IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 3, October 2025
Impact Factor: 7.67

Utilization of Plastic Waste in Bituminous Mix for Durable and Sustainable Road Construction

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Abstract: *The accelerated generation of plastic waste has emerged as one of the most serious environmental concerns of the contemporary era. Conventional methods like landfilling and incineration are responsible for causing enormous environmental degradation and pollution. In order to overcome this, the current study investigates the efficient use of plastic waste in bituminous road construction as a green and sustainable option. Plastic wastes like polyethylene (PE), polypropylene (PP), and polystyrene (PS) are utilized as modifiers in the bituminous mixture to enhance the performance of the pavement. Modified bitumen with improved binding strength, enhanced stability, and enhanced resistance to water damage and rutting is a result of this method. This technique not only decreases plastic waste but also minimizes the use of traditional bitumen, thus making road construction less costly and environment-friendly. In addition, plastic waste addition imparts improved load-carrying capacity, increased Marshall Stability values, and increased resistance to deformation due to heavy traffic. Field observations and laboratory tests have proved that plastic-modified bitumen roads record higher service life and reduced maintenance. The concept promotes waste-to-wealth practices and meets the global objectives of sustainable infrastructure as well as environmental conservation. Accordingly, use of plastic waste in bituminous mixes is a promising and sustainable option for contemporary road construction techniques.*

Keywords: plastic waste

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DOI: 10.48175/IJARSCT-29353