TOWARDS IMPLEMENTATION OF THE SURFACE PERFORMANCE GRADED (SPG) SPECIFICATION FOR CHIP SEAL BINDERS

Shi Chang¹, Amy Epps Martin¹, Edith Arambula²

¹Texas A&M University, College Station, Texas, 77843-3135
²Texas A&M Transportation Institute, College Station, Texas, 77843-3135

Over the past 15 years, a Surface Performance-Graded (SPG) specification for chip seal binders has been developed and validated by the Texas Department of Transportation (TxDOT) using a modified PG framework, laboratory measurements, and visual field performance (aggregate loss and bleeding) of 75 highway sections (HSs). The SPG was established in an effort to extend the service life of chip seals by providing a binder selection method that accounts for differences in climate and allows for adjustments due to traffic. TxDOT recently commenced a statewide implementation effort of the SPG specification.

The initial activities include: (i) reviewing laboratory and field performance of HSs built in 2011 based on the latest version of the SPG specification, newly generated SPG requirement map, and revised Surface Condition Index (SCI) calculation; (ii) characterizing binders from HSs built in 2013 and monitoring their field performance; (iii) evaluating additional parameters to complement the SPG specification and (iv) exploring the possibility of predicting bending beam rheometer (BBR) creep stiffness values from frequency sweep results. When comparing the expected performance of the binders (based on their SPG grade) against actual field performance after the first year in-service, the majority of the HSs built in 2011 correlated well, while fewer of the HSs built in 2013 had a good correlation with most of the discrepancies occurring in areas of the states with severe winter climates. A phase angle parameter was introduced in the SPG specification to differentiate between modified and unmodified binders, but prediction of BBR creep stiffness values via frequency sweep was not reliable at colder temperatures, even when a 4-mm DSR plate test was used. This type of performance-based chip seal binder specification shows promise for implementation nationwide, and the lessons learned in Texas can shorten this process.