



# NJDOT UPDATE

57<sup>th</sup> Annual NJ Asphalt Paving  
Conference

By Robert Blight &  
Susan Gresavage

# OVERVIEW

- ⦿ Pavement Management Updates
- ⦿ Preservation and Treatments
- ⦿ Status of NJDOT System

# PAVEMENT MANAGEMENT UPDATES

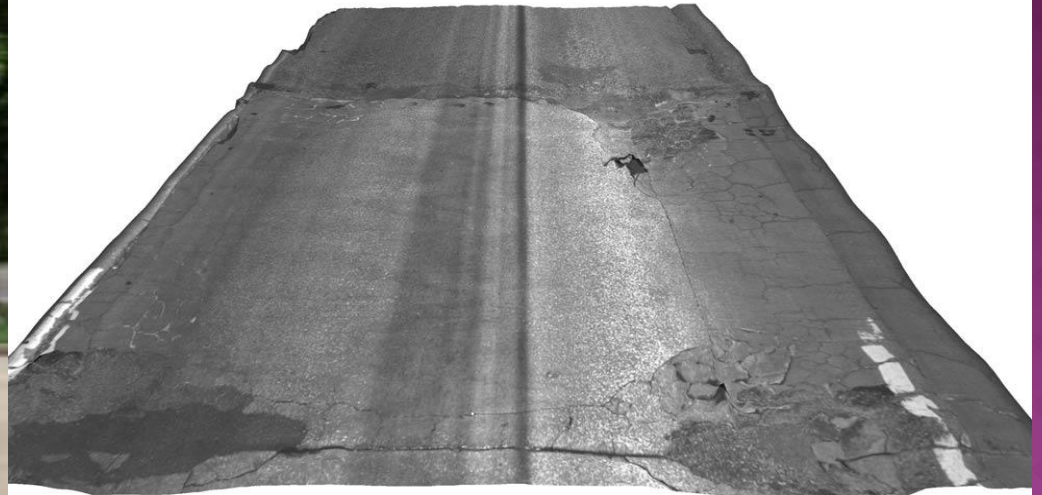
# WHAT IS PAVEMENT MANAGEMENT?

- ⦿ Define & quantify your system
- ⦿ Collect data for your system
- ⦿ Analyze data & assess condition of your system
- ⦿ **Optimize condition and future performance of your system**

# NJDOT PMS - WHERE WE ARE

- ◉ Sophisticated laser equipped testing equipment
- ◉ Annual assessment of the entire NJDOT maintained system
  - Roughness assessment - laser
  - Rutting in wheel paths - laser
  - Skid frictional testing (triennial)
  - Detailed pavement distress surveys - laser
  - High resolution digital images
- ◉ All pavement projects for Capital Program Management and Operations developed through PMS using cost benefit techniques
- ◉ PMS used for Capital Investment Strategy planning

# NJDOT PMS - WHERE WE ARE



# PROJECT GENERATION & SYSTEM PERFORMANCE - DTIMS CT PAVEMENT MANAGEMENT SOFTWARE



## Input:

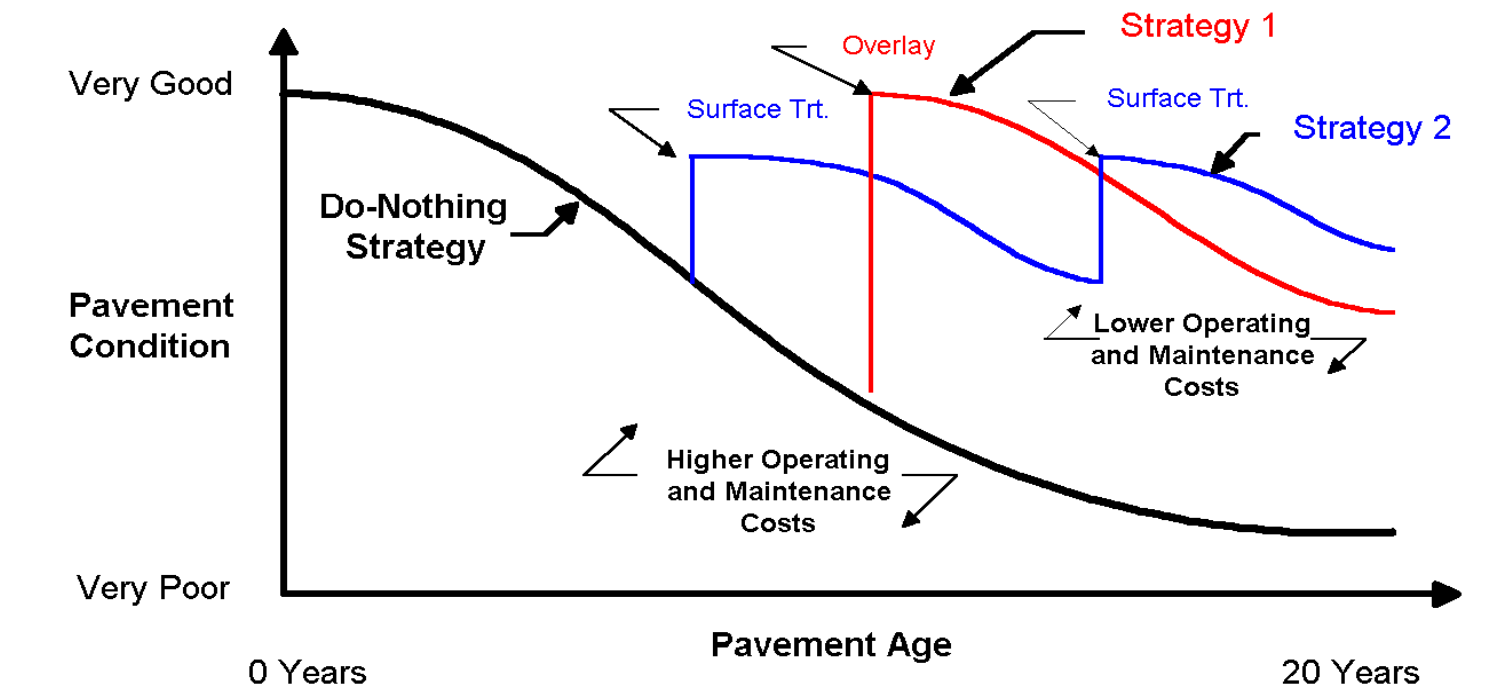
- ◉ Roadway network defined in the program
- ◉ Database developed with condition data
- ◉ Treatment types and costs defined
- ◉ Decision trees developed to trigger treatments
- ◉ Performance curves developed for pavement “families”

## Output for a specified analysis period (e.g. 5-10 years).

- ◉ Each route divided into analysis sections
- ◉ For each section optimal treatment scenarios created
- ◉ System performance predicted for various budgets

# DTIMS LIFE CYCLE COST ANALYSIS (LCCA)

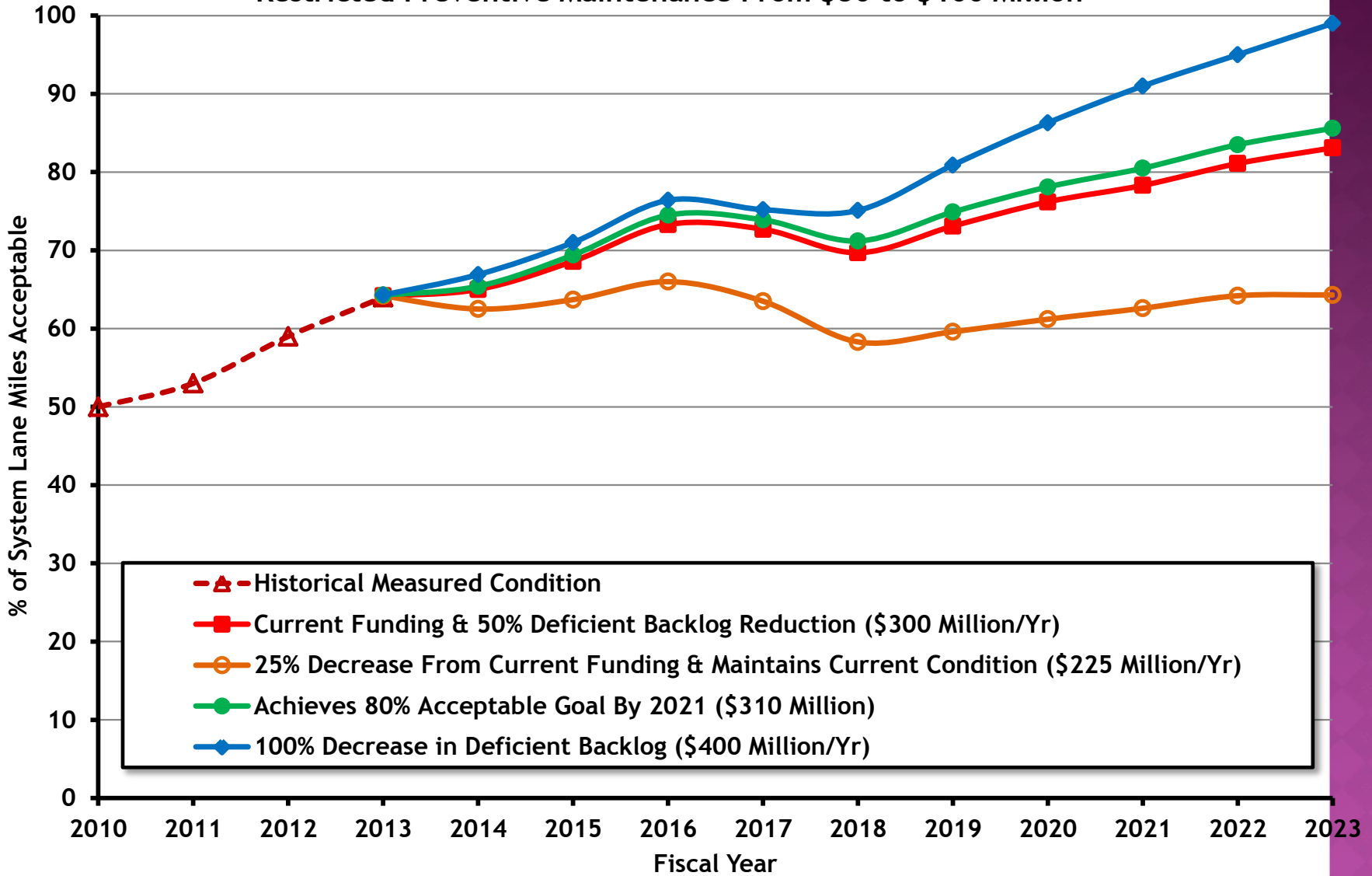
- Divide the pavement network into analysis sections
- For each section, apply condition data and triggers to generate strategies



- For each strategy, calculate benefit = area between the Strategy & Do-Nothing curves
- Calculate Benefit / Cost ratios
- Use optimization technique to select projects with most network benefit



**Multi-Year Performance Analysis (Updated Deterioration Curves & Triggers)  
 State Maintained Pavement System Acceptability Based on IRI & SDI  
 Restricted Preventive Maintenance From \$30 to \$100 Million**

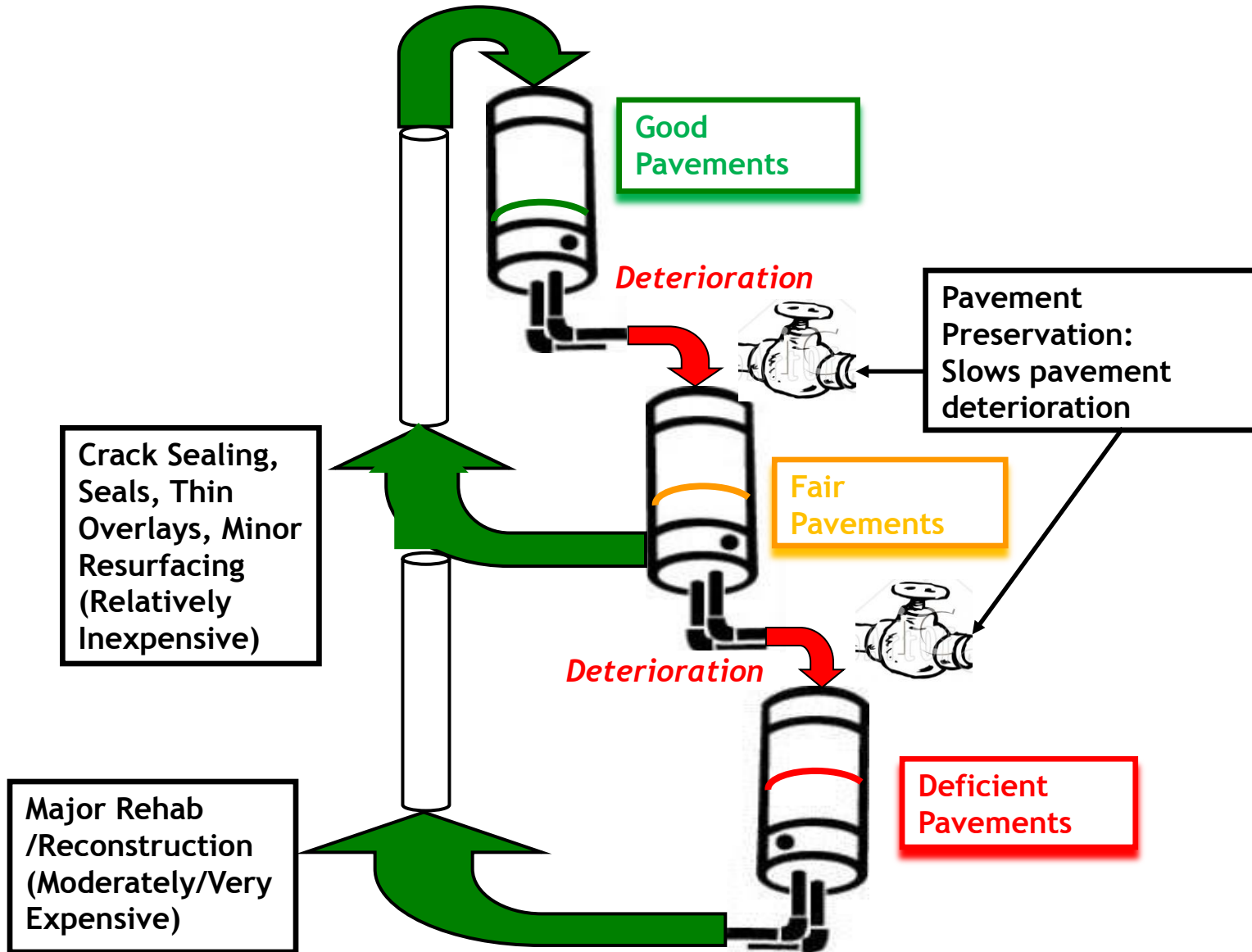


# IMPACTS OF NJDOT PAVEMENT MANAGEMENT SYSTEM

- ◉ *Has made senior leadership aware of need for substantial pavement funding*
- ◉ *Has influenced the selection of capital projects to include more pavement restoration*
- ◉ *Has provided a plan to return the system to a state of good repair*
- ◉ *Looking ahead: pavement preservation programs with “mix of fixes” (rehab / resurfacing / thin overlays / seals, etc.)*

# PRESERVATION & TREATMENTS

# Pavement Preservation Methodology



# NJDOT Pavement Treatment Strategy

## Pavement Preservation

## Capital Program Major Resurfacing/Rehab

### Routine Maintenance

### Preventive Maintenance

### Minor Resurfacing

- Isolated Patching
- Sweeping/Drain Cleaning
- Quick-Set Concrete Patching
- If-Where Repair Contracts

- Crack Sealing
- Slurry Seal/Micro Surfacing
- Thin Overlays
- Concrete Joint Sealing
- Concrete Diamond Grinding
- Isolated Concrete Partial/Full Depth Repairs

- Non-Structural Enhancements
- Mill X/Pave X
- Limited Scope Resurfacing

# PAVEMENT PRESERVATION

- ◉ When properly applied, pavement preservation treatments can extend the service life of pavements that are generally in good structural condition
- ◉ Fundamentally it is about using the RIGHT TREATMENT on the RIGHT ROAD at the RIGHT TIME

# SMA

- ◉ Stone Matrix Asphalt
  - 6% min AC - PG 76-22 with Fibers
  - Cubicle Aggregate required
- ◉ Used on highways with high truck loadings
  - 30 million ESAL's on flexible pavement
  - 15 million ESAL's on composite pavement
- ◉ Continued use on composite pavements due to cracking resistance
- ◉ Field and lab performance better than HMA
- ◉ May be used in combination with BRIC

# BRIC

- Binder Rich Intermediate Course, 4.75 mm
  - 7% MIN. AC AND VOIDS 0 TO 6% MAX
  - NO RECLAIMED ASPHALT PAVEMENT (RAP), CRUSHED RECYCLED CONTAINER GLASS (CRCG), GROUND BITUMINOUS SHINGLE MATERIAL (GBSM) OR REMEDIATED PETROLEUM CONTAMINATED SOIL AGGREGATE (RPCSA)
- Intended to reduce reflective cracking on composite pavements
- Mix performance testing required
  - Overlay Tester (reflective cracking)
  - APA (rutting)
- Often paired with SMA



# COMPOSITE PAVEMENT

**2" SMA 12.5mm S.C.**

**1" BRIC**

**CONCRETE**

# HPTO

- High Performance Thin Overlay
- 6 mm mix used as Surface or Intermediate Course
  - 7% min PG 76-22 to prevent rutting
  - Voids 2% to 7% max
- Requires performance testing of the mix design.
  - APA (rutting)
- Minimal impact to profile and roadway geometry with 1" thick design

# HPPTO (CONT...)

- 7 projects since 2007
  - 6 successful and performing well
  - IRI improved and surface sealed to prevent further deterioration due to moisture
  - 1 with improper bonding/tack coat issues
- Continued use as pavement preservation thin overlay treatment or intermediate course
- Incorporate bond strength requirement for future specification improvement

# HMA HIGH RAP

- ⦿ Allows higher RAP %
  - Minimum 20% in surface
  - Minimum 30% in intermediate and base
- ⦿ Mix performance testing required
  - Overlay Tester (reflective cracking)
  - APA (rutting)
- ⦿ Interstate Route 295 SB pilot
- ⦿ Additional pilot projects have been let in Region North where the most RAP and least space exists
  - MRRC N-104
  - MRRC N-204

# BDWSC

- Bridge Deck Waterproofing Surface Course
- Uses a highly modified binder in a 3/8” (9.5 mm) mix.
- Requires performance testing of the mix design and production.
  - Fatigue Testing
  - APA (rutting)
- Continued limited use on projects

# IMPORTANT FOR SPECIALTY MIXES

- BRIC, BDWSC, HPTO, High RAP
- Mix design (JMF) required at least 45 days before initial production
- Test strip at least 14 days before start of paving
- The Contractor may need to construct **multiple test strips** in order to produce material that meets **both the plant production requirements and the field density requirements!!!**
- First time may not be a charm

# WMA

- ◉ Warm Mix Asphalt
- ◉ Permissive upon request to Bureau of Materials
- ◉ Required for any Asphalt Rubber mixtures
  - AROGFC
  - ARGG Surface and Intermediate
  - Additive only
- ◉ Warm SMA w/o fibers pilot projects still being considered

# ARGG

- Asphalt Rubber Gap Graded
  - Surface Course
  - Intermediate Course (10% max RAP allowed)
- Field and lab performance of rubber modified asphalt mixtures continues to be excellent
- NJDOT Operations requested an alternative to AROGFC due to struggle with Winter Maintenance icing issues
- Use an alternate treatment
  - Asphalt Rubber Gap Graded Friction Course
- Route 72 MP 13.8 to MP 18.5 in MRRC C-305 project currently in construction this year



# POROUS PAVEMENT

RT.27 SIX MILE RUN BRIDGE, MIDDLESEX AND SOMERSET COUNTIES

- CURRENTLY IN CONSTRUCTION THIS YEAR
- FULL DEPTH POROUS ASPHALT SHOULDERS
  - 2" MOGFC
  - 8" ASDC (MODIFIED)
  - 12" TO 36" COARSE AGGREGATE NO.57 STONE
  - GEOTEXTILE (DRAINAGE AND STABILIZATION)

# PREVENTIVE MAINTENANCE MICROSURFACING OR SLURRY SEAL

## MIXTURE OF

- POLYMER MODIFIED ASPHALT EMULSION
- AGGREGATE
- MINERAL FILLER
- WATER
- OTHER ADDITIVES



# FOG SEAL

- ◉ FOG SEALS ARE USED TO RESTORE OR REJUVENATE AN HMA SURFACE
- ◉ FILL CRACKS AND VOIDS, SEALING WEATHER-TIGHT
- ◉ MATERIAL- ASPHALT EMULSION



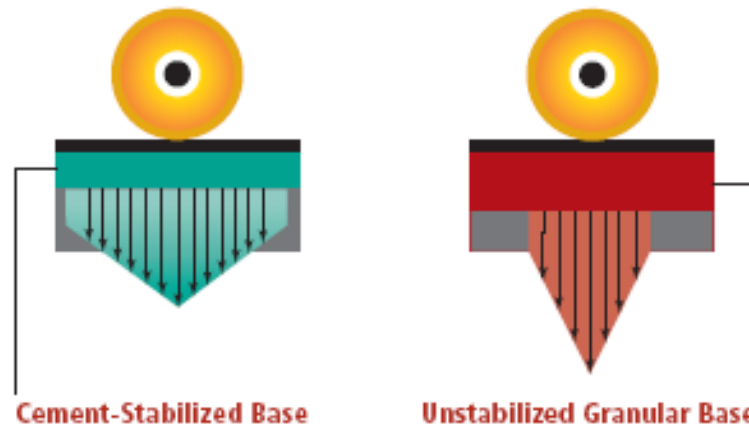
# FULL DEPTH RECLAMATION (FDR)

- IN-PLACE RECYCLING OF DETERIORATED ASPHALT PAVEMENT, AGGREGATE BASE COURSE AND WITH THE ADDITION OF CEMENT/ EMULSION OR FOAMED ASPHALT, WHICH CREATE A NEW STABILIZED BASE.
- MRRC C305 - ROUTE 72 EB SHOULDER (FDR WITH CEMENT)
  - 2" HMA over 8" FDR
- Rt.55 PROJECT - FDR OF OUTSIDE SHOULDERS



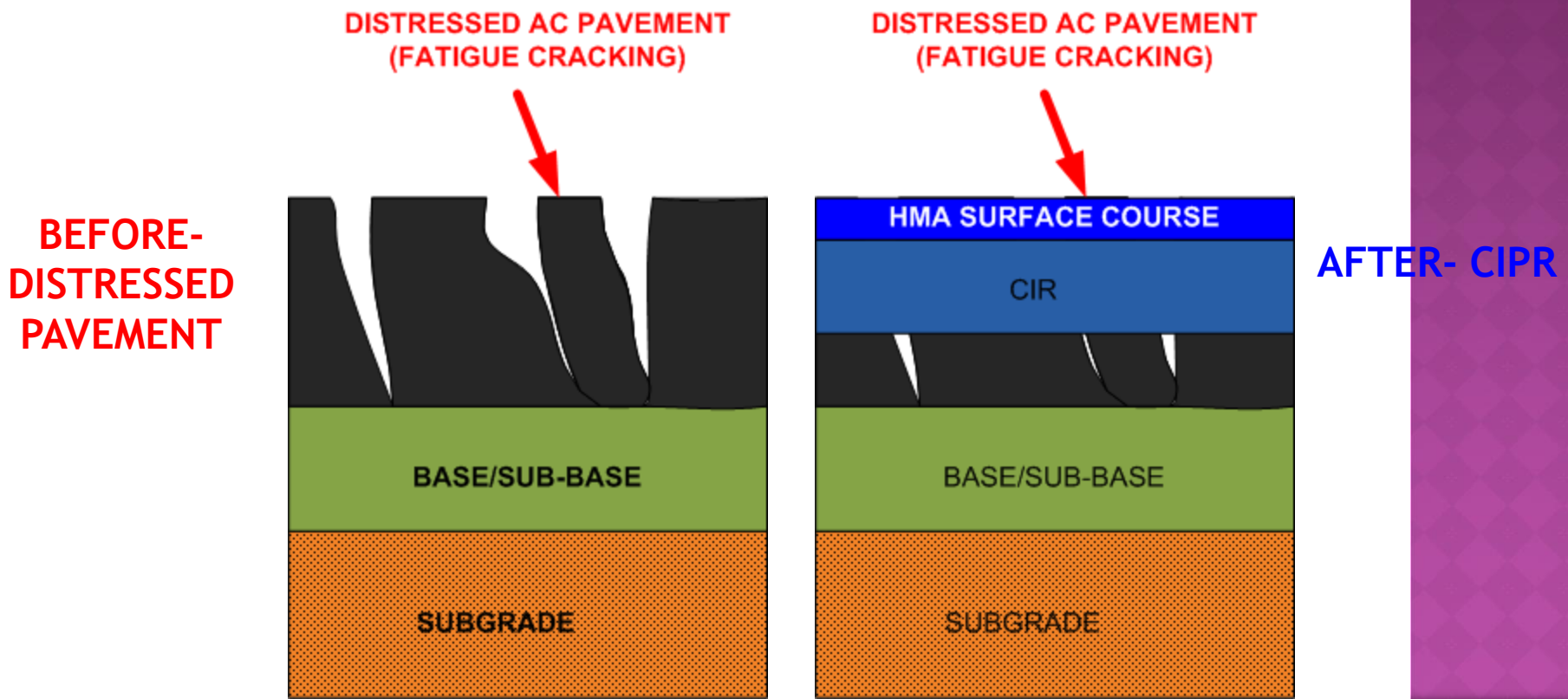
**Stabilized Base vs. Unstabilized Base**

**A stabilized base spreads loads and reduces stress on the subgrade.**



# COLD IN-PLACE RECYCLING (CIPR)

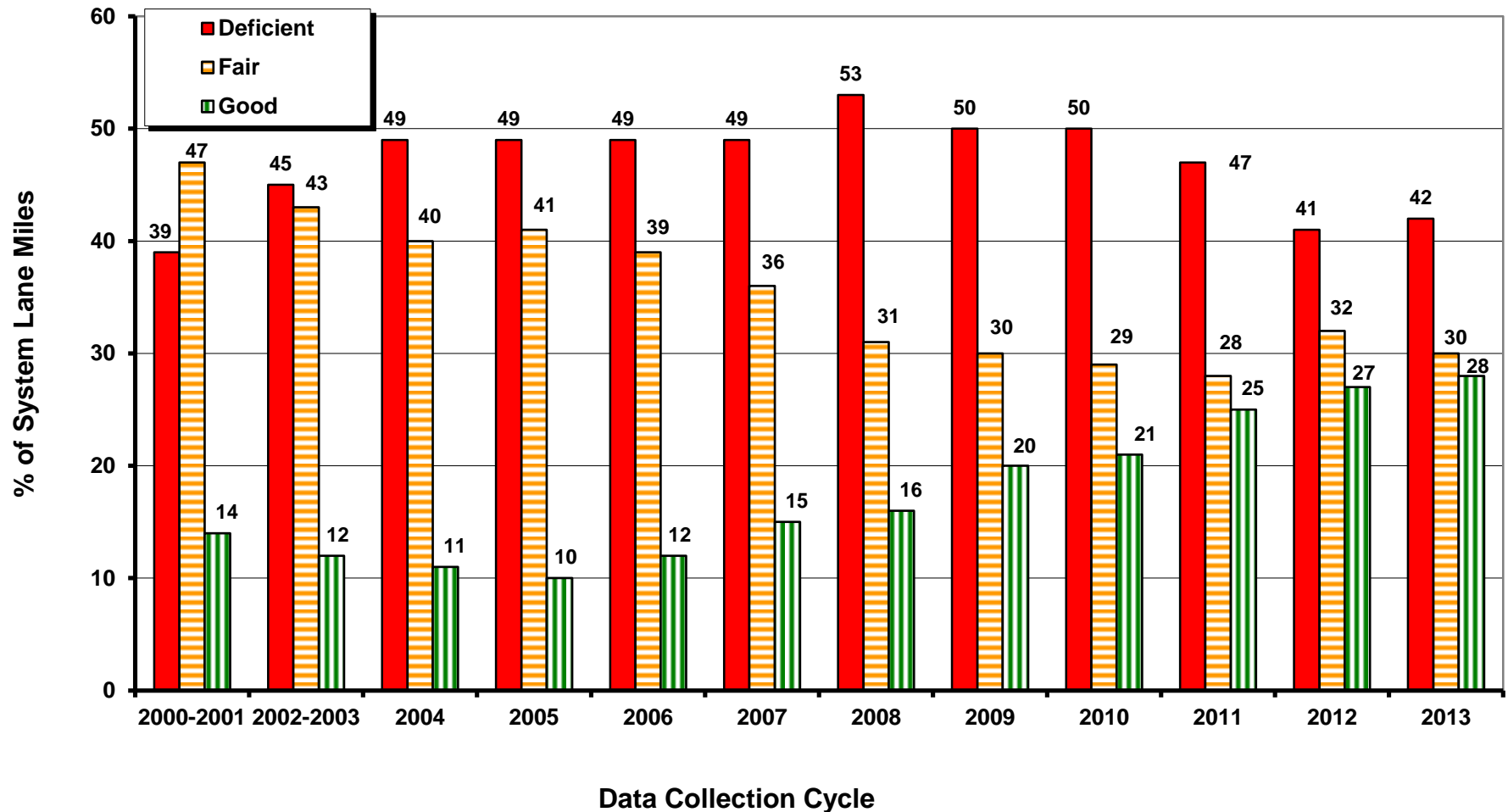
- LESS COST, PERFORM SIMILAR TO RESURFACING AND BENEFITS THE ENVIRONMENT BY USING ALL RAP.
- EMULSION OR FOAMED ASPHALT
- CAN BUILD STRUCTURAL VALUE
- NORMALLY TRAFFIC CAN RESUME IN FEW HOURS DEPENDING UPON BINDER IN THE MIX



# STATUS OF SYSTEM

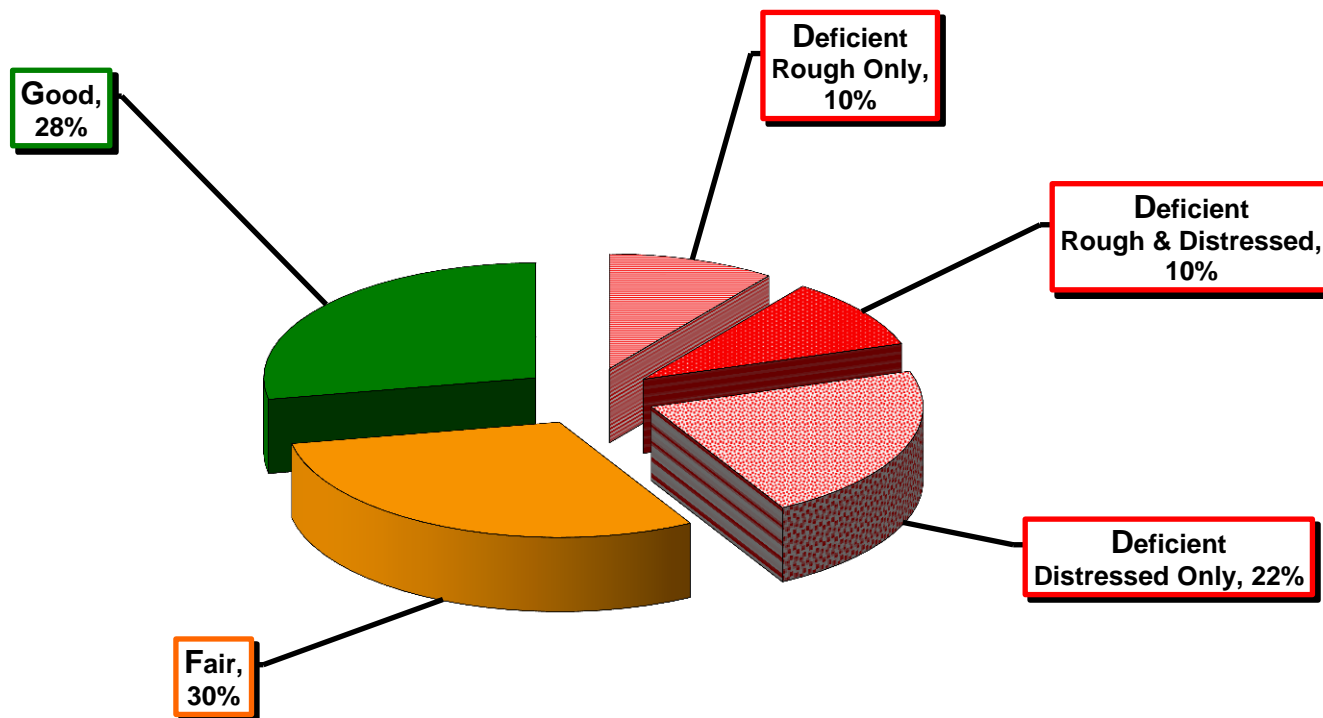
# STATUS OF THE SYSTEM

## Multi-Year Status of State Highway System



Source: NJDOT Pavement Management System

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

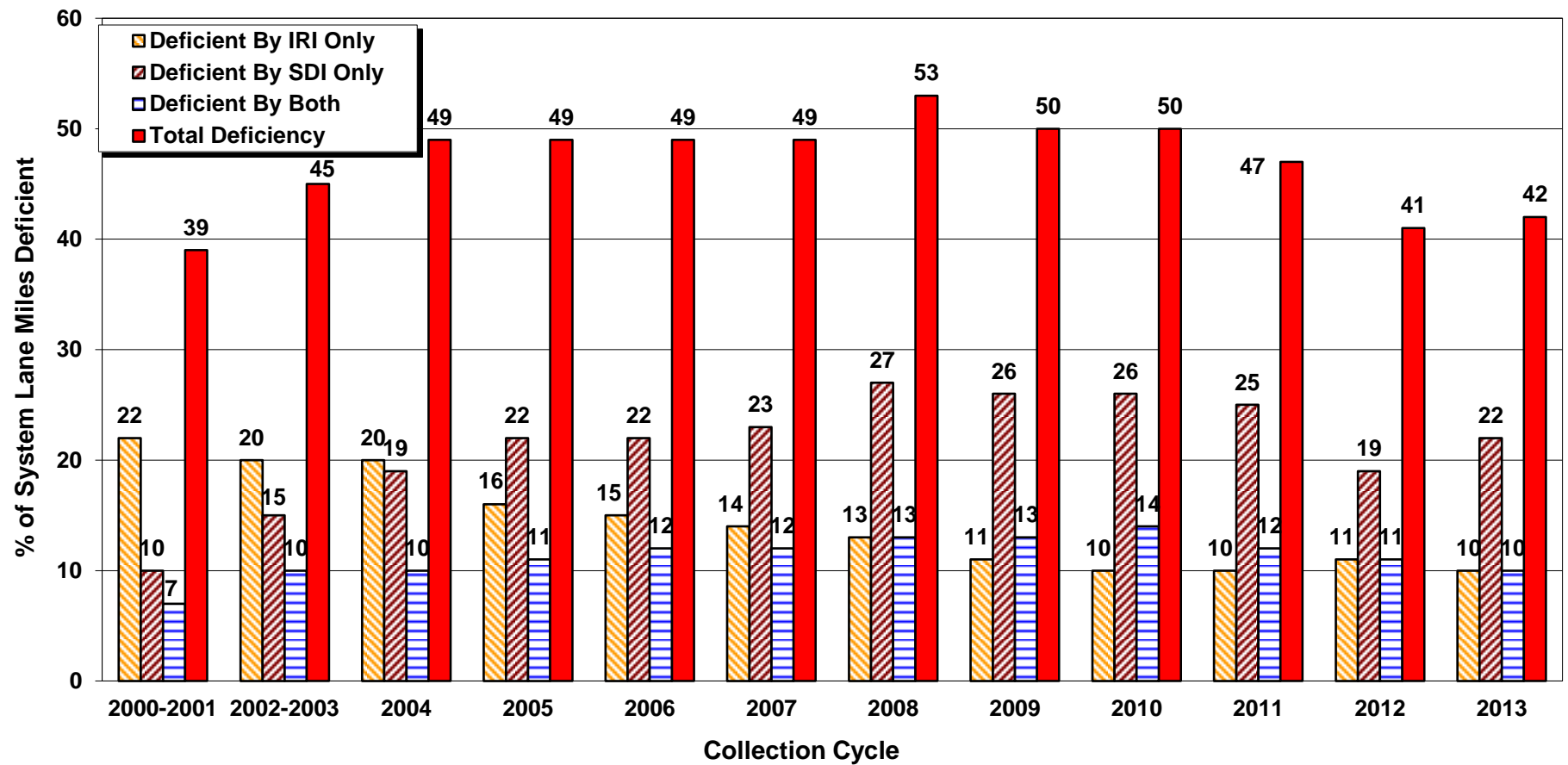


*Source: NJDOT Pavement Management System, 2013 Data*



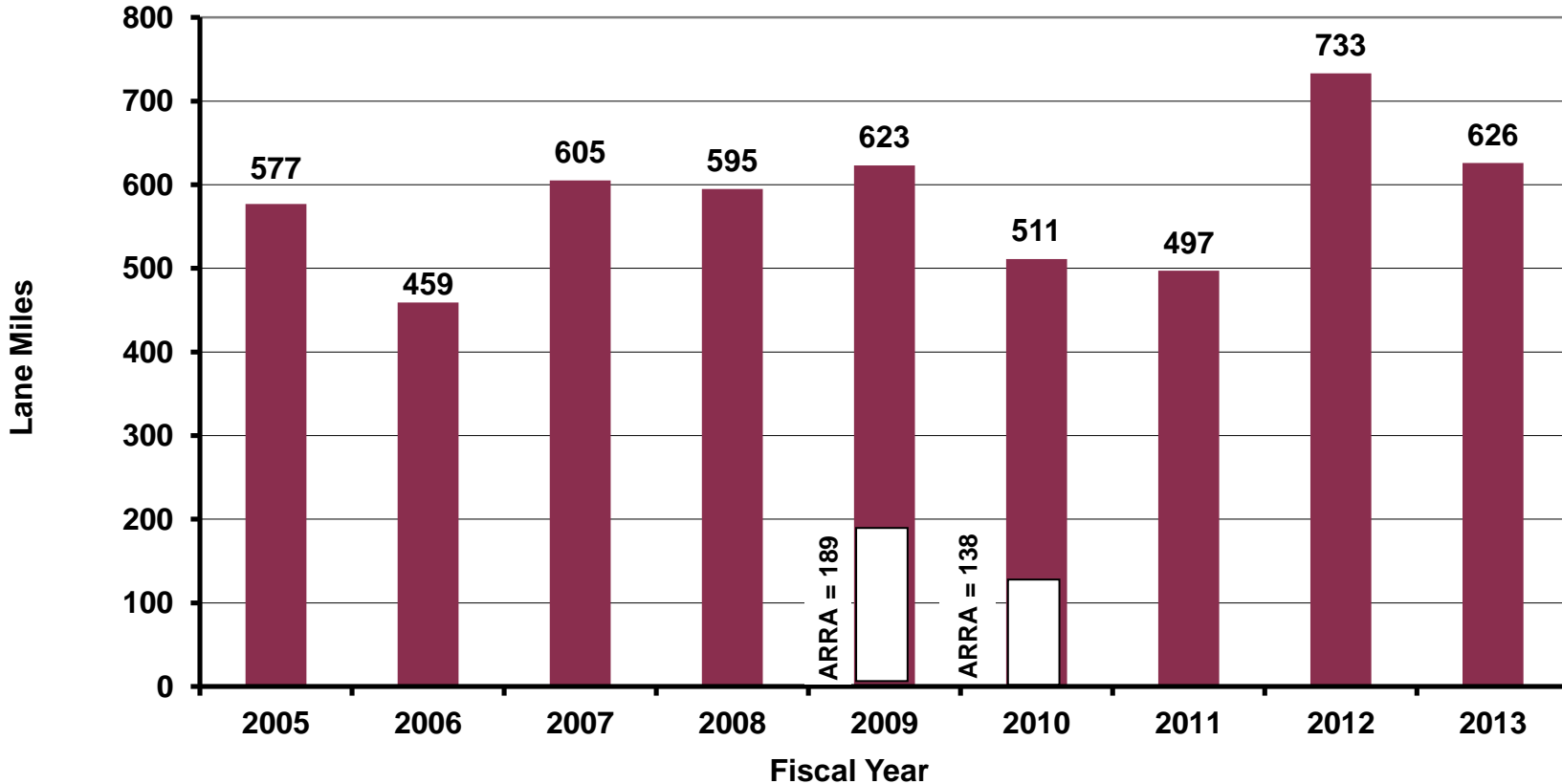
# BREAKDOWN OF DEFICIENT PAVEMENT

## Multi-Year Deficiency of State Highway System



# SYSTEM IMPROVEMENTS

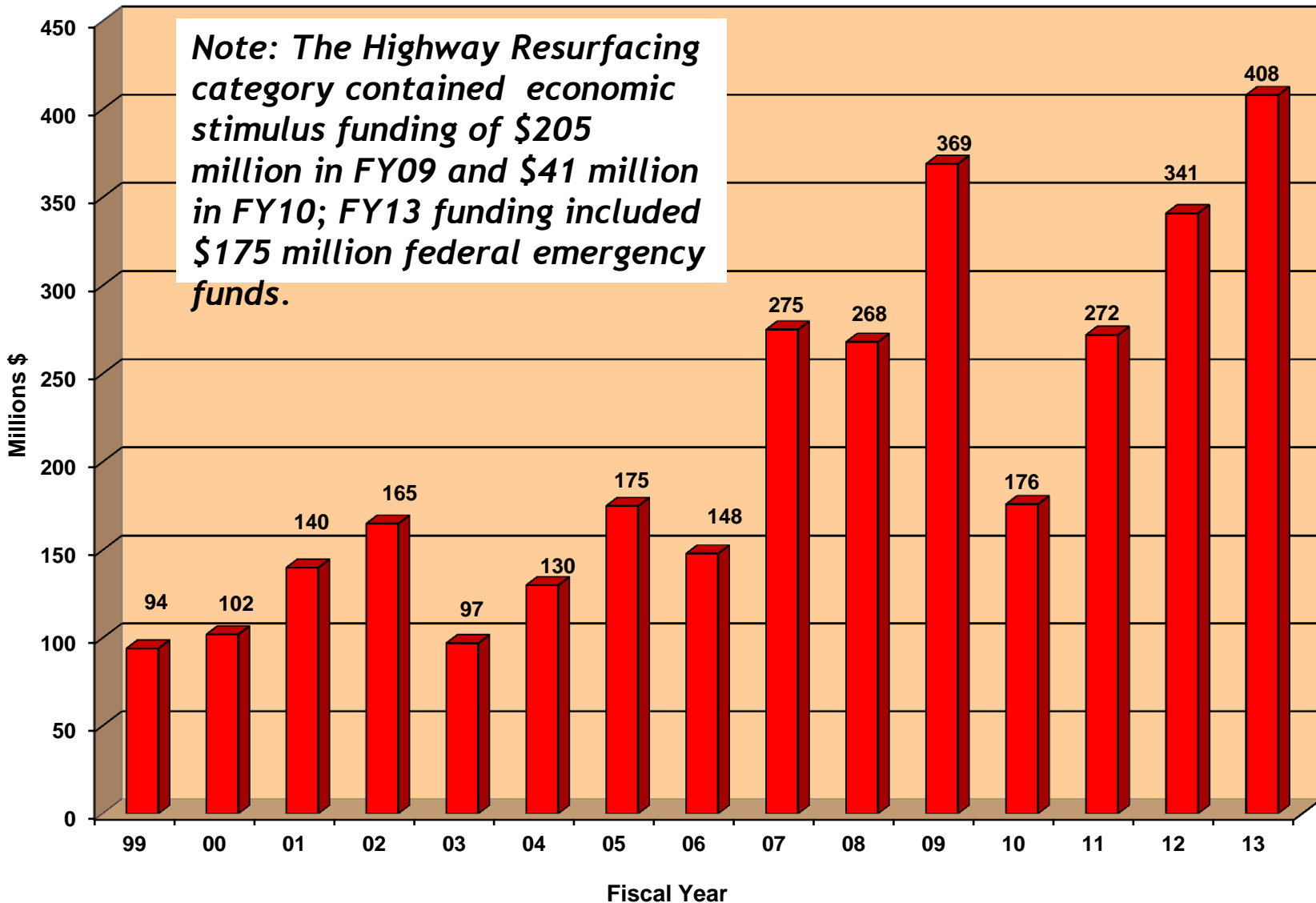
**NJ State Highway System  
Lane Miles of Major Pavement Work Completed**  
(Total system mainline lane miles = 8410)



# STATUS OF THE SYSTEM

- What's important?
  - % Good Pavement is increasing!
    - From 14% in 2000-2001 to 28% in 2013
  - % Poor Pavement is decreasing!
    - From 53% in 2008 to 42% in 2012
- NJ Pavements continue to improve
- NJDOT Goal of 80% Acceptable by 2021 is achievable if we continue to get the funding for pavements

# Pavement Funding History



# QUESTIONS?

Susan.Gresavage@dot.state.nj.us

