

## Investigating the Properties of Asphalt and Asphalt Mixture Based on the Effect of Waste Toner

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**Abstract :** This study aimed at investigating the properties of asphalt and mix asphalt based on the effects of waste toner sources (WT1 and WT2) with 8% dosage waste toner powders (WT). The test results included penetration, softening points, ductility,  $G^*\sin\delta$ ,  $G^*/\sin\delta$ , Ideal cracking test(IDEAL-CT), and Ideal shear rutting test(IDEAL-RT). The results showed that the base binder with WT2 had a significantly higher viscosity value compared to the WT1 modified binder, and thus, higher energy for mixing and compaction is needed. Furthermore, the results of penetration, softening points,  $G^*\sin\delta$ , and  $G^*/\sin\delta$  were all affected by waste toner type. In terms of asphalt mixture, the IDEAL-RT test revealed that the addition of waste toner improved the rutting resistance of the asphalt mixture regardless of toner type. Further, CTindex values for waste toner-modified asphalt mixtures show no significant difference. Above all, WT-modified asphalt mixtures produced by the wet process have better rutting performance.

**Keywords :** waste toner, waste toner modified asphalt, asphalt mixture properties, IDEAL-RT test, IDEAL-CT test

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