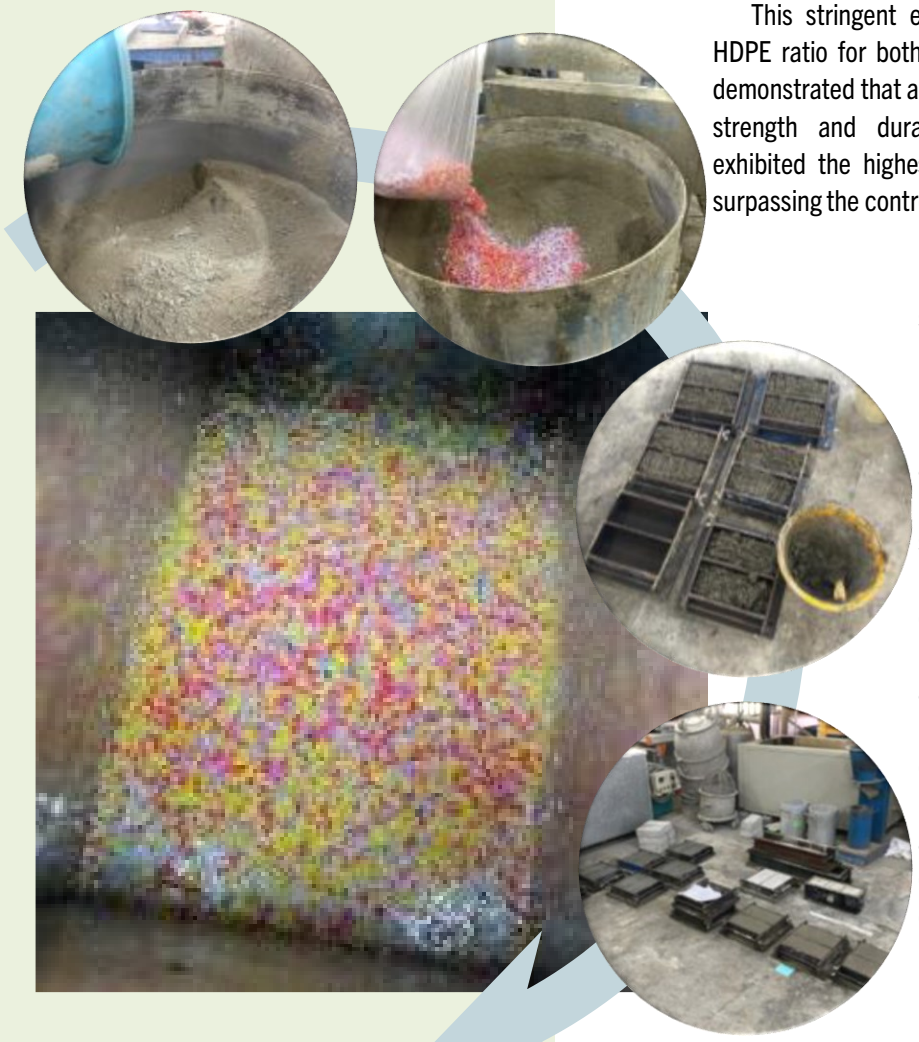
Concrete and bricks constitute the foundation in modern construction; however, their conventional manufacturing processes significantly contribute to carbon emissions. The rising demand for bricks compels the construction industry to seek sustainable alternatives urgently. An innovative solution may involve tackling another environmental concern—plastic waste. Polyethylene Terephthalate (PET), a plastic frequently utilised in water bottles, demonstrates significant potential as a sustainable additive in brick production, minimising waste while improving brick performance. This research investigated the incorporation of PET in concrete bricks to mitigate plastic waste and enhance brick durability. The incorporation of PET as a partial substitute for fine aggregate enhances the eco-friendliness of bricks while maintaining their structural integrity.

This study incorporated High-Density Polyethylene (HDPE) into cement bricks as a partial substitute for sand, thereby repurposing plastic waste and improving the structural properties of the bricks. Bricks were manufactured with differing HDPE concentrations—2.5%, 5%, 7.5%, and 10%—and subsequently evaluated for compressive strength and water absorption over a 28-day curing duration.



This stringent evaluation sought to ascertain the ideal HDPE ratio for both resilience and robustness. The findings demonstrated that a small quantity of HDPE can enhance both strength and durability. Bricks containing 2.5% HDPE exhibited the highest compressive strength at 31.94 MPa, surpassing the control sample.

However, as the HDPE content increased beyond 2.5%, compressive strength decreased, highlighting the importance of a balanced ratio. Furthermore, bricks with higher HDPE levels showed increased water absorption, even though all samples remained within permissible limits. This suggests that meticulous management of HDPE content is critical for performance optimisation.

This study suggests a promising avenue for sustainable construction. Bricks made from recycled HDPE reduce carbon emissions, reuse waste, and improve durability. HDPE-infused bricks, a low-carbon alternative, could help the construction industry become more environmentally friendly.

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