Fog Seal Performance on Asphalt Mixture Longitudinal Joints

Introduction

Due to the nature of construction, it is common for longitudinal joints in asphalt pavements to have lower densities and therefore higher permeability than the main portions of the pavement lanes. To address this concern, many states employ joint sealant techniques such as fog seals or void reducing asphalt membranes. Qualitative evidence in Indiana appears to indicate that longitudinal joint lives have been improved by the use of joint sealers and adhesives, but the specific materials and application rates used to treat longitudinal joints in Indiana have not been quantitatively investigated.

This research aims to specifically investigate the fog seal materials and application rates specified for use on longitudinal joints in Indiana to provide guidelines for future joint sealant treatments. The specific objectives of the project are to determine if applying fog seals to the longitudinal joints of new asphalt surface mixtures improves the performance of the joints; determine the preferred type of fog seal material for use in sealing the longitudinal joints; determine if fog seals need to be reapplied to the longitudinal joints, and if so, at what intervals; and compare the performance of longitudinal joints receiving fog seal and void reducing asphalt membrane treatments. These objectives are accomplished by employing laboratory testing of both laboratory prepared specimens and field samples.

Findings

- Fog seals can lower the permeability of longitudinal joints in asphalt pavements. Lower permeability should increase longitudinal joint performance.
- Either SS-1h or AE-NT, applied as fog seals, can be used to lower longitudinal joint permeability.
- Fog seal applications should be reapplied to longitudinal joints every 5 to 7 years, for maximum effectiveness.
- The SS-1h fog seal treatment did a better job of sealing the pavement surface than the void reducing...
asphalt membrane treatment did. However, this result may be attributable to the late-season paving operation.

Implementation

Given the findings of the research, the Indiana Department of Transportation (INDOT) should continue the use of fog seals on the longitudinal joints of asphalt surface mixtures, using either SS-1h or AE-NT asphalt emulsions at the currently specified rates. Additionally, the department should consider reapplying the fog seals to the surface of the longitudinal joints every 5 to 7 years.

While the results and recommendations presented here are specific to the asphalt material, joint sealant materials, and application rates used in this research, they can be applied generally to other asphalt pavements, materials, and situations as well. However, additional research is recommended to provide greater quantitative support and guidelines for fog seal implementation.

Specifically, a comparison of SS-1h and AE-NT field test sections would provide additional support for and verification of the conclusions and recommendations presented in this research. Additional testing of the SS-1h and void reducing asphalt membrane test sections over time would also provide greater insight into the performance of these joint sealant treatment methods.

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