

The background features a dark blue gradient with a subtle pattern of white dots. On the left side, there is a large, semi-circular scale with numerical markings from 150 to 260 in increments of 10. Several circular and semi-circular lines, some solid and some dashed, are scattered across the page, some with arrows indicating a clockwise or counter-clockwise direction.

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

The background is a dark blue gradient with a field of small white stars. On the right side, there are several technical diagrams. The most prominent is a circular scale with numerical markings from 0 to 210 in increments of 10. It features concentric circles, a dashed outer boundary, and a solid inner boundary. A white arrow points to the 180-degree mark. Below this, there is another circular diagram with a dashed outer boundary and a solid inner boundary, with a white arrow pointing to the right. In the top left corner, there is a small circular diagram with a white arrow pointing to the right. In the bottom left corner, there is a circular diagram with a dashed outer boundary and a solid inner boundary, with a white arrow pointing to the left.

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 12.5MEu Surface Course

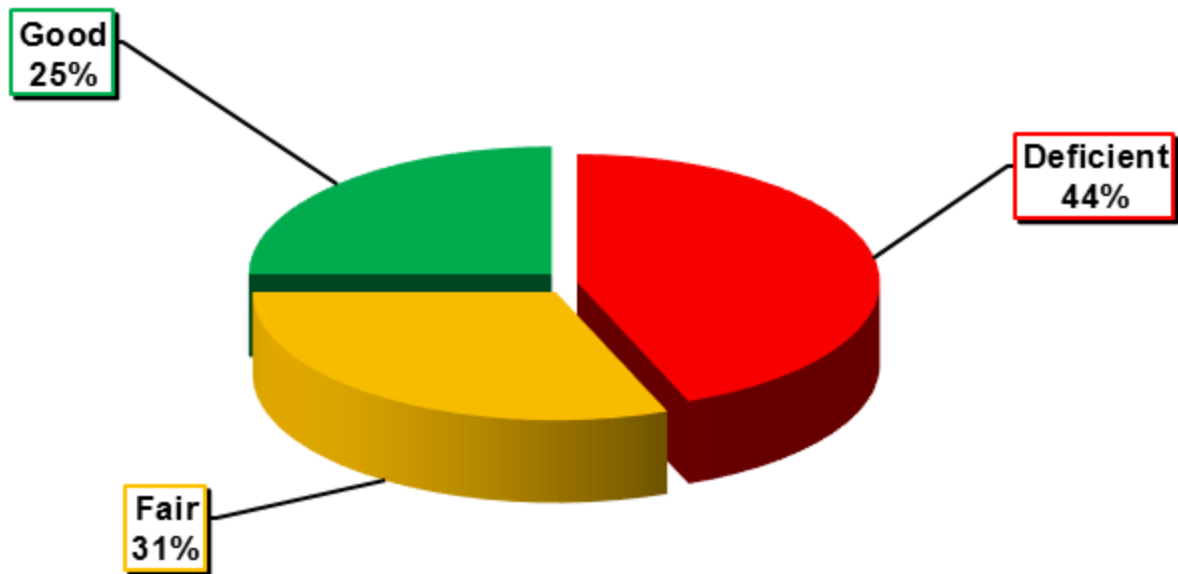
SPECIFICATION CHANGES

- Division 420 Pavement Preservation Treatments added to the SI (in progress)
 - Section 421 Micro Surfacing and Slurry Seal
 - Section 422 Fog Seal

STATUS OF NJDOT HIGHWAY SYSTEM

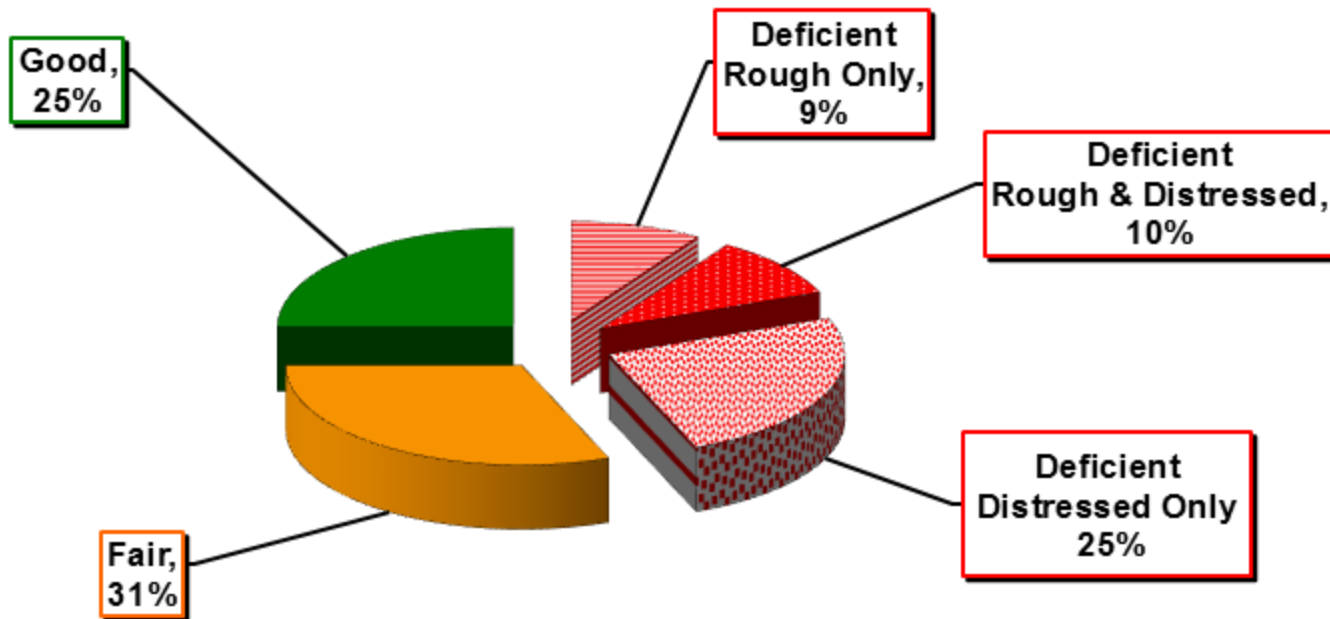
The background is a dark blue gradient with a subtle pattern of small white stars. On the right side, there are several circular gauges or dials. The largest one is at the top right, with a scale from 0 to 210 and a needle pointing to approximately 180. Below it is a smaller gauge with a scale from 0 to 100 and a needle pointing to approximately 80. At the bottom right, there is a dashed circular gauge with a scale from 0 to 100 and a needle pointing to approximately 80. In the top left and bottom left corners, there are partial views of other circular gauges.

NJDOT Maintained Pavement Status Based on IRI & SDI (Based on 2014 Data)



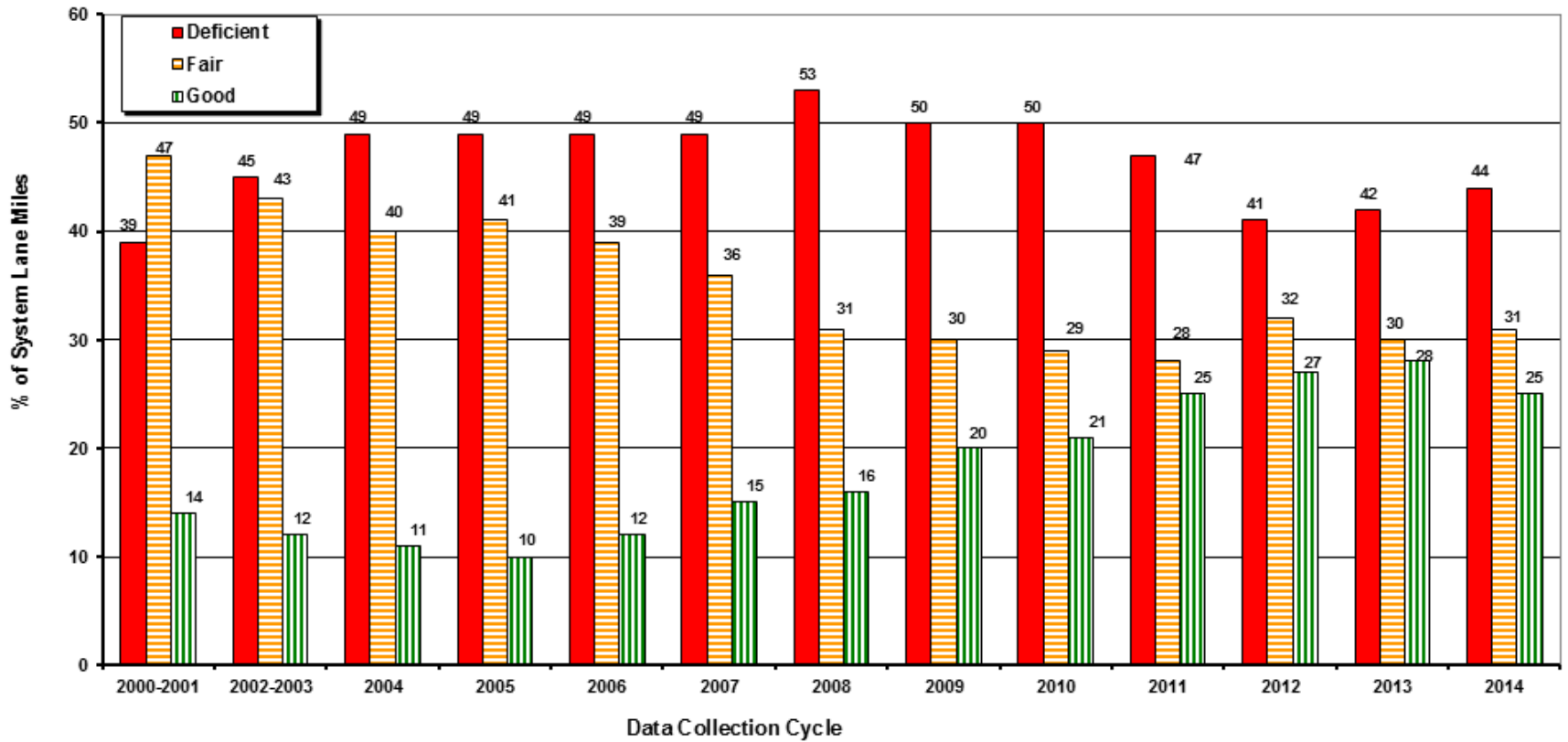
Source: NJDOT Pavement Management System, 2014 Data

Current Functional Adequacy of NJ State Highway System (Based on Roughness & Distress)



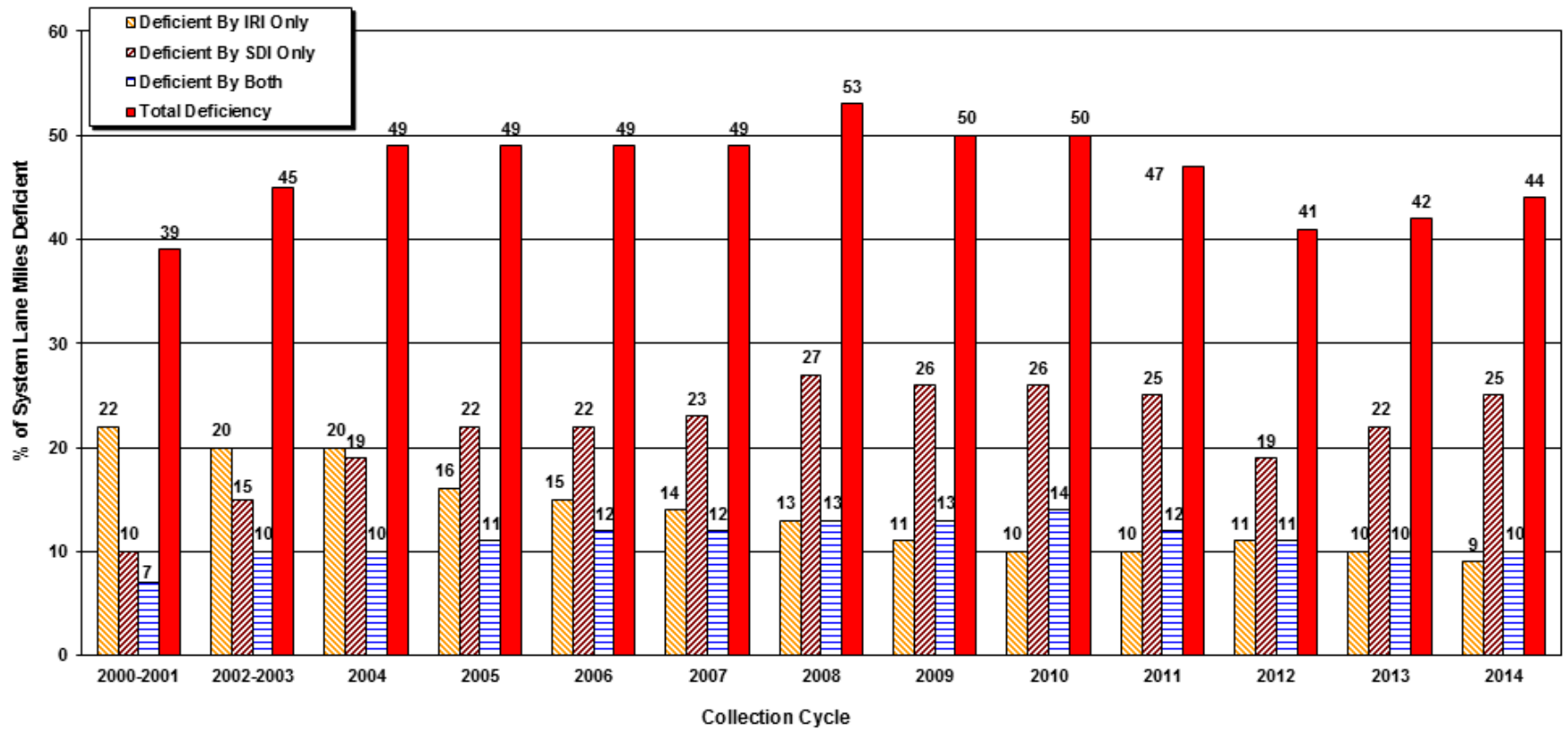
Source: NJDOT Pavement Management System, 2014 Data

Multi-Year Status of State Highway System



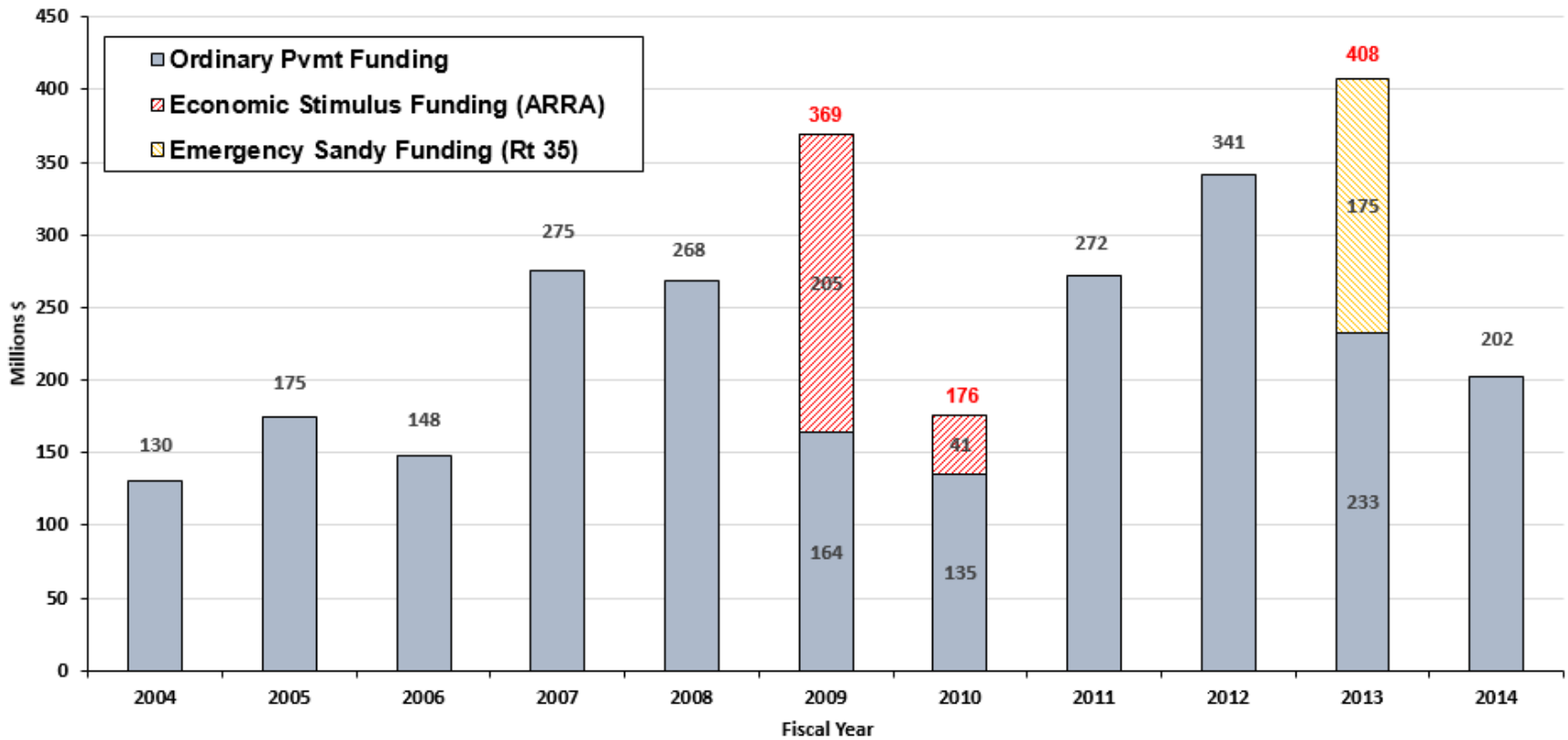
Source: NJDOT Pavement Management System

Multi-Year Deficiency of State Highway System

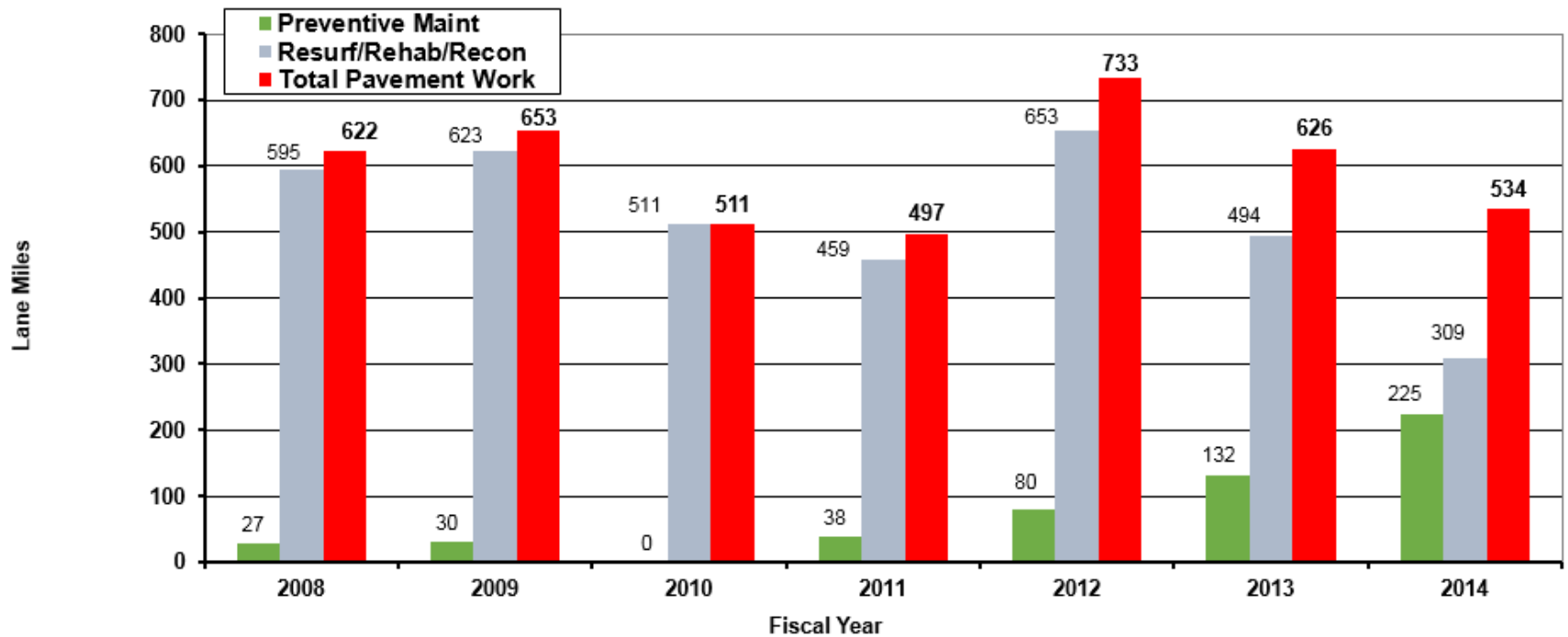


Source: NJDOT Pavement Management System

PAVEMENT FUNDING HISTORY



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



BEST OF 2014 PAVING PROJECTS

The background is a dark blue gradient with a field of small white stars. On the right side, there are several technical diagrams. A large circular gauge with a scale from 0 to 210 is visible, along with other smaller circular diagrams and arrows, suggesting a theme of engineering or construction.

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



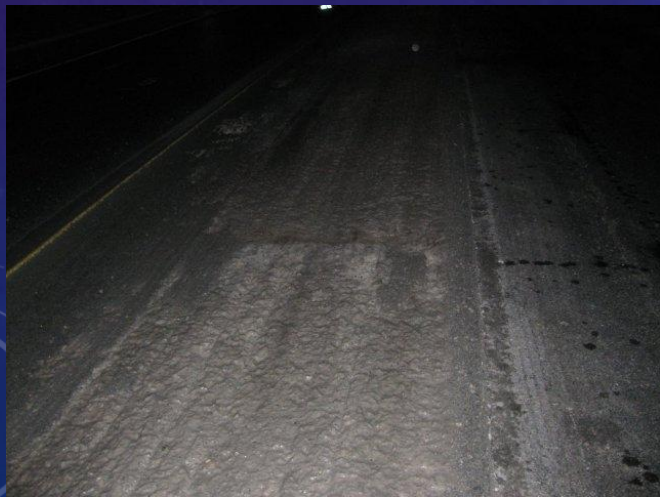
ROUTE 72 MP 13.8 TO MP 18.5

- 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

The background is a dark blue gradient with a field of small white stars. On the right side, there are several technical diagrams. At the top right, a large circular gauge with a scale from 0 to 210 and a white arrow pointing to approximately 180. Below it, a smaller circular diagram with a dashed outer ring and a solid inner ring, with an arrow pointing clockwise. At the bottom left, another circular diagram with a dashed outer ring and a solid inner ring, with an arrow pointing counter-clockwise.

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 \leq 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

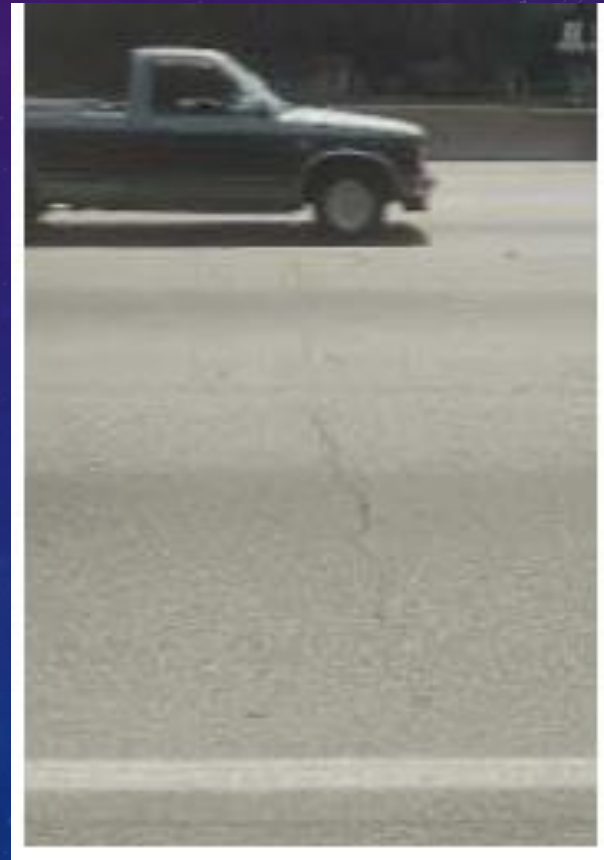
POTENTIAL APPLICATIONS

- 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 ($\leq 1/2$ 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



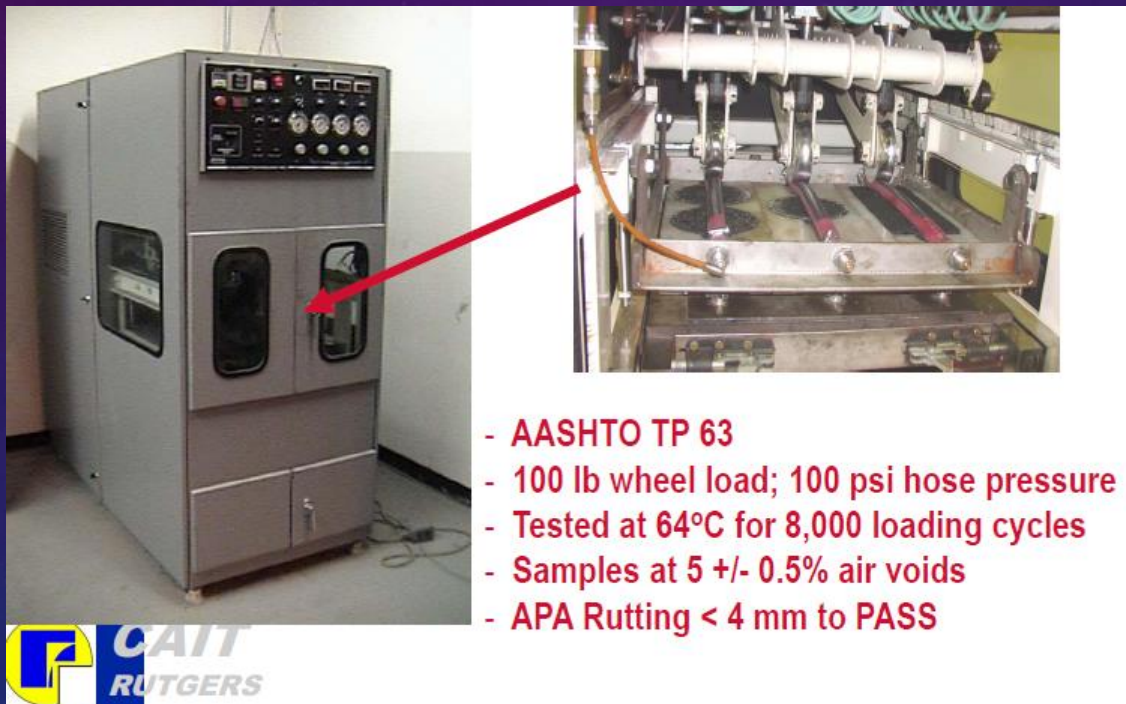
HPTO

- 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



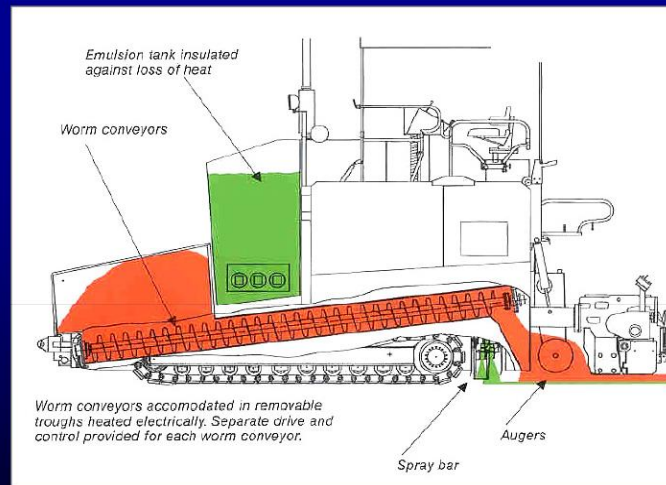
ULTRA-THIN FRICTION COURSE



UTFC – SPRAY PAVER

RoadTec

Vogele



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

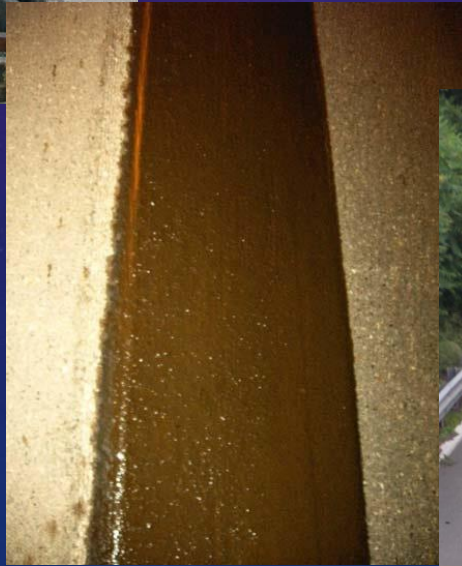
- Cold applied mixture of polymer modified asphalt emulsion (CSS-1hPM), high quality aggregate, mineral filler, water, and additives
- Can apply in variable thick cross-sections: wedges, ruts, scratch courses or final riding surfaces
- Good skid-resistant surface (high wet friction coefficient)
- Types 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



A micro-milling drum with 3 times (est.) more bits than a standard drum (Courtesy of Keystone Engineering)



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

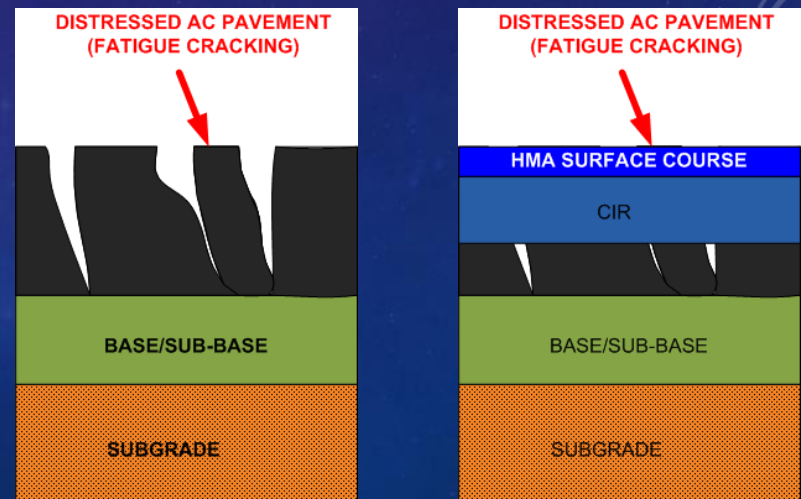
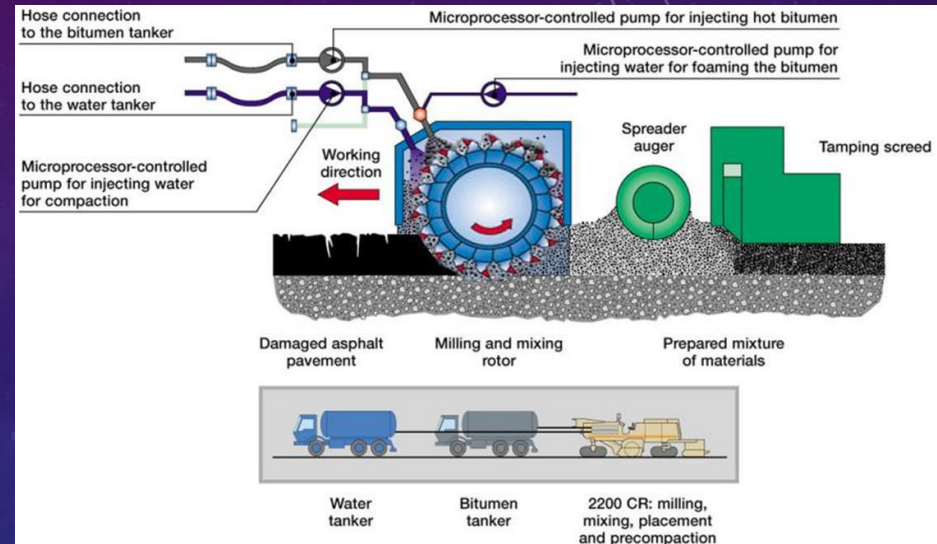


RECYCLING AND POROUS PAVEMENT



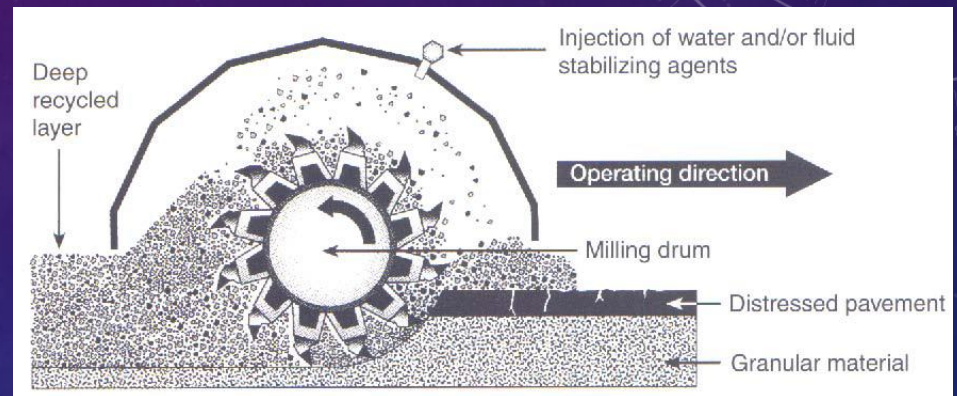
COLD IN-PLACE RECYCLING (CIR)

- 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



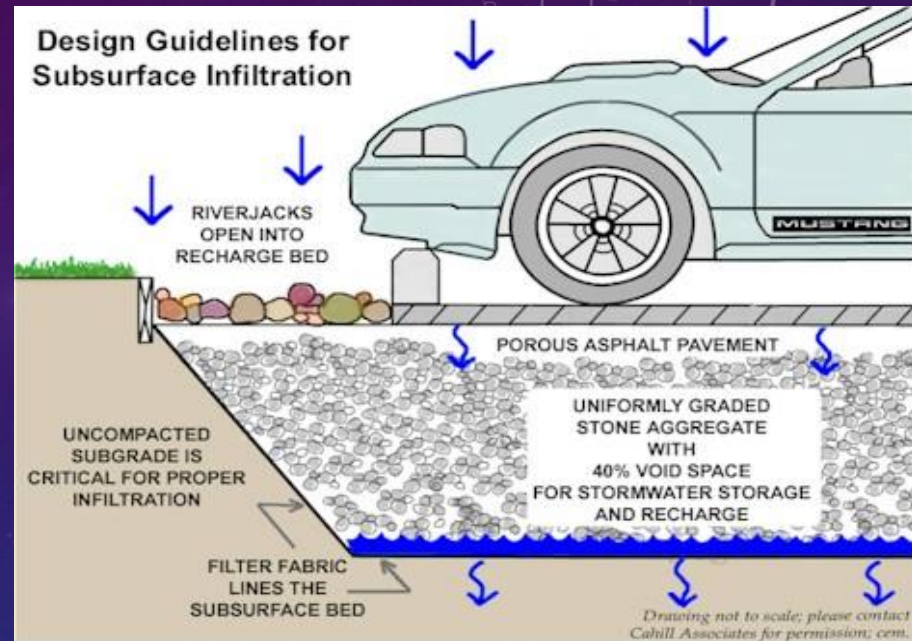
FULL DEPTH RECLAMATION (FDR)

- 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

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NJDOT ASPHALT PLANT



NJDOT PAVING CREW



QUESTIONS?

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