

Partial Replacement of Coarse Aggregate with Rubber Waste

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Abstract: *The rapid urbanization and expansion of infrastructure have significantly increased the demand for concrete, resulting in the excessive extraction of natural aggregates. This practice poses serious environmental concerns, including the depletion of natural resources and ecological imbalance. Simultaneously, the disposal of rubber waste, particularly from used automobile tires, has become a major environmental challenge due to its non-biodegradable nature and the limited capacity of landfills. In this context, the present study investigates the potential of partially replacing coarse aggregate in concrete with rubber waste as a sustainable and eco-friendly alternative. The research focuses on the preparation of concrete mixes with varying percentages of rubber waste—typically 5%, 10%, 15%, and 20% by volume—replacing conventional coarse aggregates. The concrete samples are tested for key mechanical properties such as compressive strength, tensile strength, flexural strength, and workability. Durability aspects, including resistance to impact, water absorption, and chemical attacks, are also examined. The results indicate a gradual decrease in compressive strength as the rubber content increases; however, there is a noticeable improvement in impact resistance, energy absorption, thermal insulation, and ductility. These characteristics make rubberized concrete suitable for specific applications such as pavements, sound barriers, lightweight concrete structures, and shock-absorbing construction elements.*

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