

Eco-Friendly Pavement Design using Plastic Waste Modified Bitumen

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Abstract: Rapid urbanization and the growing use of plastics have resulted in a significant increase in plastic waste, leading to serious environmental concerns. Disposing of this non-biodegradable waste is a major challenge, as traditional methods like landfilling and incineration cause pollution and resource loss. To address this issue, an eco-friendly pavement design incorporating plastic waste is proposed. In this approach, waste plastics such as polyethylene, polypropylene, and polystyrene are shredded and used as a partial replacement for bitumen in flexible pavement construction. The addition of plastic waste improves the binding properties, increases the stability and durability of the pavement, and enhances resistance to water-induced damage. This method not only provides an effective solution for plastic waste management but also reduces the cost of road construction and conserves natural resources. Therefore, using plastic waste in pavement design offers a sustainable, economical, and environmentally responsible alternative for modern road infrastructure.

Keywords: Eco-friendly pavement, plastic waste, flexible pavement, bitumen modification, sustainable road construction, waste management, recycled plastics, environmental protection, durability, cost-effective pavement.

