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TITLE OF PROJECT: **Sustainable Plastic Aggregates for Concrete in Civil Infrastructure**

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ABSTRACT (150-300 words): This research investigates the preparation of plastic aggregates for concrete mixtures, employing a novel process involving recycled plastic sourced from a local shredder. The plastic, broken into strips and ranging from 1mm to 6mm, undergoes melting at temperatures between 294°C and 339°C. Sand and rock dust are integrated into the mixture. The aggregates, initially varying from 2.36mm to 20mm, conform to granulometry standards outlined in ASCE-C330, C33-99a, and IS383-2019. Analytical techniques, including scanning electron microscopy (SEM) and energy-dispersive X-ray analysis (EDX or EDA), provide insights into the elemental composition. The study explores the use of lightweight plastic aggregates and high-density plastics in creating single and well-graded aggregates. It delves into the manufacturing process for plastic aggregates in civil infrastructure, emphasizing composition considerations. This research contributes valuable insights into sustainable construction practices and materials.

Beyond technical considerations, the research underscores the economic advantages associated with recycled plastic aggregates. This includes sustainable plastic waste management practices, mitigating landfill disposal, and reducing production costs. Additionally, the study highlights potential social benefits, anticipating job creation in recycling and construction, thereby fostering local economic growth and social welfare.

In conclusion, this research positions recycled plastic aggregates, evaluated for their impact on compressive strength according to ACI 211.2-98 (Re-approved 2004) and ACI 213R-14 standards and subsequently analyzed through SEM and EDX techniques, as a promising and practical solution for enhancing concrete sustainability in construction. The findings contribute to ongoing efforts in the construction industry to embrace eco-friendly alternatives, offering economic and social benefits while addressing crucial environmental challenges.

KEYWORDS: plastic aggregates, concrete mixtures, recycled plastic, SEM, EDX, granulometry, lightweight aggregates, civil infrastructure.

CATEGORY: Concrete Technology and Building Materials