Repurposing Plastic Bottles in Concrete Mixtures: Study on the Strength and Displacement Performance

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Plastic waste from bottles is a major environmental issue. This study explores using recycled plastic bottles in concrete to create a lightweight, durable, and eco-friendly material. The project builds on research on irradiated plastics and examines concrete mixed with plastic aggregates that have not been gamma irradiated. The goal is to reduce plastic waste, assess concrete's strength and weight, and evaluate its environmental and economic benefits. The study tests compressive strength and weight changes in concrete containing recycled fine plastic (RP) and fine recycled concrete aggregate (FRCA) by substituting coarse aggregates with crushed plastic bottles. Six initial samples were tested: two controls, two with 15% plastic, and two with 25%. Only HDPE plastic was used in this phase, which was scaled up to 15 samples. The research highlights the potential of recycled plastics in construction, providing a sustainable solution that reduces waste while maintaining structural integrity.

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