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Studying the Behavior of Asphalt Mix and Their Properties in the Presence of Nano Materials

Authors : Aman Patidar, Dipankar Sarkar, Manish Pal

Abstract : Due to rapid development, increase in the traffic load, higher traffic volume and seasonal variation in temperature, asphalt pavement shows distresses like rutting, fatigue and thermal cracking etc. because of this pavement fails during service life so that bitumen needs to be modified with some additive. In this study VG30 grade bitumen modify with addition of nanosilica with 1% to 5% (increment of 1%) by weight of bitumen. Hot mix asphalt (HMA) have higher mixing, laying and rolling temperatures which leads to higher consumption of fuel. To address this issue, a nano material named ZycoTherm which is chemical warm mix asphalt (WMA) additive is added to bitumen. Nanosilica modification (NSMB) results in the increase in stability compared to unmodified bitumen (UMB). WMA modified mix shows slightly higher stability than UMB and NSMB in a lower bitumen content. The Retained stability and tensile strength ratio (TSR) is more than 75% and 80% respectively for both mixes. Nanosilica with WMA has more resistant to temperature susceptibility, moisture susceptibility and short term aging than NSMB.

Keywords : HMA, nanosilica, NSMB, temperature, TSR, UMB, WMA
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