

The Impact of Plastic Waste as a Partial Replacement for Sand in Normal Strength Concrete

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Plastic waste is a significant environmental concern due to its negative impact on the ecosystem. This study investigated the use of waste plastic as a partial replacement for sand in M15 grade concrete and assessed its effects on the physical and mechanical properties of concrete. Ten concrete mixtures were prepared with varying levels of plastic substitution: 0%, 2%, 4%, 6%, 8%, 10%, 12%, 14%, 16%, and 18%. Concrete cubes measuring 150 x 150 x 150 mm were cast for each mixture to evaluate workability, unit weight, compressive strength, and tensile strength. Slump tests were performed on-site to assess workability. Two cubes from each mixture were cured in water and tested for compressive strength at 7 and 28 days. Results indicated that plastic replacement up to 10% improved mechanical and physical properties compared to conventional M15 concrete. This study highlights the potential benefits of incorporating waste plastic into concrete, including enhanced material properties, cost savings, and environmental benefits. Reusing waste plastic in concrete not only mitigates environmental issues related to plastic waste but also contributes to more sustainable and economical construction practices.

Keywords: *environmental sustainability; recycling; normal strength concrete; plastic waste*