OVERVIEW

• Pavement Specification Changes
• Status of NJDOT Highway System
• NJDOT Pavement Preventive Maintenance Treatments
• Recycling and Porous Pavement
PAVEMENT SPECIFICATION CHANGES
SPECIFICATION CHANGES

• Warm Mix Asphalt additives are now permissible in all HMA mixes
  • Promotes better compaction
  • Reduces VOC’s
• HMA mixes designated by “H” compaction level have been eliminated
• MSCR test is now adopted by northeast states including NJ
  • Binder designated PG 76-22 is replaced by PG 64E-22 for polymer modified asphalt
  • Example: Hot Mix Asphalt 12.5ME Surface Course
SPECIFICATION CHANGES

• Division 420 Pavement Preservation Treatments added to the SI
  • Section 421 Micro Surfacing and Slurry Seal
  • Section 422 Fog Seal
    • Fog Seal Surface Treatment
    • Fog Seal Strip
STATUS OF NJDOT HIGHWAY SYSTEM
Current Functional Adequacy of NJ State Highway System (Based on Roughness & Distress)

- Good: 25%
- Deficient Rough Only: 9%
- Deficient Rough & Distressed: 10%
- Deficient Distressed Only: 25%

Source: NJDOT Pavement Management System, 2014 Data
Multi-Year Status of State Highway System

The chart shows the percentage of system lane miles in different conditions over various data collection cycles. The conditions are categorized as 'Deficient', 'Fair', and 'Good'. The data is sourced from the NJDOT Pavement Management System.
Multi-Year Deficiency of State Highway System

Source: NUDOT Pavement Management System
NJ State Highway System
Lane Miles of Major Pavement Work Completed
(Total system mainline lane miles = 8403)
NJ State Highway System
Lane Miles of Preventive Maintenance Pavement Work
(Total system mainline lane miles = 8410)

- HPTO
- SMA TH OV
- UTFC
- MICRO
- SLURRY SEAL

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<th>Year</th>
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NJDOT PAVEMENT PREVENTIVE MAINTENANCE TREATMENTS

• Thin Surface Highway Improvement Treatments
  • High Performance Thin Overlay (HPTO)
  • Ultra-Thin Friction Course (Novachip or Ultra-Thin Bonded Wearing Course)
  • Asphalt Rubber Gap Graded (ARGG)
  • Micro-surfacing and Slurry seal
  • Fog seal
  • Micro-milling
UPCOMING PAVEMENT PRESERVATION PROJECTS

I-80 EB MP 12.84 - 28.15
- Warren Co. & Morris Co.
- High Performance Thin Overlay Mainline
- Slurry Seal Ramps
- $5-10 Million

I-195 EB MP 16.00 - 34.17
- Monmouth Co. & Ocean Co.
- Ultra Thin Friction Course Mainline
- Micro Surface Ramps
- $5-10 Million

I-287 MP 0.00 - 5.84
- MIDDLESEX CO.
- MICRO SURFACE SCRATCH COURSE & HIGH PERFORMANCE THIN OVERLAY SURFACE COURSE
- MICRO SURFACE RAMPS
- $5-10 MILLION

ROUTE 55 SB MP 40.00 - 26.50
- CUMBERLAND CO. & GLOUCESTER CO.
- MICRO SURFACE
- <$5 MILLION
UPCOMING PAVEMENT PRESERVATION PROJECTS

I-80 EB & WB MP 28.1 – 41.5
- Morris Co.
- High Performance Thin Overlay Mainline
- > $10 Million

I-80 WB 0.5 – 12.8
- Warren Co.
- Micro surface
- $5-10 Million

Additional Projects for FY2015:
- RT. 37 MP 0 - 6.27 IN OCEAN CO.
  - Slurry Seal
- I-78 MP 42.2 – 50.6 IN SOMERSET CO. & UNION CO.
  - HPTO
- I-80 EB MP 58.2 – 65.4 IN BERGEN CO. & PASSAIC CO.
  - Ultra-Thin Friction Course
- RT. 208 MP 3.32 – 10.07 IN BERGEN CO. & PASSAIC CO.
  - Micro Surfacing
- I-295 MP 14.6 – 24.5 IN GLOUCESTER CO.
  - HPTO

TOTAL +/- $20 MILLION
HPTO

- High Performance Thin Overlay - 1” +/- thickness
- Hot Mix Asphalt
- 4.75 mm nominal maximum size aggregate
- 7% min. PG 76-22 (or PG 64E) asphalt binder
- Volumetric Mix Design Requirements
- Mix Performance Test Requirements
  - APA Rut Test
HPTO
ASPHALT PAVEMENT ANALYZER

- AASHTO TP 63
- 100 lb wheel load; 100 psi hose pressure
- Tested at 64°C for 8,000 loading cycles
- Samples at 5 +/- 0.5% air voids
- APA Rutting < 4 mm to PASS
HPTO

- Improves ride quality
  - 70% improvement on some projects
- Seals out water
- Renew road surface
- Quick open to traffic
- Minimal RAP
- Placed with a Conventional Paver or spray paver
- Bond is critical!!
ULTRA-THIN FRICTION COURSE
UTFC – SPRAY PAVER

RoadTec

Vogeile

The Self-Priming Paver

Emulsion tank insulated against loss of heat

Worm conveyors

Worm conveyors accommodated in removable troughs heated electrically. Separate drive and control provided for each worm conveyor.
ULTRA-THIN FRICTION COURSE

• Slight Improvement in ride quality
• Seals out water
• Renew road surface
• Quick open to traffic
• Minimal RAP
• Placed with spray paver
  • Superior bond with existing pavement
  • No tracking by HMA trucks!!
Asphalt Rubber Gap Graded (ARGG)

- Asphalt Rubber Gap Graded - 3/8” NMS
  - Surface Course (no RAP)
  - Intermediate Course (10% max RAP allowed)
  - 7% minimum AR modified binder
  - 15% minimum crumb rubber

- NJDOT Operations requested an alternative to AROGFC due to struggle with Winter Maintenance icing issues

- Field and lab performance of rubber modified asphalt mixtures continues to be excellent
ROUTE 72 MP 13.8 TO MP 18.5
ARGG

- Composite pavement with high severity reflective cracking of the existing 3” thick HMA overlay
- Design
  - Mill 3” and pave with
    - 1.5” thick Asphalt Rubber Gap Graded (ARGG) Surface Course
    - 1.5” thick Asphalt Rubber Gap Graded (ARGG) Intermediate Course (10% RAP)
- Shoulders
  - Mill 2” and pave 2” HMA 12.5M64 Surface Course
  - EB Shoulder MP 16 to 18.5
    - 2” HMA 12.5M64 Surface Course
    - 8” Full Depth Reclamation (FDR) with 5% cement
ROUTE 72 MP 13.8 TO MP 18.5
ARGG
ROUTE 72 MP 13.8 TO MP 18.5
ARGG

• Ride quality was improved by 67%
• Average IRI = 39 in/mile
• Air void incentive = 2% (out of 4%)
• 1st successful ARGG project
• 1st successful FDR project
• Not a good preventive maintenance example but
  • Considering for Preventive Maintenance “Tool Box” for future projects
MICRO-SURFACING AND SLURRY SEAL

- Cold applied mixture of polymer modified asphalt emulsion (CSS-1hPM), high quality aggregate, mineral filler, water, and additives
- Can apply in variable thick cross-sections: wedges, ruts, scratch courses or final riding surfaces
- Good skid-resistant surface (high wet friction coefficient)
- Types of equipment
  - Truck mounted slurry paver
  - Continuous slurry paver
    - Support vehicles
MODIFIED MICRO-SURFACING RUT BOX

- Longitudinal joint fill/repair
- Fill RPM holes
- Rumble strip fill
- Approximately 24” wide
MICRO-SURFACING / SLURRY SEAL

- Slight Improvement in ride quality
- Seals out water
- Renew road surface
- Quick open to traffic
- Minimal RAP
- 25% of the cost of mill and pave

Disadvantages
- Cracks will reflect through
- Public sensitive to tire noise/macro texture
- Very weather sensitive
FOG SEAL

- Mixture of asphalt emulsion and water: ss-1h, css-1h or cqs-1h
- Applied with asphalt distributor
- Light sand application (0.25 to 0.5 lbs./sy)
- Benefits
  - Seals out water
  - Protects surface from oxidation and raveling
  - Quick open to traffic
  - No RAP
  - Pennies on the dollar
MICRO-MILLING

- More teeth than fine or standard milling drum; 3 times standard
- Transitions for thin overlays
  - Beginning and end of treatment
  - Bridge approaches
  - Bridge vertical under-clearance
- Maintain elevations, removes traffic striping/markings and improves bonding
- Improves Ride Quality
- Can be final riding surface if necessary
RECYCLING AND POROUS PAVEMENT
HOT IN-PLACE RECYCLING (HIR)

- Less cost
- Perform similar to resurfacing
- Minimal RAP
- Rejuvenating oil added
- Opportunity for more thin overlays
- Opening to traffic similar to HMA paving
- Future project - Rt.50 MP 10 – 11
  - 1” thick HPTO
  - 1.5” depth HIR of existing HMA
COLD IN-PLACE RECYCLING (CIR)

- Less cost
- Perform similar to resurfacing
- Minimal RAP
- Emulsified or foamed asphalt stabilizer
- Renew pavement structure
- Opening to traffic similar to HMA paving
- Requires HMA overlay or surface treatment
- Future projects
  - Rt. 83 MP 0 – 3.81
  - Route I-287 Shoulders MP 47.1 – 58.4
FULL DEPTH RECLAMATION (FDR)

- Recycle thin structurally failed HMA pavements in-place
- Cost less
- No RAP or excavation
- Stabilize with emulsion, foamed asphalt or cement
- Restore or improve pavement structure
- Can be opened to traffic, but exercise caution
- Requires HMA overlay
- Future projects
  - Route 22 WB Shoulder MP 34.3 – 36.9
  - Route 55 SB Shoulder MP 21.8 – 26.5
ROUTE 72 MP 13.8 TO MP 18.5
FULL DEPTH RECLAMATION
POROUS PAVEMENT

- Reduce storm water runoff and contaminants in waterways
- Promote groundwater recharge
- Rt. 27 Six Mile Run Bridge project, Middlesex and Somerset Counties is currently in construction
  - Full depth porous asphalt shoulders
    - 2” MOGFC
    - 8” ASDC (modified)
    - 12” to 36” Coarse Aggregate No.57 stone
    - geotextile (drainage and stabilization)
FUTURE OF HMA PRODUCTION
NJDOT ASPHALT PLANT
NJDOT PAVING CREW