

عنوان مقاله:

Performance optimization in bitumen properties from different sources modified with shredded tier waste

محل انتشار:

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خلاصه مقاله:

BACKGROUND AND OBJECTIVES: Optimization of bitumen with Polymer modification such as a shredded tier, which serves as a waste in the environment has been used for road pavement to minimize common failure mechanisms associated with roads. The objectives aimed at using a shredded tier to modified bitumen (STMB) in ratio ۱۰:۹۰, ۲۰:۸۰, ۳۰:۷۰, ۴۰:۶۰, and ۵۰:۵۰, from Shredded tier were added to bitumen from Agbabu and Loda to study their performances when applied in the construction industry. **METHODS:** Bitumen, which was obtained from Odigbo and Irele Local Government Area of Ondo State, Nigeria, was mixed at ۳۰۰°C for two hours at different proportion with a shredded tier. Characteristics such as Penetration, Viscosity, melting point, marshal Stability, specific gravity and mechanical properties were determined. **FINDINGS:** Marshall Stability (kg) at ۶۰°C increased with an increase in shredded tier modified bitumen from ۱۰% to ۴۰% improved performance in both modifications and reduced in a ۵۰% increase. This indicated that the increased in shredded tier reduced the measured value of penetration after the attainment values of ۴۰:۶۰ blends. This interaction between the bitumen-tier blends has a penetration value adequately agreed with the predicted value by the penetration index model. The rheological properties from different proportions at temperatures ranging from ۴۵°C to ۶۵°C at ۴۰% modification were observed to have the least rutting parameter at ۳.۹ (G*/Sin δ (kPa) in Agbabu and ۲.۹ (G*/Sin δ (kPa) in Loda for defects accountable to paving deformation and ageing as there was a decrease in the rutting parameter with the increase in temperature generally. **CONCLUSION:** Generally, the values obtained for the physico-mechanical properties increased with an increase in modifiers from ۱۰% to ۴۰% modification in the two samples. Though, Agbabu is preferable and economical due to the percentage yield for road construction.

کلمات کلیدی:

Marshal stability, penetration, Phase angle, Putting property, Stiffness

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