



MDOT, NCAT Place Delta Mist™ Rejuvenating Seal

By Sandy Lender

Photos Courtesy of the National Center
for Asphalt Technology at Auburn University

During August and September 2018, the researchers at NCAT tested Delta Mist™ Rejuvenating Seal alongside seven other rejuvenators for the Tennessee and Mississippi DOTs.

When officials at the Mississippi Department of Transportation (MDOT) wanted to test the efficacy of rejuvenating seals, they turned to sponsorship of NCAT Test Track Section S03. State Materials Engineer Jeff Curtis, Asphalt Laboratory Engineer Cass Coon, and Soils Laboratory Engineer William Sullivan selected Delta Mist™ penetrating asphalt rejuvenator from Collaborative Aggregates LLC to check its performance sealing and protecting pavement.

During August and September 2018, the researchers at NCAT tested eight different rejuvenators for the Tennessee and Mississippi DOTs. Those researchers include Postdoctoral Researcher Raquel Moraes, Ph.D., the new Test Track Manager Jason Nelson and Assistant Research Engineer Grant Julian. They explained the purpose of the test strips placed in third quarter 2018: “The objective of the study was to screen among eight different surface rejuvenators that could, potentially, be selected as the surface treatment for sections sponsored at the 2018 NCAT Test Track cycle.”

They met their objective, with MDOT opting to test two rejuvenators from the offerings. While both DOTs are now using rejuvenators on their test sections of the test track, Mississippi would like to find out if the plant-based Delta Mist™ penetrating asphalt rejuvenator product from Collaborative Aggregates LLC, headquartered in Wilmington, MA, can help with friction and binder properties. The team at NCAT has already noticed what helped on the test strip section: “Lower dilution rate and higher application rate resulted in better restoration of the binder properties at long term (six months).”

“The overall objective of the study is to support agencies on the findings that rejuvenating agents are a low-cost option for preventing or retarding the surface deterioration of pavements. Furthermore, to show that rejuvenating seals are practical in use since they do not require specialized equipment, and can be effective for restoring the surface condition of an existing pavement. Rheological properties—complex modulus and complex

Rejuvenating agents are a low-cost option for preventing or retarding the surface deterioration of pavements and can be effective for restoring the surface condition of an existing pavement while not requiring specialized equipment.



viscosity—of extracted binders before and after the application of the treatment are being monitored. Pavement surface friction characteristics collected before and after 3, 24 and 96 hours of treatment application are also in the testing matrix. Both rheological and friction properties will continue to be evaluated over the cycle of the 2018 NCAT Test Track.”

Something the NCAT team didn’t realize they’d get to report for MDOT is how weather affects the process. When it came time to apply the Delta Mist™ penetrating asphalt rejuvenator, the Auburn area experienced rainy days. They had to wait for clear skies and dry pavement.

“Location, weather, traffic loading, and pavement conditions are factors used to determine if a rejuvenating fog seal application is appropriate to treat a pavement.

In order to construct a durable surface treatment layer, the key factors in determining success of the application are condition of the existing pavement, application rate, residual binder content, proper distribution operation, and emulsion break and set times. Furthermore, the following pavement surface characteristics must be considered: cleanliness, age, texture and pavement type. The pavement surface receiving the surface treatment should be free of any substance that might inhibit bond. In this study, the cleaning operation of the surface prior application of Delta Mist was accomplished through manual and mechanical brooming.”

The pavement section had already experienced 20 million ESALs. “The pavement was constructed during the NCAT Test Track cycle of 2012. The base asphalt layer was a mix with gravel aggregate. The asphalt content of the mix was 6.8 percent.”

Moraes shared three specific observations from the section so far:

- 1st** The dilution and application rates of the rejuvenator “play a role in the effectiveness of the surface treatment in restoring the rheological properties of the aged binder. Rejuvenating seals with lower dilution ratios and higher application rates showed higher restoration of the binder rheological properties over the long-term.”
- 2nd** Older existing pavements can take more work. “For asphalt surfaces more than three years old, the complex modulus and complex viscosity of the binder extracted four weeks after the rejuvenating seal application must decrease by at least 40 percent from the pretreated values to assure the effectiveness of the surface treatment.”
- 3rd** Monitoring begins before the treatment. “To ensure safety, the coefficient of friction of the existing pavement surface should be measured before application of the rejuvenating seal treatment. After three hours of curing of the applied rejuvenating fog seal, friction values similar to those prior to application should be obtained.” If all has gone as planned, after 96 hours of curing, “the rejuvenating seal should have no adverse effects on friction.”

As the two 2018 track test sections undergo increased ESALs, the NCAT researchers will continue to update Mississippi, Tennessee and other interested parties in the progress of the selected rejuvenating seals.