Texas A&M Transportation Institute

PROJECT SUMMARY

Texas Department of Transportation

0-6989: Update Seal Coat Application Rate Design Method

Background

A successful seal coat is one that seals the pavement from air and water intrusion while providing the safety benefits of maintaining sufficient friction over the design life of the seal coat. Seal Coat application rate design methods are rarely used and have not been significantly updated since the early 1980s. The Texas Department of Transportation (TxDOT) typically uses experience to determine seal coat application rates. Unfortunately, the experience level is variable, and loss of experienced personnel can lead to increased problems until experience is gained. Some of these problems are flushing, bleeding, and rock loss. With over $300 million annual investment, it is imperative that seal coats are successful.

What the Researchers Did

Researchers reviewed national and international seal coat design methods, including those from the *TxDOT Seal Coat and Surface Treatment Manual*, TxDOT district-specific methods, New Zealand, Australia, and South Africa. The review included factors that influence the application rates of both the binder and aggregate. Using the best practices from the methods reviewed and TxDOT experience, researchers developed a new method for TxDOT.

What They Found

Researchers concluded a Texas design method was needed. The Australia and New Zealand methods resulted in binder application rates that were expected, but the aggregate spread rates were heavy. The modified Kearby board test resulted in aggregate spread rates that were expected, but the binder application rate was too light.

The factors that influence the application rates are:

- Binder.
  - Type, including modifier.
  - Residual asphalt content (emulsions and cutbacks).
  - Application temperature.
- Aggregate.
  - Mat thickness.
  - Aggregate shape.
  - Aggregate absorption.
  - Cleanliness.

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- Roadway conditions.
  - Existing surface hardness.
  - Existing surface texture.
  - Existing surface absorption.
  - Traffic volume
  - Trucks (percentage).
  - Energy/heavy industrial sector.
  - Speed (mph).
  - Roadway alignment.
    - Vertical grade.
    - Horizontal curves.
    - Cross slope.
  - Intersecting roadways/driveways.
    - Daily traffic amount.
    - Density (number of driveways/intersections).
- Climate.
  - Construction time of year.
  - Shaded areas.
  - Ambient temperature.
  - Sky conditions (cloudy, etc.).
  - Forecast.
  - Time to first frost.

What This Means

The risk of failure of seal coats can be reduced if the following recommendations are implemented:

- Perform the new Texas seal coat design method.
- Remove subjectivity from the factors that influence the application rates through continued research.

For More Information

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