NJ Asphalt Paving Conference March 5, 2024 NJDOT Update



What is Pavement Preservation?

"Preservation consists of work that is planned and performed to improve or sustain the condition of the transportation facility in a **state of good repair**." (Guidance on Highway Preservation And Maintenance, FHWA, February 25, 2016)

A well-implemented pavement preservation approach achieves maximum efficiency by increasing the average condition of your pavement while decreasing your average spend per square yard.



Benefits of Preservation

- Federally Eligible Preservation line item
- Faster Delivery Limited Scope Preservation
- Lower overhead in Design (in-house) and Delivery Costs
- Good Shelf Projects to Maximize unforeseen funding opportunities
- More Programming flexibility than Resurfacing/Rehab/Recon
- Environmentally friendly
 - Reduces rap (Reclaimed Asphalt Pavement)
 - Reduced traffic impacts/Fuel consumption



Opportunity for Preservation vs. Resurfacing/Rehab/Reconstruction



Preservation Treatments

Type I

- Fog Seal
- Slurry Seal
- Chip Seal

Type II

- Microsurfacing
- Ultra-Thin Friction Course (UTFC)
- High Performance Thin Overlay
- Cape Seal (Slurry or Microsurfacing over Chip Seal)

https://www.nj.gov/transportation/capital/pd/documents/LimitedScope ProjectDeliveryGuideline.pdf

Fog Seal

Fog Sealing

- Mixture of asphalt emulsion and water
 - SS-1h, CSS-1h, or CQS-1h
 - Other proprietary products available
- Applied with asphalt distributor (0.06-0.10 gallons/SY)
 - Higher application rates with light sand
- Light sand application
 (0.25 to 0.5 lbs./sy) to
 ensure skid resistance

Fog Seal Benefits



- No change in Ride Quality
- Seals out water
- Preserves surface
- Quick open to traffic
- No milling = No RAP
- Pennies on the dollar
- 2 4 Years Life Extension

Micro-surfacing and slurry seal

-Cold applied mixture of:

- High quality aggregate (4.75mm NMAS)
- Polymer modified asphalt emulsion (CQS-1hP w/ SB, SBS, SBR or natural latex polymer)
- Mineral filler, Water, and Additives
- Typical application rate of 20 lbs/SY aggregate and 0.30 gallons/SY asphalt emulsion
- Approximately ¼ inch thick



Micro-surfacing and slurry seal

- Renew road surface and fast open to traffic
- Capable of being spread in variable cross-sections:
 - Fill Ruts, Longitudinal joints and rumble strips (micropaving joints)
 - Scratch or intermediate layer
 - Surface treatment
- Minimize RAP (micro-milling under structures only)
- Improves wet weather skid resistance
- Maintains or slightly improves ride quality (15%)
- 5 8 Years Life Extension







Figure 6.3 Flow Diagram of a Typical Slurry Seal Mixer

Chip Seal

- Asphalt binder application
 - Polymer modified asphalt binder(PG88-22FR or PG94-22) applied at 0.40 – 0.5 gallons/SY
- High quality aggregate ¹/₄ inch size
 - clean and cubicle shape
 - 20 30 lbs. per SY
- Rolled w/ Pneumatic Rollers
- Vacuum Sweep



Chip Seal

- Fast renewal road surface and opening to traffic
- Seals out water
- Minimize RAP (micro-milling under structures only)
- Maintains existing ride quality (no improvement)
- Improves wet weather skid resistance
- 5 7 Years Life Extension



Ultra-Thin Friction Course (UTFC)



- ¾ inch thick Thin Bonded Hot Mix Asphalt (HMA) Overlay
 - 9.5 mm nominal maximum size high quality aggregate
 - Gap/open graded
 HMA
 - Flakiness Index (cubicle aggregate)
 - 4.9 6.0 % polymer modified (PG 64E-22) asphalt binder
- Constructed with a spray paver
 - Polymer Modified
 Emulsified Asphalt Tack
 Coat (CRS 1P @
 application rate of 0.15 –
 0.25 gallons per SY)

UTFC Benefits

- Renew road surface
- Quick open to traffic (300 feet!!)
- Improves wet weather skid resistance/spray
- Minimize RAP (micro-milling as needed)
- Improves ride quality (30-40%)
- Superior bond with spray paver and heavy tack coat application = Good Performance (8-10 years)



High Performance Thin Overlay (HPTO)



- 1-inch thick Hot Mix
 Asphalt Surface Course
 - High quality 4.75mm
 NM aggregate size
 - Polymer modified asphalt binder PG 64-22E or better
 - Mixture performance test requirements
 - Asphalt Pavement Analyzer Rut Test (< 4mm)
 - Texas Overlay Crack Test (> 600 cycles)

HPTO Benefits

- Placed with a conventional HMA paver
- Minimal impact to roadway geometry and roadside features
- Seals out water
- Renew road surface like HMA
- Quick open to traffic
- Minimize RAP (micro-milling as needed)





HPTO on Route 21 (completed October 2023)

- Applicable to all roadways
- Quiet
- Improves skid resistance (SN40 ~ 50)
- Improves ride quality (IRI) significantly (60%)
- Excellent life extension
 - Mill 2" pave 2" w/ HMA = 8 years
 - HPTO = 12+ years

Micro-milling

- Finest milling available = Ideal for Thin Preservation Treatments
- Maintain elevations where necessary
 - Transitions for thin overlays -beginning and end of treatment
 - Bridge approaches
 - Bridge vertical under-clearance
- Ride quality improvement
- Provides better bonding for thin preservation treatments
- Smoothest surface of milling
- Can be used as a final riding surface or traffic staging





Lane Miles

Total Pavement Funding

PAVEMENT CONSTRUCTION SPENDING HISTORY





ResurdRebab/Recon Work = Preservation Work - Pavement Investment

NJ State Highway System Annual Preventive Maintenance Pavement Investment



Millions



Effect of Preservation on Network Condition



Effect of Resurf/Rehab/Recon on Network Condition



Effect of Total Pavement Work on Network Condition



NJDOT Pavement **Preservation Treatments**

HMA Industry

- Produced by HMA **Suppliers**
 - Constructed by hma contractors

HMA Industry & Non-HMA

Contractors

- Ultra-thin friction course (UTFC)
- Produced by HMA Suppliers
- Constructed with • spray paver (only one contractor in NJ)

Non-HMA

Contractors Microsurfacing*

- Slurry Seal*
- Chip seal*
- Cape seal*
- * One contractor in NJ

Ride Quality Percentage Improvement using HPTO (1-Inch Thick) Projects



PreconIRI = PostconIRI - IRI for New Construction - Improvement

Effect of HPTO on Network Condition



Effect of HPTO on Netwo

HPTO Performance

- Significant use over past 10 years, 30+ projects, 1700+ lanes miles
- Performance
 - Improved
 smoothness (IRI) by
 ~ 40-60%+
 - Reduced Reclaimed Asphalt Pavement (RAP) by over <u>1</u> <u>million tons!</u>
- Excellent life extension
 & durability
 - Mill 2" pave 2" w/ HMA = <u>8 years average life</u>
 - 1" HPTO + no milling (No RAP) = <u>12+ years</u> <u>life</u>







Multi-Year Status of State Highway System

FY2024 Pavement Program Goals



- Anticipated Awards July 2023 through June 2024
 - Approximately 53
 Projects
 - 35 Preservation
 - 18
 Resurfacing/Rehab/Recon

Thank you!

Robert Blight

NJDOT Manager

Pavement & Drainage Management & Technology

Robert.Blight@dot.nj.gov

https://www.nj.gov/transportation/eng/pavement/technologies .shtm



Optimism is the best way to see life