

Incorporation of Polymer Material to Enhance Properties of Traditional Asphalt: A Review

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Sustainability and green concepts are currently acknowledged throughout the global construction industry. The present study is focussed to review the effects of polymer incorporated traditional asphalt. Besides, wearing of roads due to the melting of near-surface tar has become a critical issue in road construction. The traditional material used in road construction is a mixture of rock aggregates with bitumen. However, the introduction of waste plastics such as polythene bags, cups, bottles, and polyethylene terephthalate (PET) is highly appreciated. Since the plastics and polythene are non-biodegradable, these have become the major environmental pollutants around the World. However, these have been effectively incorporated in the asphalt mixture to be used in the construction of roads. According to literature, various polymer materials have been pre-heated at 150°C-200°C until the melt is well liquefied. The well-heated aggregates have then been added to the polymer melt. Thereafter, the plastic-coated aggregates have been mixed with bitumen to produce the polymer mixed asphalt composite (Plastiphalt). The mechanical properties of the composite have shown excellent strength values. Further, this composite has shown higher wear resistance and the melting of bitumen during exposure to sunlight has also reduced. Thereby, the durability of plastiphalt has been concluded to be much higher than the traditional asphalt material. Moreover, the dark black colour has also been reduced, thus minimizing heat absorbance to the inner material. The surficial oil formation of newly paved roads has also reduced. Consequently, road safety has been increased with a reduced number of accidents during rainy seasons. Therefore, the utilization of abundantly available waste plastics in road construction is highly recommended to developing countries such as Sri Lanka.

Keywords: Plastic waste, Eco-friendly, Roads, Asphalt, Durability