NJDOT UPDATE

58TH ANNUAL NJ ASPHALT PAVING CONFERENCE

FEBRUARY 27, 2015
OVERVIEW

• Pavement Specification Changes
• Status of NJDOT Highway System
• Best of 2014 Pavement Projects
• Preserving Pavement for the Future
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 (in progress)
  • Section 421 Micro Surfacing and Slurry Seal
  • Section 422 Fog Seal
NJDOT Maintained Pavement Status Based on IRI & SDI (Based on 2014 Data)

- Good: 25%
- Fair: 31%
- Deficient: 44%

*Source: NJDOT Pavement Management System, 2014 Data*
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%
- Fair, 31%

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

Source: NDOT Pavement Management System
Multi-Year Deficiency of State Highway System

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

![Bar chart showing lane miles completed from 2008 to 2014.](chart.png)
BEST OF 2014 PAVING PROJECTS
BEST OF 2014

• Route 72 MP 13.8 to MP 18.5, MRRC C-305 project in Ocean County
  • Defino Contracting
• Route 72 MP 0 to 6.0, Resurfacing project in Burlington County
  • Earle Asphalt Co.
• Route 24 EB MP 6.98 to MP 9.09, MRRC N-204 project in Essex and Union Counties
  • Della Pello Paving
• Route 17 MP 6 to MP 7.5, MRRC N-310 project in Bergen County
  • Della Pello Paving
ROUTE 72 MP 13.8 TO MP 18.5
ROUTE 72 MP 13.8 TO MP 18.5

• 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 Intermediate Course

• Shoulders
  • Mill 2” and pave 2” HMA 12.5M64 Surface Course
  • EB Shoulder MP 16 to 18.5 – 8” Full Depth Reclamation (FDR) with cement
ROUTE 72 MP 13.8 TO MP 18.5
ROUTE 72 MP 13.8 TO MP 18.5
ROUTE 72 MP 13.8 TO MP 18.5

- Ride quality was improved by 67%
- Average IRI = 39 in/mile
- Air void incentive = 2%
- 1st successful ARGG project
- 1st successful FDR project
ROUTE 72 MP 0 TO MP 6.0
ROUTE 72 MP 0 TO MP 6.0

- Composite pavement with high severity reflective cracking of the existing 3” to 7” thick HMA overlay

- Design
  - Mill 3” and pave with
    - 2” thick Stone Matrix Asphalt 12.5mm Surface Course
    - 1” thick Binder Rich Intermediate Course
  - Shoulders
    - Mill 2” and pave 2” HMA 12.5M64 Surface Course
ROUTE 72 MP 0 TO MP 6.0
ROUTE 72 MP 0 TO MP 6.0

- Ride quality was improved by 73%
- Average IRI = 40 in/mile
- Air void incentive = 3.1%
- Successful BRIC mix design and production
- Centerline Rumble Strip (CLRS) added for safety enhancement
ROUTE 24 EB MP 6.98 TO MP 9.09
ROUTE 24 EB MP 6.98 TO MP 9.09

- Composite pavement with moderate to high severity reflective cracking of the existing 1.5” to 3” thick HMA overlay
  - Delamination of the 1.5” thick OGFC in shoulder areas
- Design
  - Mill 1.5” and pave with
    - 1.5” thick High Performance Thin Overlay (HPTO)
  - Shoulders
    - Mill 2” and pave 2” HMA 9.5M64 Surface Course
ROUTE 24 EB MP 6.98 TO MP 9.09
ROUTE 24 EB MP 6.98 TO MP 9.09

- Ride quality was improved by 71%
- Average IRI = 32 in/mile
- Air void incentive = 4%
- Successful HPTO mix design and production
ROUTE 17 MP 6.5 TO MP 7.5
ROUTE 17 MP 6.5 TO MP 7.5

- Composite pavement with moderate to high severity reflective cracking of the existing 7” to 11” thick HMA overlay
- Design
  - Mill 2” and pave with
    - 2” thick Stone Matrix Asphalt 12.5mm Surface Course
- Shoulders
  - Mill 2” and pave 2” HMA 12.5M64 Surface Course
ROUTE 17 MP 6.5 TO MP 7.5
ROUTE 17 MP 6.5 TO MP 7.5

- Ride quality was improved by 70%
- Average IRI = 42 in/mile
- Air void incentive = 1.9%
- Successful SMA mix design and production
PRESERVING PAVEMENT FOR THE FUTURE
NJDOT THIN TREATMENTS

• Thin Surface Highway Improvement Treatments
  • High Performance Thin Overlay (HPTO)
  • Ultra-Thin Friction Course (Novachip or Ultra-Thin Bonded Wearing Course)
  • Micro-surfacing and Slurry seal
  • Fog seal
  • Micro-milling
NJDOT’S REQUIREMENTS FOR THIN OVERLAY

• Thin Lift ≤ 1 inch
• Minimal change/impact to existing infrastructure
  • No milling required
  • Minimal impact on bridge clearances, curb reveal, etc.
• Minimal Impact to Users
  • Constructible in overnight closure
  • Good production rates in order for project construction to be fast
  • Minimal “cure” time
• Some treatments require special Equipment
• Applicable for High Volume Roads
POTENTIAL APPLICATIONS

• Surface Rehabilitation Treatment (band aid)
  • Restore the riding surface of an HMA pavement for surface renewal.

• Preventative Maintenance
  • Pave at first signs of distress to avoid future larger expenditure in pavement rehabilitation.

• “Shim” or “scratch” Course prior to Surface Course
  • Adjust (minimally) cross slope.
  • Level out faulted slabs so the wearing course is smoother
  • Fill in minor surface distress – longitudinal joints or cracks
POTENTIAL AREAS OF APPLICATION – OTHER DISTRESSES – HMA PAVEMENT

• No to minimal rutting (≤ 1/2 inch)
• No potholes
  • Repair of localized areas maybe done
• No base failures
  • Repair of localized areas maybe done
• Minimal change in cross slope
• limited milling necessary
• Pavement surface fair to good condition
POTENTIAL AREAS OF APPLICATION – LOW SEVERITY CRACKING HMA PAVEMENT
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
- Seals out water
- Renew road surface
- Quick open to traffic
- Minimal RAP
- Placed with a Conventional Paver or spray paver
ULTRA-THIN FRICTION COURSE
UTFC – SPRAY PAVER

RoadTec

Vögele

The Self-Priming Paver
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!!
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
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
- 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
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
  - no Improvement in ride quality
  - Seals out water
  - preserve surface
  - 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 and can improve bonding
- Ride quality improvement for thin treatment or can be final riding surface
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
RECYCLING AND POROUS PAVEMENT
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
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
POROUS PAVEMENT

• Reduce storm water runoff and contaminants in waterways
• Promote groundwater recharge
• Rt.27 Six Mile Run Bridge, 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
QUESTIONS?

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