Verification of pavement marking degradation models using eastern tennessee pavement marking retroreflectivity data

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Abstract:
Pavement markings are lines/markings drawn on pavement surface to provide vital information to road users pertaining to lane restrictions and vehicle movements, which if adhered to, results into improved road users' safety. For the pavement markings to be useful they ought to be reflective. Pavement markings retroreflectivity is a measurement of how well the markings can be seen by road users, especially at night. Pavement marking retroreflectivity is measured in milli-candela per square meter per lux ($mcd/m^2/lux$). Candela is a measurement of light intensity and lux is measurement of luminous light per square meter. The USA Federal Highway Administration (FHWA) in the Manual on Uniform Traffic Control Devices (MUTCD) recommends minimum retroreflectivity levels on different types of pavements. Pavement markings retroreflectivity degrade as a function of time, environmental condition and number traffic repetition after its application. There have been several studies that were conducted to establish trends and time it takes for pavement markings to stay above the threshold. Some of the studies published degradation models. This paper seeks to verify the published pavement marking degradation models using pavement retroreflectivity data collected from East Tennessee. The models selected for verification are published by Lee et. al., Aboud and Bowman , Sarasua et. al., and Sitzabee at. al. From these models, the model by Abboud and Bowman for white paint pavement markings had the highest R^2; other models have published R^2 values that are larger than what was obtained from this study. The model by Lee et..al., had a published R^2 value similar to what was obtained from this study.