INTRODUCTION

Due to the nature of construction, it is common for longitudinal joints in asphalt pavements to have low density and high permeability. This condition causes the pavement to be more susceptible to air and water penetration thus having an accelerated deterioration.

“A light spray application of diluted asphalt emulsion used primarily to seal an existing asphalt surface to reduce raveling and enrich dry and weathered surfaces.”

The success of an initial fog seal treatment project led the Indiana Department of Transportation (INDOT) in 2012 to begin requiring longitudinal joints to be fog sealed with a 2-ft wide band centered along the construction joint. However, no data have been collected to quantitatively support the observations that the lives of longitudinal joints have been improved.

OBJECTIVES

1. Determine if applying fog seals to the longitudinal joints of new asphalt surface mixtures improves the performance of the joints.
2. Determine the preferred type of fog seal materials for use in sealing the longitudinal joints.
3. Determine if the fog seal needs to be reapplied if and at what intervals.

RESULTS

After the first aging round, the permeability of all three groups increased and the permeability of the untreated samples was higher than of the treated samples. The permeability of all three groups after the second aging round was comparable to those after the first aging round. This indicates that there is a plateau in the effects of aging on permeability.

The ANOVA indicated that both the treatment type and asphalt condition were statistically significant and that the interaction between the two independent variables was not significant. The low p-values indicate a statistically significant difference between the two fog seal types. The only statistically significant differences in asphalt condition were between the samples after treatment with the samples after both aging rounds.

CONCLUSIONS & RECOMMENDATIONS

1. The presence of fog seals can improve the performance of longitudinal joints with respect to permeability. In this research, the fog seal treatments reduced the asphalt permeability and kept it lower than the untreated asphalt samples after aging.
2. There was no statistical difference between the performance of the two fog seal types evaluated in this experiment on asphalt permeability. Therefore, the benefits of using fog seals may be obtained from either emulsion type.
3. The fog seal treatment was no longer in effect after the second aging round. Consequently, that there is a plateau in the effects of in service aging, than additional fog seal applications are recommended at 5-7 year intervals.