

Independent MnDOT Study Highlights Long-Term Performance of Asphalt Rejuvenators

As public agencies continue balancing aging infrastructure, limited budgets, and increasing expectations for long-term pavement performance, preservation strategies remain more important than ever. Across the industry, agencies are increasingly shifting from reactive maintenance toward proactive pavement preservation practices designed to extend roadway life before costly rehabilitation becomes necessary.

A recently completed independent study commissioned by the Minnesota Department of Transportation (MnDOT) provides valuable insight into how spray-applied asphalt rejuvenators perform under real-world conditions over time. Conducted in partnership with Michigan State University at the MnROAD research facility and a local roadway in St. Michael, Minnesota, the 36-month evaluation examined the long-term effectiveness of 12 commercially available rejuvenators across multiple pavement conditions and environmental cycles.

The study evaluated products using a broad range of performance metrics, including creep stiffness, friction, permeability, surface texture, rutting resistance, and long-term aging behavior. Researchers monitored test sections at multiple intervals, including immediately after application and at one, two, and three-year checkpoints.

The findings reinforced a growing industry understanding: spray-on rejuvenators can play a significant role in slowing asphalt aging and preserving pavement performance when incorporated into a proactive maintenance strategy. However, the study also showed that not all rejuvenators perform equally over time. While many products demonstrated short-term benefits, only a limited number maintained strong long-term performance throughout the duration of the evaluation.

Table 3.17 Ranking of SORs based on lab studies

Rank	Order	MnROAD28	Composition	MnROAD34	Composition
Best	1	B_Reclamite	Petroleum-based	B_CRF	Petroleum-based
	2	B_ARA1 Ti	Petroleum-based	B_Reclamite	Petroleum-based
	3	B_CRF	Petroleum-based	A_RPE-R	Petroleum-based
	4	A_RPE-R	Petroleum-based	B_ARA1 Ti	Petroleum-based
Better	5	A_BioMAG	Bio-based	A_BioMAG	Bio-based
	6	B_Replenify	Petroleum-based	A_Invigorate	Bio-based
	7	B_GSB-88	Petroleum-based	B_GSB-88	Petroleum-based
	8	A_Invigorate	Bio-based	B_Replenify	Petroleum-based
Good	9	A_Delta Mist	Bio-based	A_BioRestor Low	Bio-based
	10	A_BioRestor	Bio-based	A_Delta Mist	Bio-based
	11	A_RePlay	Bio-based	A_RePlay	Bio-based
	12	A_BioRestor Low	Bio-based	A_BioRestor	Bio-based
Control	13	No Treatment			

Among the strongest and most consistent performers were Corrective Asphalt Materials' Reclamite®, CRF®, and ARA1 Ti®. Across multiple laboratory and field measurements, the products consistently ranked among the top-performing rejuvenators in the study.

Reclamite® demonstrated particularly strong long-term aging resistance throughout the evaluation. According to the study summary, it was one of only a few products that maintained lower stiffness levels compared to the untreated control, even after three years of field aging. Researchers also noted that Reclamite exhibited the lowest rate of stiffness increase over time, indicating slower re-aging compared to competing products.

These findings are especially significant for agencies focused on maximizing lifecycle value through preventative maintenance. By restoring flexibility to oxidized asphalt binders and slowing future hardening, rejuvenators such as Reclamite can help delay the onset of cracking and other age-related pavement distresses. The study's results suggest that properly timed rejuvenation applications may allow agencies to extend pavement service life while reducing the need for more costly rehabilitation treatments.

CRF® also performed exceptionally well throughout the study period. Researchers observed strong rejuvenation effects at all major evaluation checkpoints, with measurable benefits continuing through both the two- and three-year marks. In addition to aging resistance, CRF demonstrated durable macrotexture improvements even after exposure to multiple winter cycles.

For agencies, maintaining surface texture and friction characteristics is an important consideration when selecting preservation treatments. The study found that CAM products maintained favorable

surface performance while minimizing negative impacts to safety-related factors such as friction and permeability.

ARA1 Ti® likewise delivered strong overall performance during the evaluation. The treatment demonstrated immediate softening effects and maintained performance benefits through the two-year interval. Researchers also identified favorable results related to friction, permeability, and surface texture performance.

One of the most valuable aspects of the MnDOT study was its long-term structure and independent methodology. Over the course of three Minnesota winters, products were exposed to real traffic conditions, environmental aging, and repeated freeze-thaw cycles. The study also evaluated performance across multiple pavement binder types and test environments, providing agencies with a more comprehensive understanding of how rejuvenators may perform in actual field conditions rather than solely laboratory simulations.

The results also underscore the importance of preservation timing. Agencies that apply rejuvenation treatments while pavements are still in fair-to-good condition can often preserve pavement flexibility and slow oxidation before more significant structural deterioration occurs. This proactive approach supports broader asset management goals by extending pavement life, improving network condition, and maximizing available maintenance funding.

As municipalities and transportation agencies continue evaluating preservation technologies, independent field data remains critical in guiding product selection and long-term planning decisions. The MnDOT evaluation provides compelling evidence that certain rejuvenation technologies can deliver measurable multi-year benefits when incorporated into a comprehensive pavement preservation program.

For agencies seeking long-term pavement preservation solutions, the study's findings demonstrated that Reclamite®, CRF®, and ARA1 Ti® consistently delivered strong aging resistance, durable surface performance, and reliable long-term results across a variety of test conditions.

In an environment where agencies are expected to do more with limited resources, preservation strategies supported by objective performance data will continue playing a key role in extending roadway life and improving infrastructure sustainability for years to come.

For more information about the study: <https://correctiveasphalt.com/case-studies/mn-dot-study-evaluation-of-proprietary-rejuvenators/>

For the full study: <https://mdl.mndot.gov/items/202539>