

Laboratory Evaluation of Rutting and Fatigue Damage Resistance of Asphalt Mixtures Modified with Carbon Nano Tubes

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Abstract : Roads are considered as the national capital, and huge developmental budget is spent on its construction, maintenance, and rehabilitation. Due to proliferating traffic volume, heavier loads and challenging environmental factors, the need for high-performance asphalt pavement is increased. In this research, the asphalt mixture was modified with carbon nanotubes ranging from 0.2% to 2% of binder to study the effect of CNT modification on rutting potential and fatigue life of asphalt mixtures. During this study, the conventional and modified asphalt mixture was subjected to a uni-axial dynamic creep test and dry Hamburg wheel tracking test to study rutting resistance. Fatigue behavior of asphalt mixture was studied using a four-point bending test apparatus. The plateau value of asphalt mixture was taken as a measure of fatigue performance according to the ratio of dissipated energy approach. Results of these experiments showed that CNT modified asphalt mixtures had reduced rut depth and increased rutting and fatigue resistance at higher percentages of carbon nanotubes.

Keywords : carbon nanotubes, fatigue, four point bending test, modified asphalt, rutting

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