# DEVELOPMENT OF AN EVALUATION SYSTEM FOR ASPHALT SEALERS AND REJUVENATORS

Asphalt pavement sealers (henceforth called fog seals) are products applied to the surface of aging asphalt pavements to extend their life and thereby reduce the life-cycle cost of the pavements. By delaying the need to resurface or rehabilitate the pavement, the use of fog seals increases sustainability by reducing aggregate resource depletion and reducing the carbon emissions associated with the production of hot-mix asphalt.

Presently, TDOT use of fog seals is hampered by the proprietary nature of many of the products available. Because there are no applicable material specifications for these products there is no way to differentiate them or approve them for use. This robs TDOT of the potential to use sealers that may perform better, last longer, and do less damage to the environment than non-proprietary products for which specifications do exist, such as asphalt emulsions.

The objective of this research is to develop test methods and procedures to evaluate and classify pavement sealers in order to produce a Qualified Products List. The emphasis is on performance tests that will determine how well the products seal the pavement and how the sealers will stand up over time.

The original approach to determining longevity was to apply sealer products to thin asphalt concrete disks cut from gyratory compactor specimens (ASTM D6925), artificially weather them under UV light (ASTM G154), then test them in a modified wet track abrasion device (ISSA 109) to evaluate their tenacity in use. We also evaluated mineral-surfaced roll roofing as an alternative substrate. This material is inexpensive, it can be easily obtained from hardware and home improvement stores, and it eliminates the need to manufacture and cut gyratory specimens.

Five sealer products were investigated in the first round of sealer testing, one of which was the standard CSS-1h emulsified asphalt currently used by TDOT. After 1000 hours of weathering, all of the proprietary sealers had performed as well as or better than the CSS-1h, which was almost entirely removed during the abrasion test. An unexpected result from the first round of testing was that unweathered specimens suffered significantly more mass loss during the abrasion test than UV-weathered specimens. Subsequent testing showed that there was no statistically significant difference in wet-track abrasion mass loss between the UV-weathered specimens and those placed in an oven at the same temperature. This suggests that the UV exposure had no appreciable effect on the sealers but the elevated temperatures of the oven and the weathering device hardened the sealers and improved their abrasion resistance. Further testing showed that wet-track abrasion mass loss decreased with increased weathering or oven curing. This suggests that the sealers are at their most vulnerable soon after they are applied. Thus we have abandoned the UV-weathering device in favor of curing the sealed specimens in an oven for 5 days before testing them. This significantly shortens the time needed to conduct the testing.

In addition to wet-track abrasion testing, we are also testing the permeability of thicker asphalt concrete disks cut from gyratory compactor specimens. The gyratory specimens are cured in an oven for 4 days, then tested in permeameter. The specimens are then sealed and cured in an oven for another 5 days before performing a second permeability test. The change in permeability provides a measure of the sealing performance of the sealers.

At present, most of the permeability and wet-track abrasion testing has been completed and the test results are being analyzed. The results will be used to classify the sealers tested according to their sealing ability and tenacity. The procedures for making and curing the gyratory compactor specimens, applying the sealers, and performing the permeability and wet-track abrasion testing will be compiled into a test method specification for use by TDOT in evaluating sealers in the future.

Principal Investigator: Roger W. Meier, Ph.D.
Department of Civil Engineering, University of Memphis
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