

Image analysis and mechanical properties of asphalt mixture with waste plastic

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ABSTRACT

Cracking is a typical problem that deteriorates the strength and longevity of a pavement structure. Waste plastic in pavement construction is cost-effective and environmentally friendly. The use of waste plastic has been growing in recent years. Adding waste plastics to the asphalt mixture would improve its physical and mechanical characteristics. As a result, it is a sustainable and long-term solution that helps to reduce plastic waste and preserve the environment. This research aims to develop the image analysis and assess the characteristic of modifying bitumen with different percentages of plastic wastes (0%, 4%, 6%, and 8%). Using blending processes, modified bitumen was prepared. The binder used in this study is penetration grade PEN 60/70. Marshall Test, Indirect Tensile Strength, Resilient Modulus and Dynamic Creep Modulus test were carried out to determine the optimum percentage of waste plastic in asphalt mixture. The modified binders can be used in high-performance asphalt mixtures, as well as to use a well-developed image analysis technique using ImageJ software to characterize asphalt pavement surfaces. The result shows that the modified asphalt mixture is more efficient than the conventional asphalt mixture. Addition of the waste plastic proved sufficient to increase the performance of the asphalt pavement as modified asphalt mixture performance is more stable than conventional mixture.

KEYWORDS

Asphalt Mixture, Creep Modulus, Image Analysis, Marshall Stability, Waste Plastic

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