CENTER FOR TRANSPORTATION RESEARCH

PROJECT SUMMARY

Texas Department of Transportation

0-7058: Development of a Performance-Related Test for Designing Seal Coats

Background

The Texas Department of Transportation's (TxDOT) seal coat program is critical to preserving its existing roadway infrastructure and ensuring roadways retain adequate skid resistance. However, sometimes seal coats fail prematurely due to either incompatibility between aggregate and binder or binder that has poor durability while meeting other specification requirements. The overall goal of this project was to identify and develop one or more laboratory tests that can be used to evaluate the expected performance of a seal coat and to use this test as a screening tool for project-specific seal coat materials (aggregate and asphalt binder or emulsion).

What the Researchers Did

The researchers investigated the effects of several influencing factors on the performance of seal coats based on a thorough literature review and a survey of TxDOT and other state DOT personnel. They evaluated tests that could be used to measure the binder-aggregate compatibility and adhesion. The study used modifications of a Sweep test and Vialit test to measure seal coat aggregate adhesion, and researchers performed these tests in multiple experiments to investigate the effects of binder type, dust, REOB and PPA, and liquid antistrip agents on adhesion characteristics using four different aggregates' mineralogies. They also evaluated more than 30 field test sections for loss of texture after one to two years in service, observed their general condition, and conducted Vialit and Sweep tests on material retained from construction.

What They Found

The researchers made the following key observations based on the study:

1. The lab testing program and a field section evaluation indicated that the Sweep test best evaluates the binder-aggregate adhesion.
2. Vialit tests performed with lab materials and field materials seem to be more variable and indicative of binder fracture than adhesion.
3. The Sweep test seems more indicative of early-age aggregate loss, which is of immediate concern to TxDOT district personnel.
4. Field evaluations indicate that aggregate "punch-in" to the pavement is more of a problem than aggregate loss.
5. Laboratory Sweep testing of field section materials from roadways where punch-in, not aggregate loss, was the significant problem suggests a Sweep test loss criterion be set at 25%.

What This Means

The project's findings yielded the following recommendations:

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- Include a Sweep test in the specification for seal coats as a check on the compatibility of the project material, with the maximum allowed loss of aggregate set at 25%. This test could be performed by TxDOT, but it may be more efficient to require the contractor to secure a commercial lab certified to perform this test.
- Reserve Vialit testing for use in a forensic analysis and do not implement it on a routine basis.

For More Information

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