

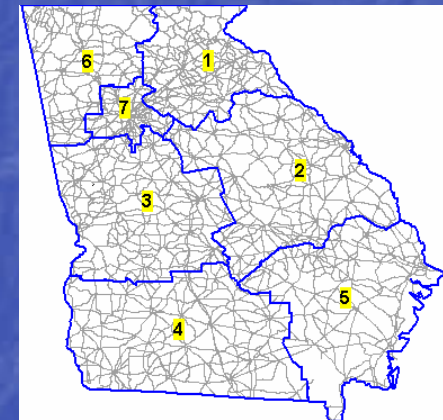
Pavement Preservation in Georgia



GDOT Pavement Management Practices

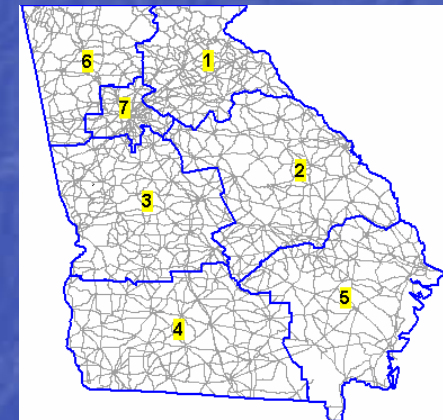
PM Practices in GDOT

- 18, 000 mile centerline highway.
- 7 working districts.
- Pavement surveyed annually with about 60 engineers.
- 10 different types of distresses surveyed (i.g. load cracking)
- Project rating is between 0 and 100.

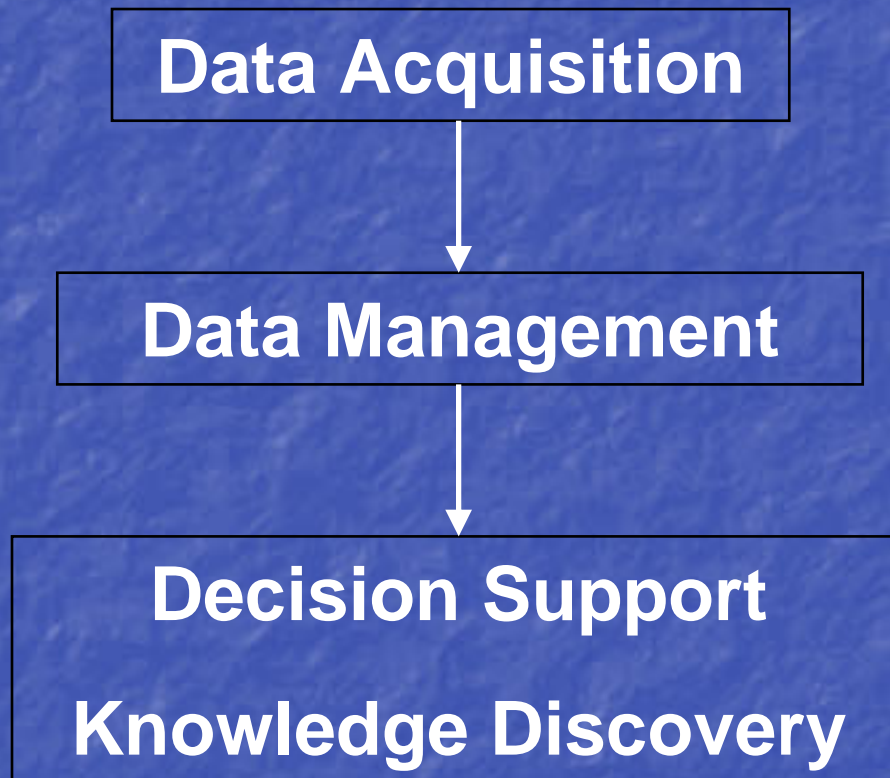


PM Practices in GDOT (cont)

- More than 17 years of survey data (1986 – 2004)
- Survey data used to determine suitable maintenance and rehabilitation strategies.
- Total miles of projects treated are subject to budget availability.
- 13 Congressional districts in Georgia and the budget for each district should be balanced.



Components in Pavement Management



Benefits of Implementing IT-based Pavement Management System

Benefits

- Data acquisition efficiency was improved
- Data quality was enhanced.
- Data can be utilized more often and more effectively.
- Treatment decisions were made more accurately and consistently.
- Provided the ability to manage more effective the pavement preservation Program
- Other benefits

***PAVEMENT CONDITION
EVALUATION SYSTEM
(P.A.C.E.S.)***

P.A.C.E.S. RATING SYSTEM

- ***RATING SYSTEM FROM 0 TO 100***
- ***RATINGS BASED ON ROADWAY DEFICIENCIES***
- ***RATINGS PERFORMED YEARLY BETWEEN OCTOBER 1ST AND DECEMBER 31ST BY AREA ASSISTANT FOR ENTIRE STATE HIGHWAY SYSTEM***

P.A.C.E.S. (cont.)

- ***ROADWAY SECTIONS WITH RATINGS OF 75 AND BELOW BY THE AREA WILL BE RATED BY THE DISTRICT AND GENERAL OFFICE***
- ***RATINGS OF 70 AND BELOW WARRANT RESURFACING***
- ***RATINGS ABOVE 70 MAY WARRANT OTHER TYPES OF TREATMENTS***

P.A.C.E.S. (cont.)

- ***SAFETY CONCERNS, SUCH AS, ACCIDENT HISTORY OR SKID RESISTANCE CAN OVERRIDE ROADWAY RATING AS JUSTIFICATION FOR RESURFACING***

DEFICIENCIES CONSIDERED

- *Load Cracking*
- *Block Cracking*
- *Rutting*
- *Raveling*
- *Reflective Cracking*
- *Loss of Section*
- *Bleeding*
- *Corrugation*
- *Edge Distress*
- *Patched Areas*

Field Data Acquisition

Field data acquisition is performed through COPACES module in GPAM.



Project-level Location Information

Project Information---1_0002_00_A1_241_00000_00200_000_00000_00000_000_00000_00000_02_12_2002_1...

Project Location

Status:	<input type="text" value="NORMAL"/>	County Name:	<input type="text" value="RABUN"/>
Date:	<input type="text" value="2/12/2002 10:40:07 AM"/>	Milepost From:	<input type="text" value="0"/>
Rater:	<input type="text" value="JAMES TSAI"/>	Milepost To:	<input type="text" value="2"/>
Office:	<input type="text" value="A1"/>	Additional Counties	
Route Type:	<input type="text" value="STATE ROUTE"/>	County 2	County 3
District Number:	<input type="text" value="1"/>	Name:	<input type="text"/>
Route Number:	<input type="text" value="0002"/>	From:	<input type="text"/>
Route Suffix:	<input type="text" value="00"/>	To:	<input type="text"/>
		Project Limits: <input type="text"/>	

Road Information

<input type="button" value="AADT -->"/>	<input type="text" value="700"/>	Divided Highway:	<input type="text" value="NO"/>
<input type="button" value="Pavement Width (ft) -->"/>	Min. <input type="text" value="12"/> Max. <input type="text" value="12"/>	Direction:	<input type="text"/>
<input type="button" value="Paved Shoulder Width (ft) -->"/>	Min. <input type="text" value="2"/> Max. <input type="text" value="2"/>	Surface Type:	<input type="text"/>
Unpaved Shoulder Width:	<input type="text"/>	No. of Bridges:	<input type="text"/>
Is this STAA?	<input type="text" value="NO"/>	Bridge Width (ft):	<input type="text"/>
Does the project contain the curb and gutter and require milling ?	<input type="text" value="NO"/>	Project Remarks:	<input type="text"/>
Estimated centerline miles with curb and gutter:	<input type="text"/>		

Segment-level Distress Information

Field Data Entry			
Project Information			
Trip Date:	2/12/2002 10:40:07	County 1:	County 2:
Route Type:	1	County Name:	RABUN
Route Number:	0002	Milepost From:	0
Route Suffix:	00	Milepost To:	2
Segment Information			
County:	RABUN		
Segment From:	0		
Segment To:	1		
Lane Direction:	POS.		
Lane No. (1,2,...):	2		
Sample Location:	2		
Project Limit:	1		
Is Crack Width greater than 1/4 inch?	NO		
Cracks have been Sealed?			
Cross Slopes			
Left		Right	
Remarks:			
Distress Information			
Rut Depth			
Outside W.P.	2		
Inside W.P.	3		
Load Cracking			
Severity Level 1:	12		
Severity Level 2:	20		
Severity Level 3:	20		
Severity Level 4:			
Reflection Cracking			
No. of cracks:			
Total Length:			
Severity (1,2,3):			
Block Cracking			
%		Severity	
Patches and Potholes			
%		Severity	
Raveling			
%		Severity	
Edge Distress			
%		Severity	
Bleeding/Flushing			
%		Severity	
Corrugation/Pushing			
%		Severity	
Loss Pavement Section			
%		Severity	
Segment			
Previous			
Next			
Add			
Delete			
Save			
Cancel			
Exit			
Back to Project Info			

LOAD CRACKING

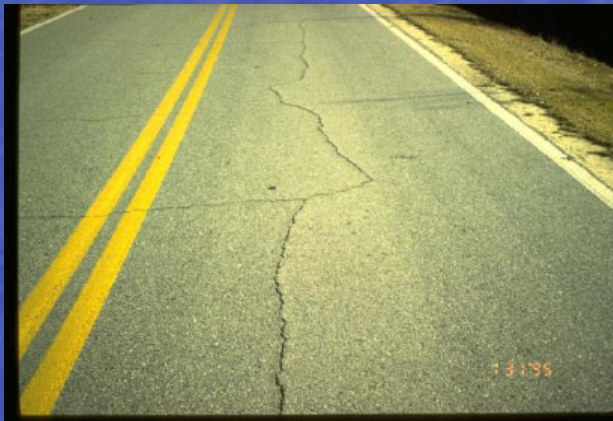


Load Cracking
Clockwise from left: level 1, level 2, level 3, level 4



Block/Transverse Cracking

Clockwise from left: Level 1, level 2, level 3



Reflective Cracking

From left to right: level 1, level 2, level 3



Other Distresses

- Other distresses considered during the survey are Patches, Potholes, Base Failures, Edge Distress, Rutting, Corrugations/Pushing, Bleeding/Flushing, Loss of section, and Raveling

RUTTING



RAVELING



Project Rating Calculation

- **Determining Project Average for Each Distress**
- Simple numeric averages for each distress are used instead of prorating in this rating system. The averages are computed by totaling the values for each type of distress and dividing by the number of rating segments.
- After the average values are computed for each distress for the project, deduct points are determined for each distress extent and severity. These deduct points are totaled and subtracted from 100 to determine the project rating.
- The following charts, used when PACES was performed manually, are representative of the deduct point values used in COPACES.

**Flexible Pavement Condition
Survey Deduct values**

Rutting Extent (inches)							
	0	1/8	1/4	3/8	1/2	5/8	3/4
Deducts	0	2	5	12	16	20	24

Patches and Potholes Extent (# per mile)					
	1-2	3-6	7-10	11-15	>15
Deducts	2	5	10	17	25

Corrugations/Pushing Extent (%)			
	1-10	11-25	>25
Severity	1	2	4
	2	4	7
	3	6	10

Reflective Cracking (%)					
	5-15	16-30	31-45	>45	
Severity	1	3	6	8	
	2	6	11	14	
	3	8	16	20	

Edge Cracking Extent (%)					
	5-25	26-50	51-75	>75	
Severity	1	2	3	4	
	2	4	6	7	
	3	6	8	10	

Raveling Extent (%)							
	1-5	6-15	16-25	26-35	36-45	>45	
Severity	1	2	5	6	8	10	13
	2	4	8	11	14	17	21
	3	6	12	16	20	25	30

Loss of Pavement (%)				
	0-25	25-50	50-75	75-100
Severity	1	0	1	3
	2	2	6	8
	3	6	10	12

Bleeding or Flushing Extent (%)			
	1-10	11-30	>30
Severity	1	5	8
	2	10	15

Ready

ESTABLISHING YEARLY ROADWAY REHABILITATION PROGRAM

- ***EACH DISTRICT SUBMITS PRIORITIES TO
STATE MAINTENANCE OFFICE***
 - ***Priorities are based on PACES Rating, AADT,
Safety History and Skid Test***
 - ***District Maintenance Assistant and State
Maintenance Liaison establishes the District's
priorities***

ESTABLISHING YEARLY ROADWAY REHABILITATION PROGRAM

- ***STATE MAINTNENANCE OFFICE REVIEWS
EACH DISTRICT'S PRIORITY LISTING AND
ESTABLISHES A STATE WIDE PRIORITY
LISTING***
 - ***Priorities are based on available funding as well
as the **items used at the district level*****

Patching



Crack Filling



Strip Sealing



Deep Base Repair



Resurfacing

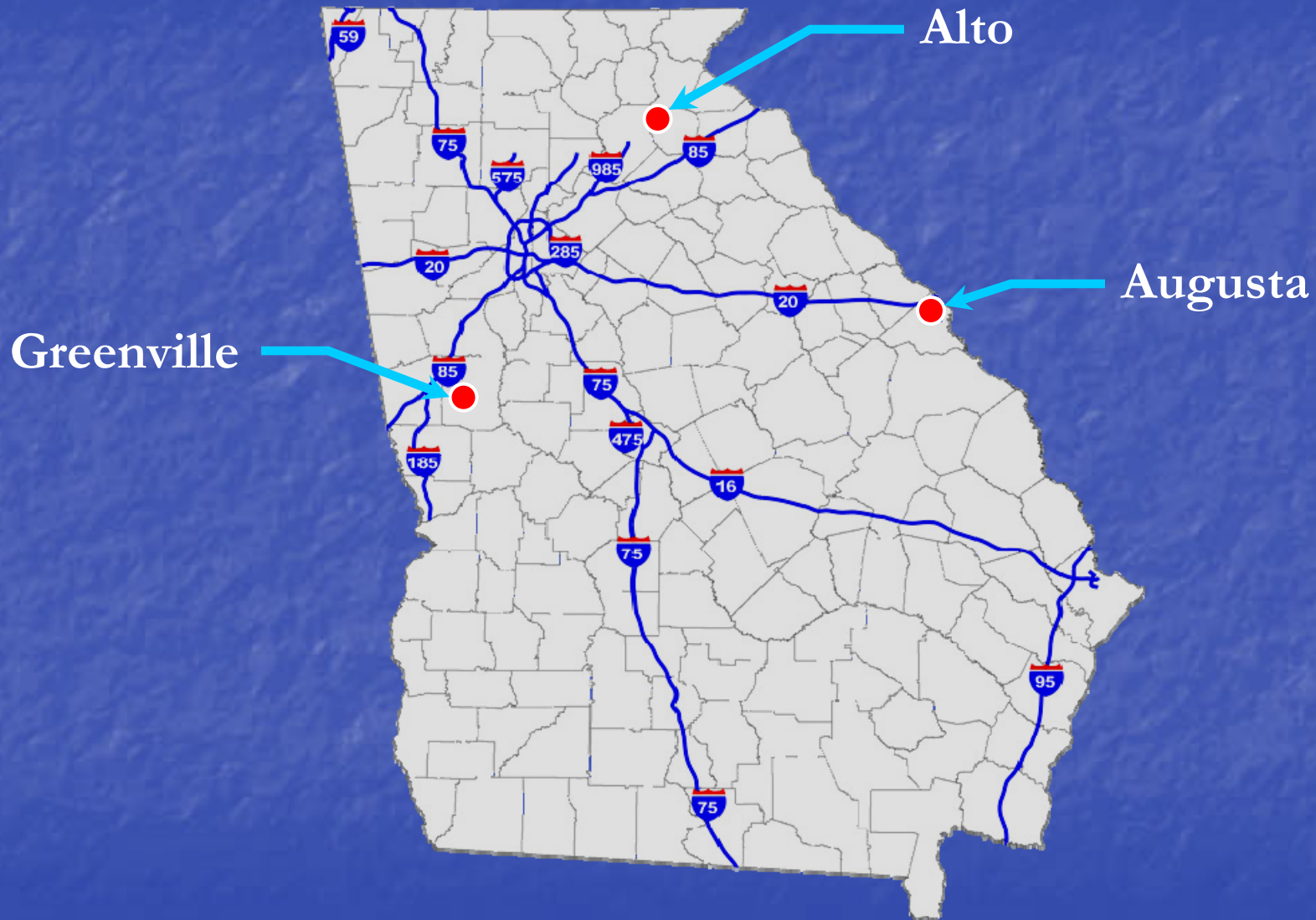
Asphaltic Concrete, Surface Treatment, & Spot Overlays



3 Asphalt Plants



Asphalt Plant Locations

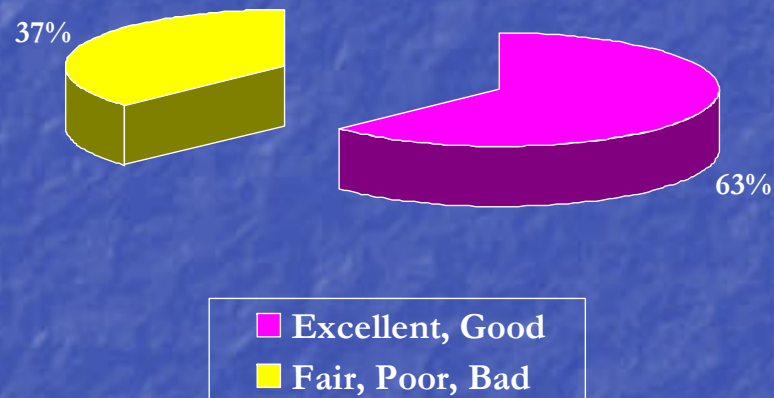


ESTABLISHING YEARLY ROADWAY REHABILITATION PROGRAM *(cont.)*

- ***FOR INTERSTATES OR OTHER STATE ROUTES WITH MAJOR DISTRESSES***
 - ***The State Maintenance Office requests detailed pavement and/or base evaluation from the Office of Materials and Research – Pavement Design Section***

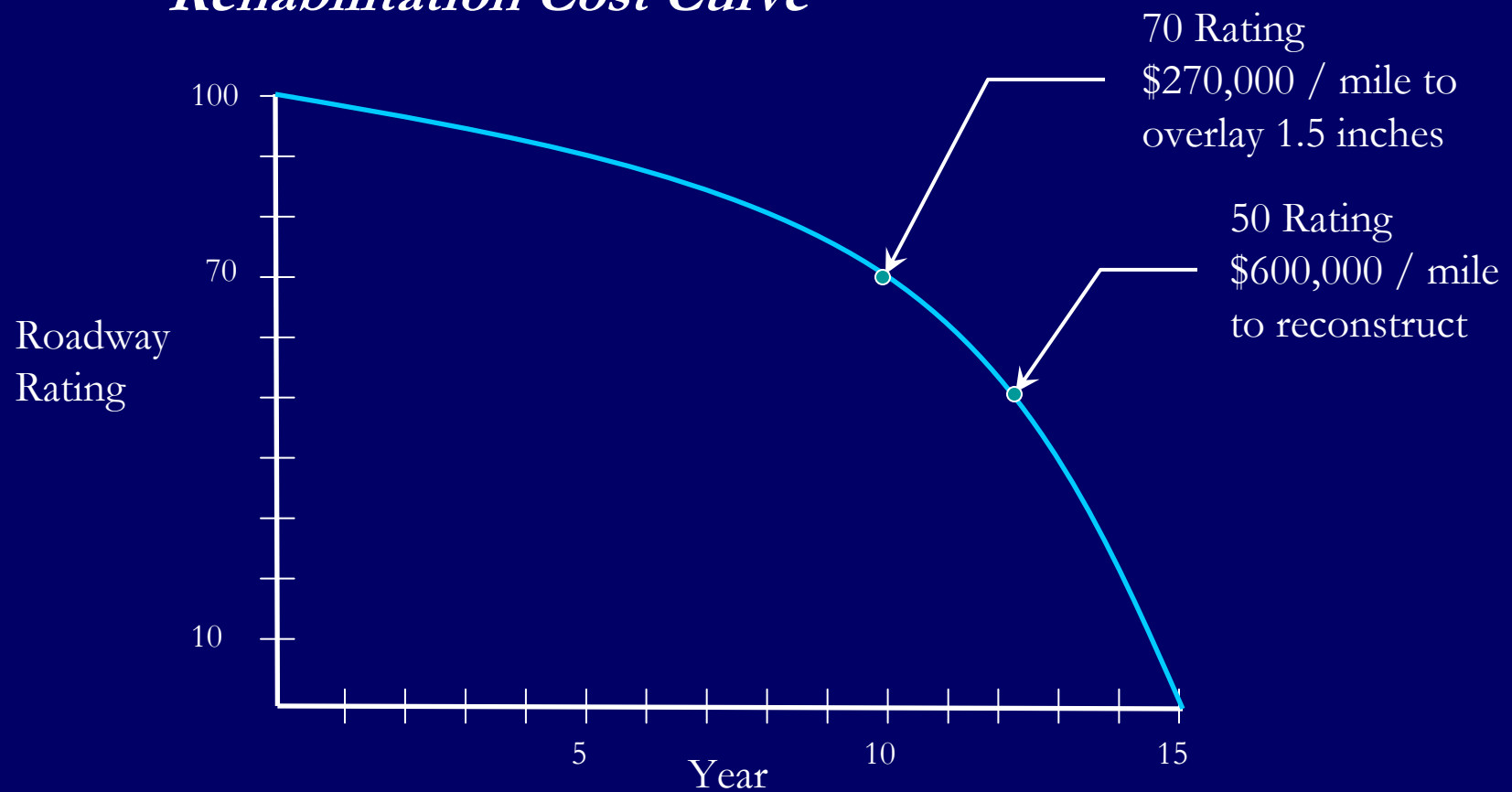
Roadway Conditions in Georgia

2006 State Route System
Roadway Ratings

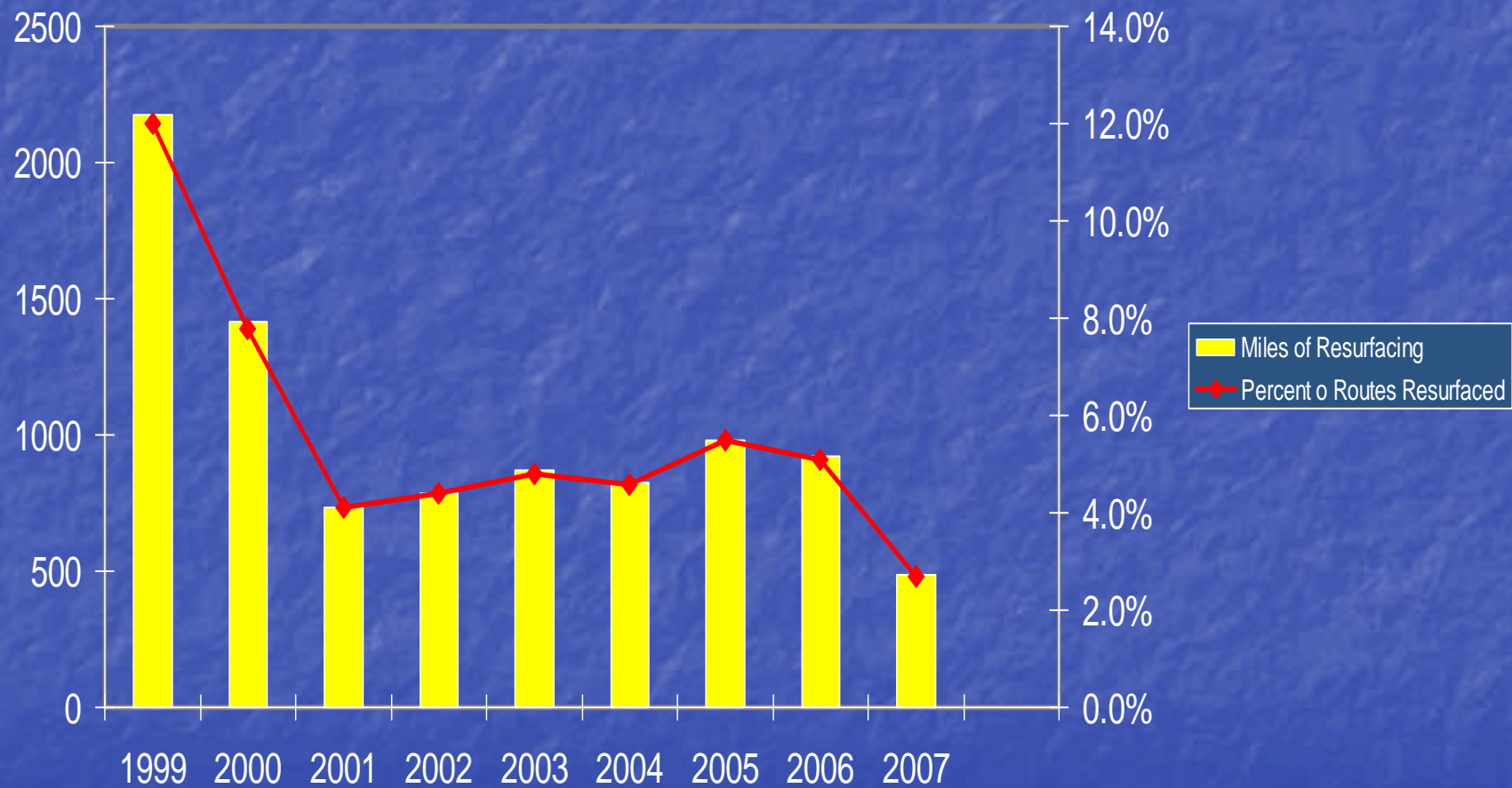


Roadway Conditions in Georgia

Rehabilitation Cost Curve

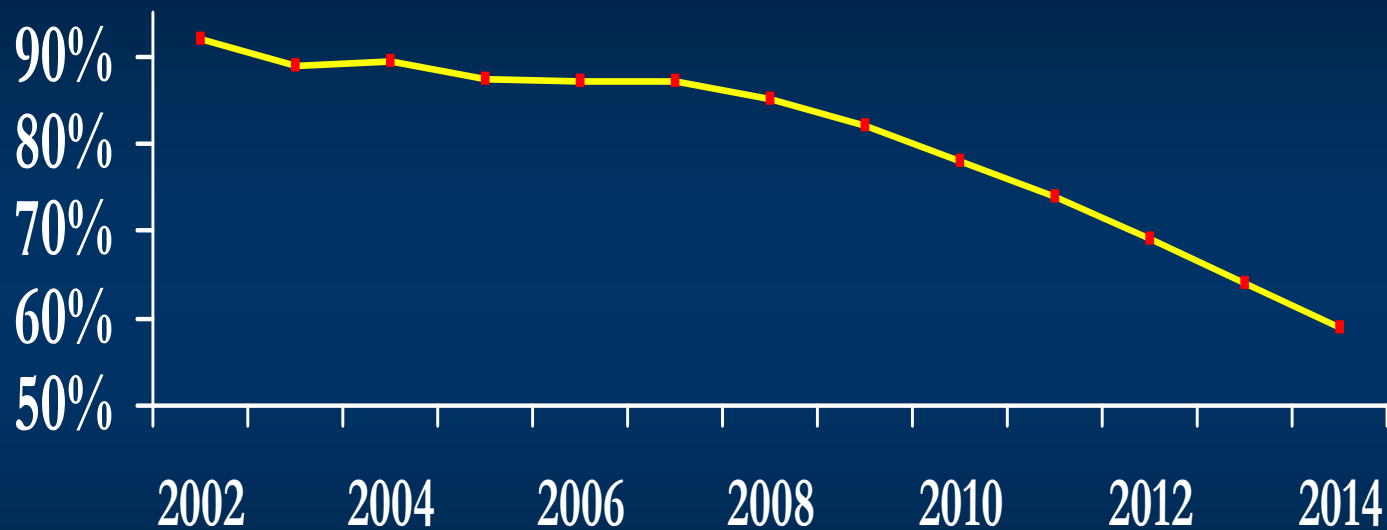


Resurfacing History in Georgia



Projected Conditions in Georgia

Percentage of State Routes with PACES Ratings > 70



Extending Pavement Life

SMA Layer

- After 20 million ESAL's at the NCAT Test Track, the Stone Mastic Asphalt (SMA) layer did not exhibited any rutting or other distresses.
- SMA is expensive relative to other mixes used by GDOT.
- SMA consists of cubical particles (3:1) with a polymer modified AC, a higher AC content and good stone on stone contact.

SMA Layer

- SMA has been used by GDOT as a surface layer when AADT > 50,000.
- SMA is also placed beneath the surface layer, the Open Graded Friction Course (OGFC), on Interstate routes.

Open Graded Friction Courses

- With repeated loading, OGFC will ravel and rut if the SMA and supporting layers are in poor condition.
- OGFC will only ravel if the SMA and supporting layers are in good condition.
- Based on NCAT Test results, GDOT decided to sacrifice the OGFC.
- This decision was supported by additional testing using the Asphalt Pavement Analyzer (APA).

Micromilling

- The milling process that sacrifices the OGFC is called "micromilling".
- An Interstate maintenance project will serve as the pilot project.
- Micro-milling will leave the high quality SMA mix in place, and micro-mill the surface over at least two maintenance cycles.

Project Cores rutted < 0.25 inches at the conclusion of the APA Test



Roller Compacted Concrete

- Roller Compacted Concrete is a relatively new addition to the Pavement Design toolbox at GDOT.
- It has been used as a shoulder on an Interstate and a major state route.
- RCC has also been used in lieu of base material, where total pavement thickness was a constraint.

RCC Shoulders along I-285



Questions?

