ALDOT's PG3 Cape Seal Project

(Scrub Seal and Micro Surfacing)

By Mark Waits
NCPP

National Center for Pavement Preservation

MICHIGAN STATE UNIVERSITY

Introduction into Pavement Preservation

ncpp
National Center for Pavement Preservation
MICHIGAN STATE UNIVERSITY

What is pavement preservation?

- The term ***"Pavement Preservation Programs and Activities"*** means programs and activities employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety, and meet road user expectations".

Source: Section 1507 of Public Law 112-141, "Moving Ahead for Progress in the 21st Century" Act (MAP-21).

What is pavement preservation?

- When the right treatment is applied to the right road at the right time, roads can be kept in good condition instead of performing costly rehabilitation and reconstruction alternatives later in the pavement's life when the structure has deteriorated.

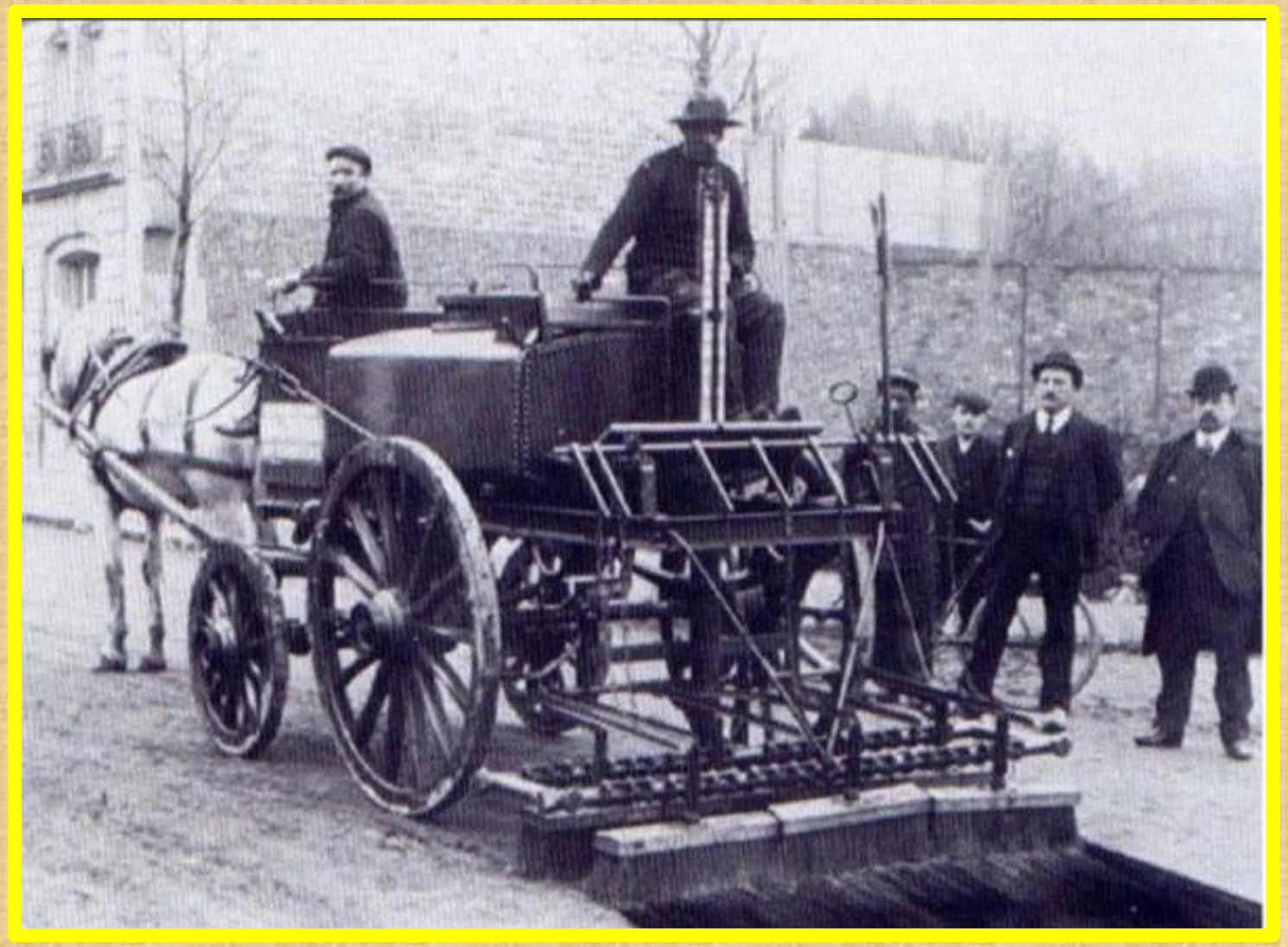
Source: National Center for Asphalt Technology (NCAT) at Auburn University.

Pavement Preservation

Pavement Preservation

Pavement Preservation

Pavement Preservation
Scrub Seal in early 1900

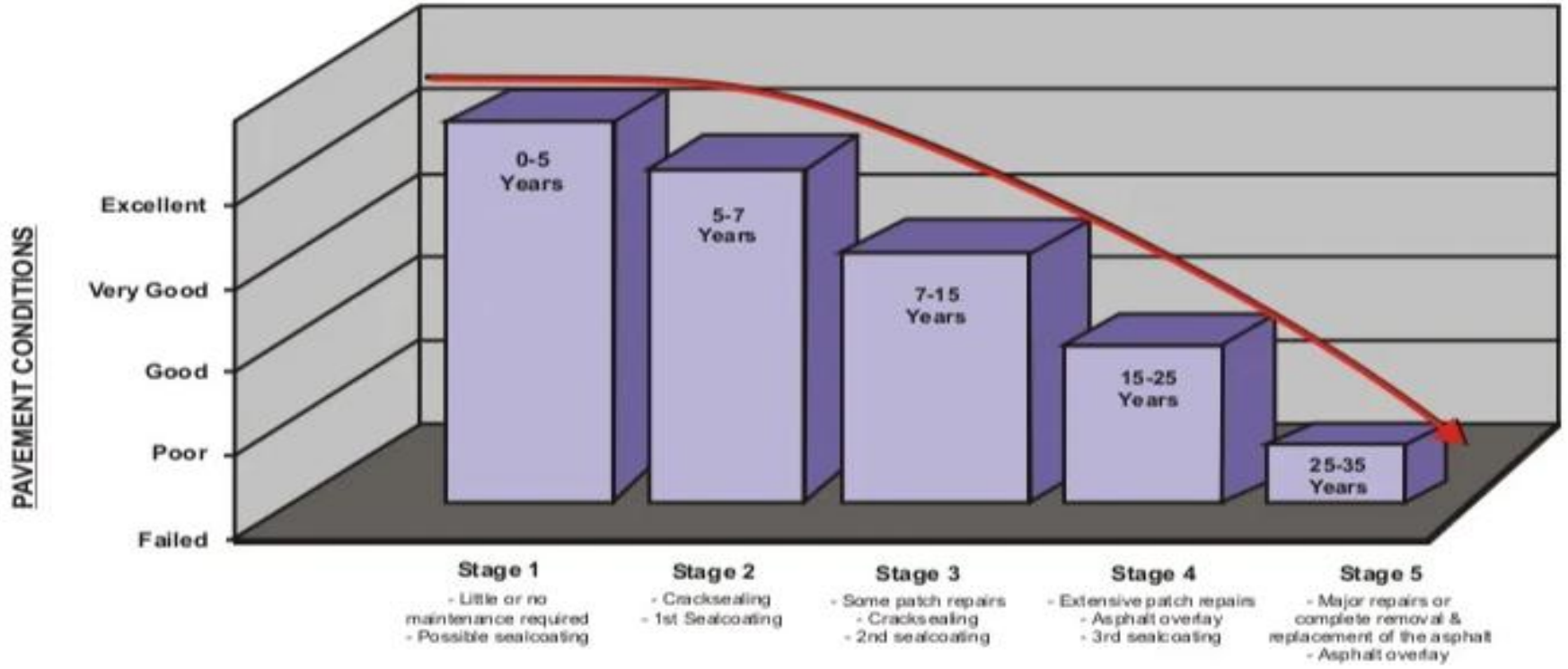


Pavement Preservation
Micro Surfacing in China

Pavement Preservation

BLACK DIAMOND
PAVING

PAVEMENT LIFE CYCLE



PAVEMENT MAINTENANCE PROCEDURE BY STAGE

www.BlackDiamondPaving.com
Ph: (510) 770-1150
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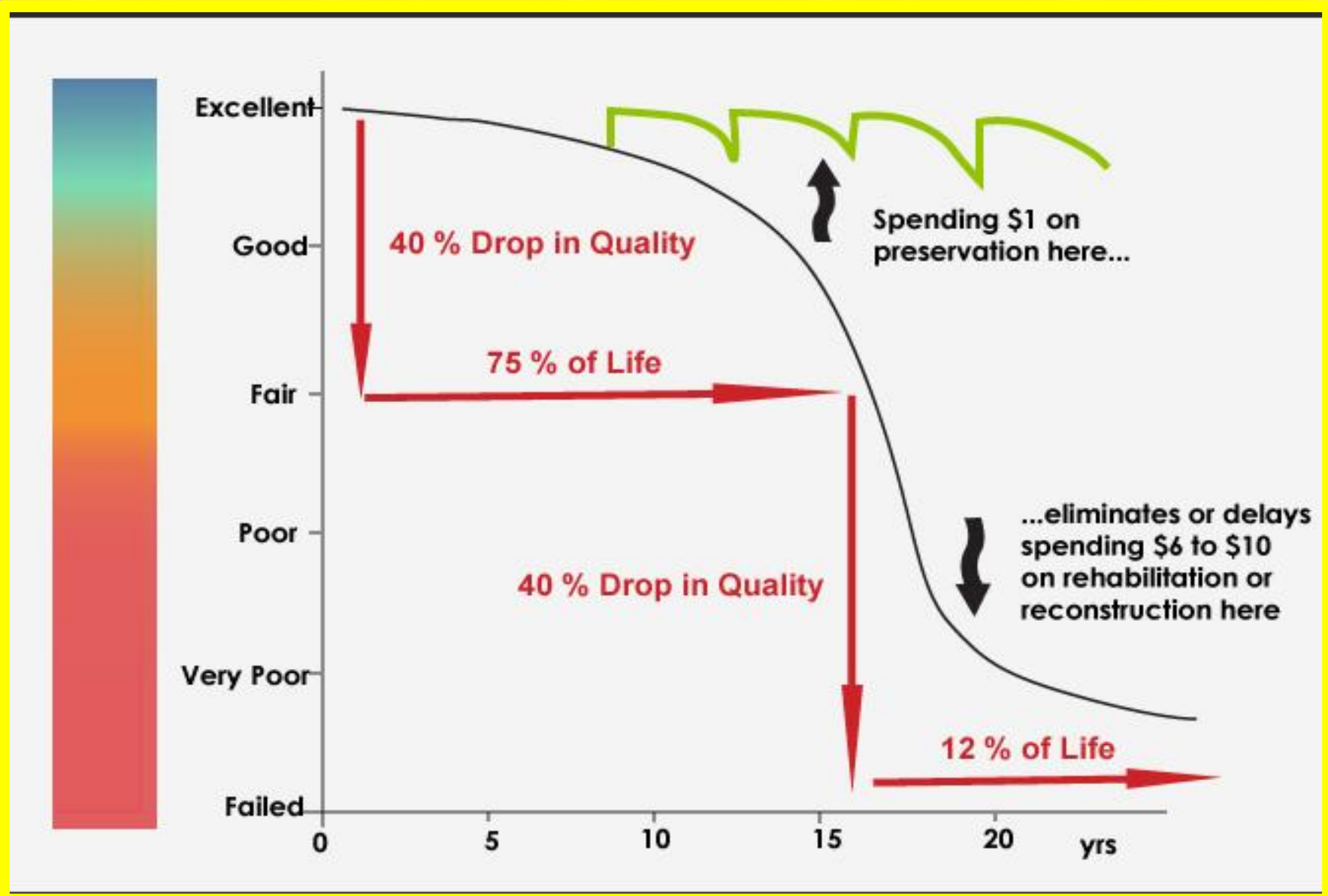
Black Diamond Paving
41550 Boscell Road
Fremont CA 94538

Pavement Preservation



Created By: Chris Sorta

BLACK DIAMOND
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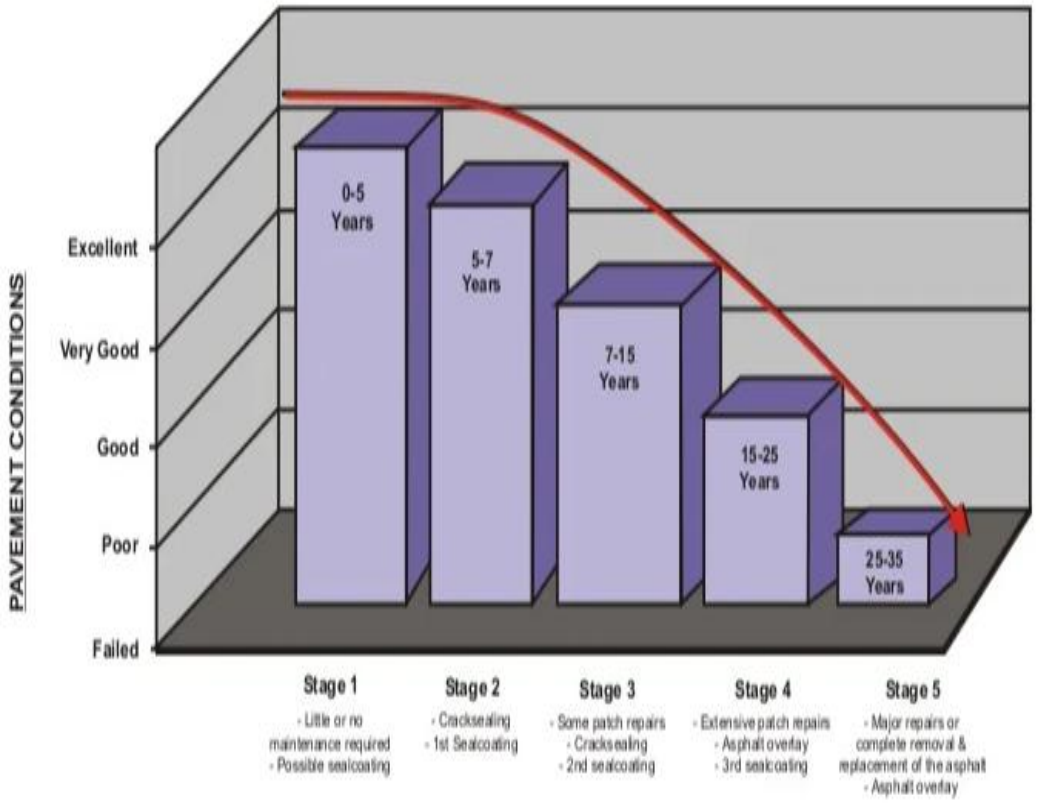
PAVEMENT LIFE CYCLE



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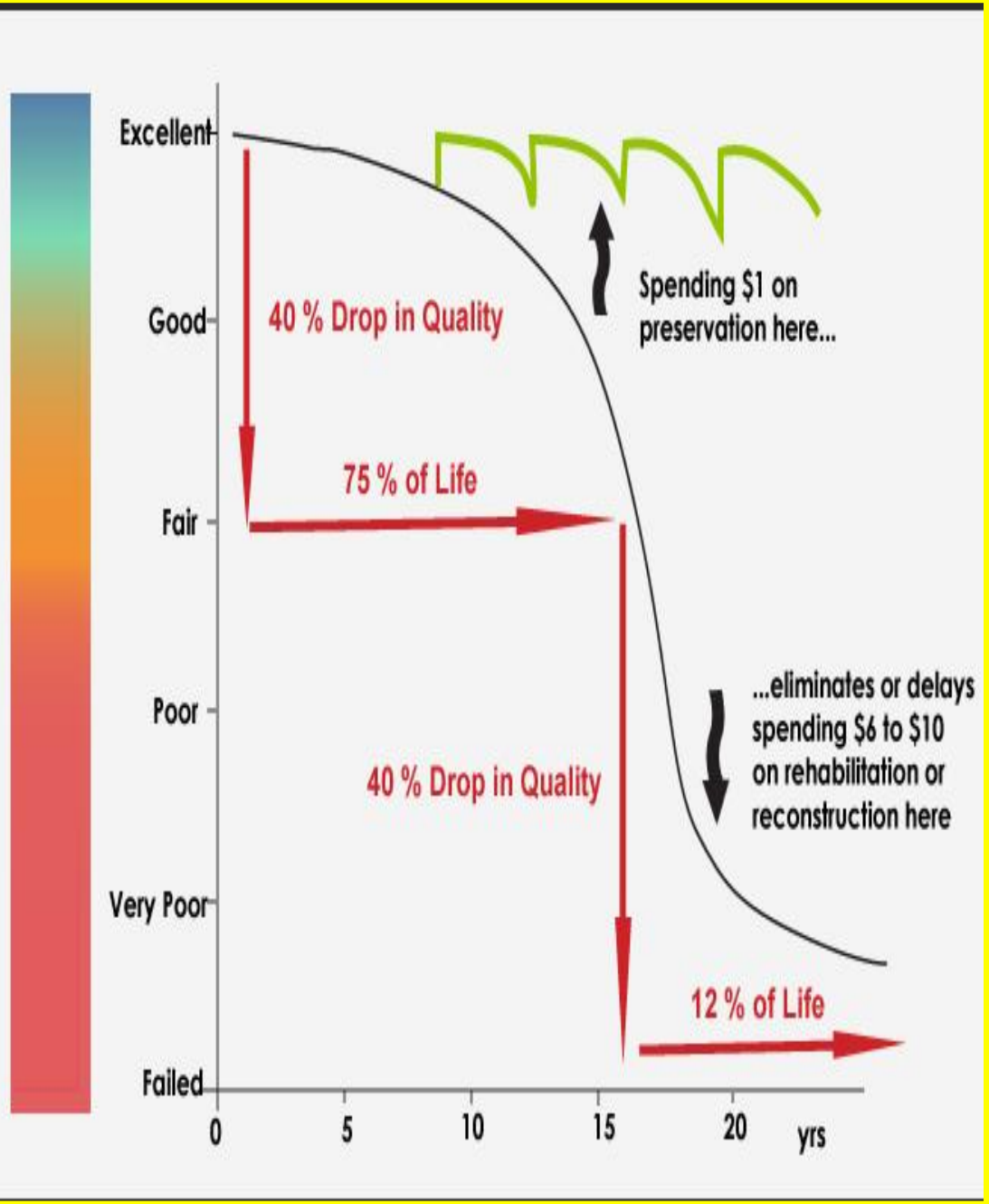

WHY PAVEMENT PRESERVATION?

WHY PRESERVATION?

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SO, ... HOW'S YOUR DAY GOING?

WHY PRESERVATION?

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WHY PAVEMENT PRESERVATION?

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Report: Alabama road conditions cost drivers $530M a year in vehicle repairs

Updated: Mar. 20, 2013, 6:05 p.m. Published: Mar. 20, 2013, 5:05 p.m.

One-quarter of Alabama's more than 97,000 miles of public roads are in poor or mediocre condition, according to the American Society of Civil Engineers. This file photo shows the Alabama Department of Transportation's rehabilitation of Interstate 20/59 near Bessemer in 2012.

By Mike D. Smith | msmith@al.com

BIRMINGHAM, Alabama - One-quarter of the state's public roads are in "poor" or "mediocre" shape, and driving them costs Alabamians more than $500 million per year in vehicle repairs, a nationwide civil engineering study concluded.

The same study also gives Alabama high marks for working to reduce traffic fatalities and serious injuries on its highways.

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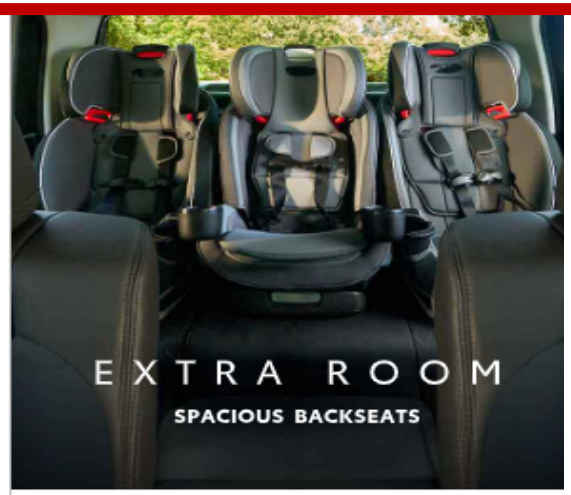

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WHY PAVEMENT PRESERVATION?

The figures come from the American Society of Civil Engineers, which this week released its

2013 Report Card for America's Infrastructure

.

Every four years, the group grades conditions of the country's roads, bridges, drinking water systems, mass transit, schools and energy networks.

For Alabama, the report stated the following issues:

Alabama's gas tax of 20.9 percent has not been increased in 20 years

- Of the state's 16,070 bridges, 1,448, or 9 percent, are "structurally deficient"
- 2,205 of the state's bridges, or 13.7 percent, are "functionally obsolete"

WHY PAVEMENT PRESERVATION?

- *In 2015-2016, I transferred into the Maintenance Bureau over Roadways.*
- *The Director was not a "Happy Camper" about Alabama's national perception.*
- *Alabama PCR's (both IM and FM) were below acceptable levels.*
- *Alabama had some significant IM roadway issues it must address soon.*

WHY PAVEMENT PRESERVATION?

Alabama has Two Funding Sources for Roadway Surface Maintenance

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Alabama has Two Funding Sources for Roadway Surface Maintenance

- ***Federal Aid Maintenance*** **(FM)**
  - **Non- Interstate State maintained roadways**

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- ***Federal Aid Maintenance*** **(FM)**
  - **Non- Interstate State maintained roadways**
- ***Interstate Maintenance*** **(IM)**

WHY PAVEMENT PRESERVATION?

Interstate Maintenance (IM)

WHY PAVEMENT PRESERVATION?

Interstate Maintenance (IM)

Alabama's Interstate has approximately 1003 centerline miles or approximately *4,700 Lane Miles (IM)*

WHY PAVEMENT PRESERVATION?

- **Approximately 4,700 *Interstate Lane Miles***

FY2014 IM *Lane Mile Cost* was *$357k*

WHY PAVEMENT PRESERVATION?

Federal Aid Maintenance (FM)

Non- Interstate State maintained roadways

WHY PAVEMENT PRESERVATION?

Alabama has approximately *24,545* *Non-Interstate Lane Miles (FM)*

WHY PAVEMENT PRESERVATION?

- **Approximately 24,545 *Non-Interstate Lane Miles***

FY2014 FM *Lane Mile Cost* was

$146k

WHY PAVEMENT PRESERVATION?

- **Approximately 24,545 *Non-Interstate Lane Miles***
- **FY2014 *Lane Mile Cost* was *$146,159.73***

In 2014, Alabama was continued to be level funded at *$244* million for FM resurfacing

WHY PAVEMENT PRESERVATION?

- **Approximately 24,545 *Non-Interstate Lane Miles***
- **FY2014 *Lane Mile Cost* was *$146,159.73***
- **Alabama had been level funded at $244 million for resurfacing**

How much would it cost to repave the whole FM system in one year?

($146k x 24.6k lane miles)

WHY PAVEMENT PRESERVATION?

- **Approximately 24,545 *Non-Interstate Lane Miles***
- **FY2014 *Lane Mile Cost* was *$146,159.73***
- **Alabama had been level funded at $244 million for resurfacing**

Approximately

$3.6 Billion

($146k x 24.6k lane miles)

WHY PAVEMENT PRESERVATION?

- **Approximately 24,545 *Non-Interstate Lane Miles***
- **FY2014 *Lane Mile Cost* was *$146,159.73***
- **Alabama had been level funded at $244 million for resurfacing**
- **Approx. $3.6 Billion to resurface all lane miles in one FY ($146k x 24.6k lane miles)**

It would take approximately 15 years of level funding at $244 million to make one FM resurfacing "cycle".

WHY PAVEMENT PRESERVATION?

- **Approximately 24,545 *Non-Interstate Lane Miles***
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- **Alabama had been level funded at $244 million for resurfacing**
- **Approx. $3.6 Billion to resurface all lane miles in one FY ($146k x 24.6k lane miles)**
- **Approximately *15 years* of level funding at $244 million to make one "cycle".**

What is the HMA Pavement design life ???????

WHY PAVEMENT PRESERVATION?

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- **FY2014 *Lane Mile Cost* was *$146,159.73***
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15 years???????

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WHY PAVEMENT PRESERVATION?

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- ***FY2014 IM Lane Mile Cost was $357k***

IM funding averaged $90 million

WHY PAVEMENT PRESERVATION?

- **Approximately 4,700 *Interstate Lane Miles***
- ***FY2014 IM Lane Mile Cost was $357k***
- ***IM funding averaged $90 million***

Approx. $1.7 Billion to resurface all IM lane miles in one FY ($357k x 4.7k lane miles)

WHY PAVEMENT PRESERVATION?

- **Approximately 4,700 *Interstate Lane Miles***
- ***FY2014 IM Lane Mile Cost was $357k***
- ***IM funding averaged $90 million***
- ***Approx. $1.7 Billion to resurface all IM lane miles in one FY ($357k x 4.7k lane miles)***

Approximately 19 years of level funding at $90 million to make one IM resurfacing "cycle".

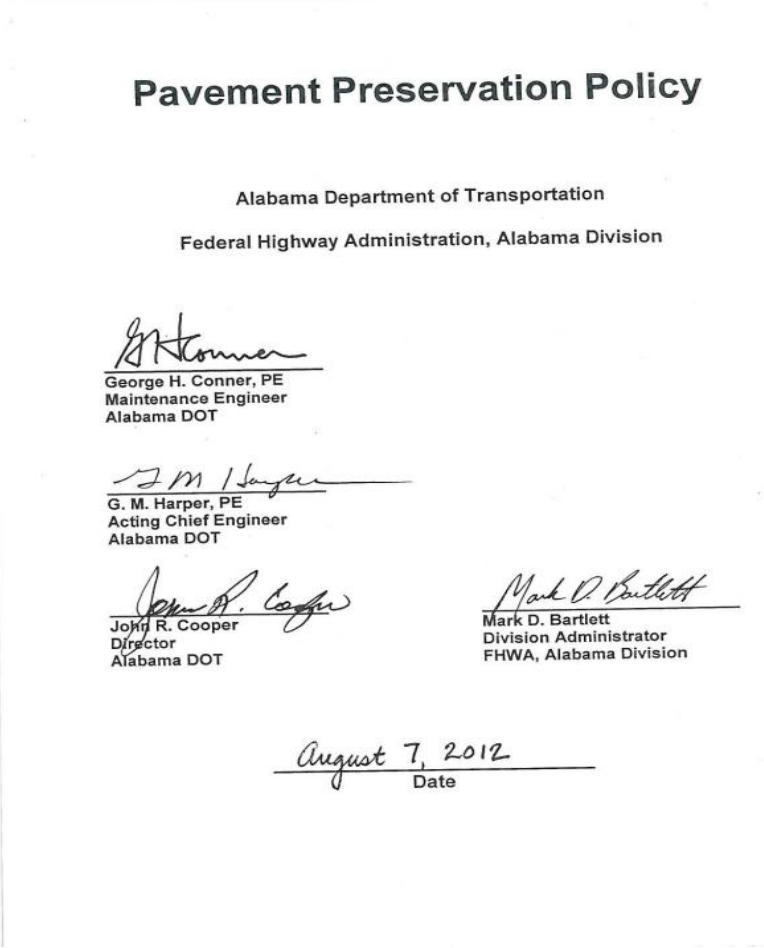
WHY PAVEMENT PRESERVATION?

- **Approximately 4,700 *Interstate Lane Miles***
- ***FY2014 IM Lane Mile Cost was $357k***
- ***IM funding averaged $90 million***
- ***Approx. $1.7 Billion to resurface all IM lane miles in one FY ($357k x 4.7k lane miles)***

Started getting more IM funding, slowly increased up to $180 million

WHY PAVEMENT PRESERVATION?

- *ALDOT had an existing 2012 PPP that allowed exemptions to some design standards when incorporating certain PP categories.*
- *It did not address concrete paving!*



Pavement Preservation Policy

Alabama Department of Transportation

Federal Highway Administration, Alabama Division

George H. Conner, PE
Maintenance Engineer
Alabama DOT

G. M. Harper, PE
Acting Chief Engineer
Alabama DOT

John R. Cooper
Director
Alabama DOT

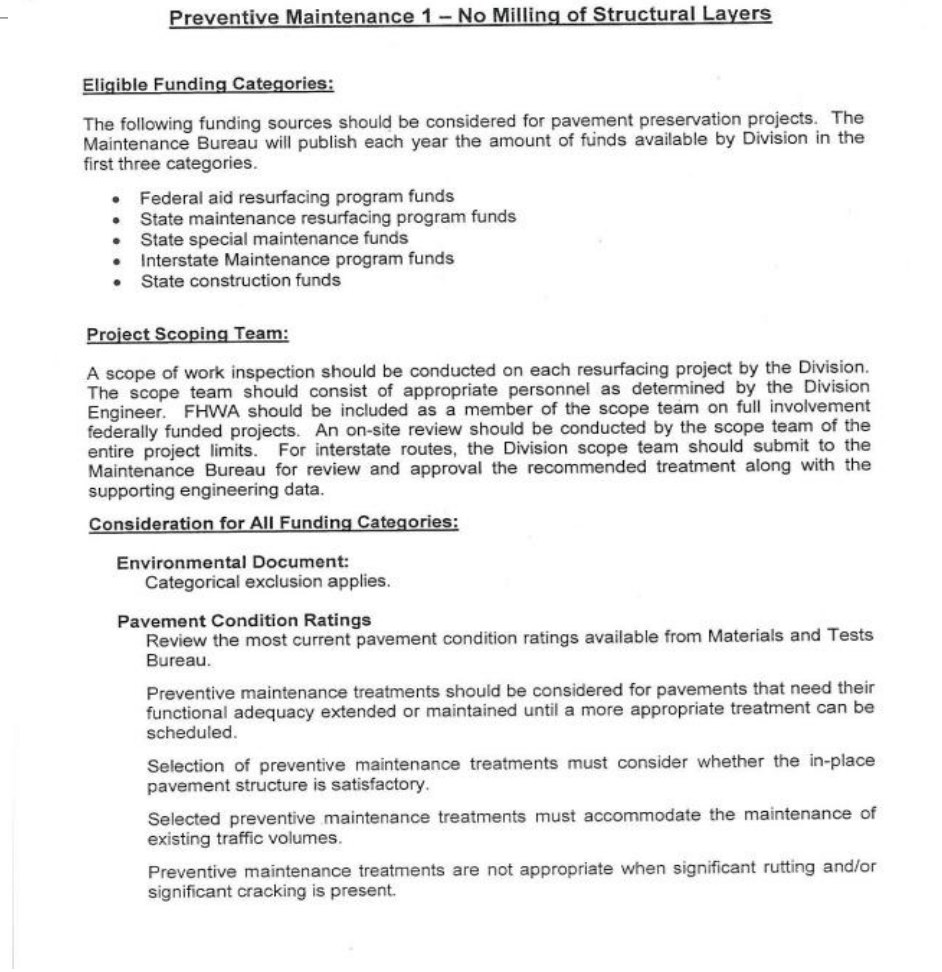
Mark D. Bartlett
Division Administrator
FHWA, Alabama Division

August 7, 2012
Date

WHY PAVEMENT PRESERVATION?

The PPP established a Preventative Maintenance Category *PM1*.

Basically, allowed up to 1" overlay and milling 50% of existing *safety* layer.



Preventive Maintenance 1 – No Milling of Structural Layers

Eligible Funding Categories:

The following funding sources should be considered for pavement preservation projects. The Maintenance Bureau will publish each year the amount of funds available by Division in the first three categories.

- Federal aid resurfacing program funds
- State maintenance resurfacing program funds
- State special maintenance funds
- Interstate Maintenance program funds
- State construction funds

Project Scoping Team:

A scope of work inspection should be conducted on each resurfacing project by the Division. The scope team should consist of appropriate personnel as determined by the Division Engineer. FHWA should be included as a member of the scope team on full involvement federally funded projects. An on-site review should be conducted by the scope team of the entire project limits. For interstate routes, the Division scope team should submit to the Maintenance Bureau for review and approval the recommended treatment along with the supporting engineering data.

Consideration for All Funding Categories:

Environmental Document:
Categorical exclusion applies.

Pavement Condition Ratings
Review the most current pavement condition ratings available from Materials and Tests Bureau.

Preventive maintenance treatments should be considered for pavements that need their functional adequacy extended or maintained until a more appropriate treatment can be scheduled.

Selection of preventive maintenance treatments must consider whether the in-place pavement structure is satisfactory.

Selected preventive maintenance treatments must accommodate the maintenance of existing traffic volumes.

Preventive maintenance treatments are not appropriate when significant rutting and/or significant cracking is present.

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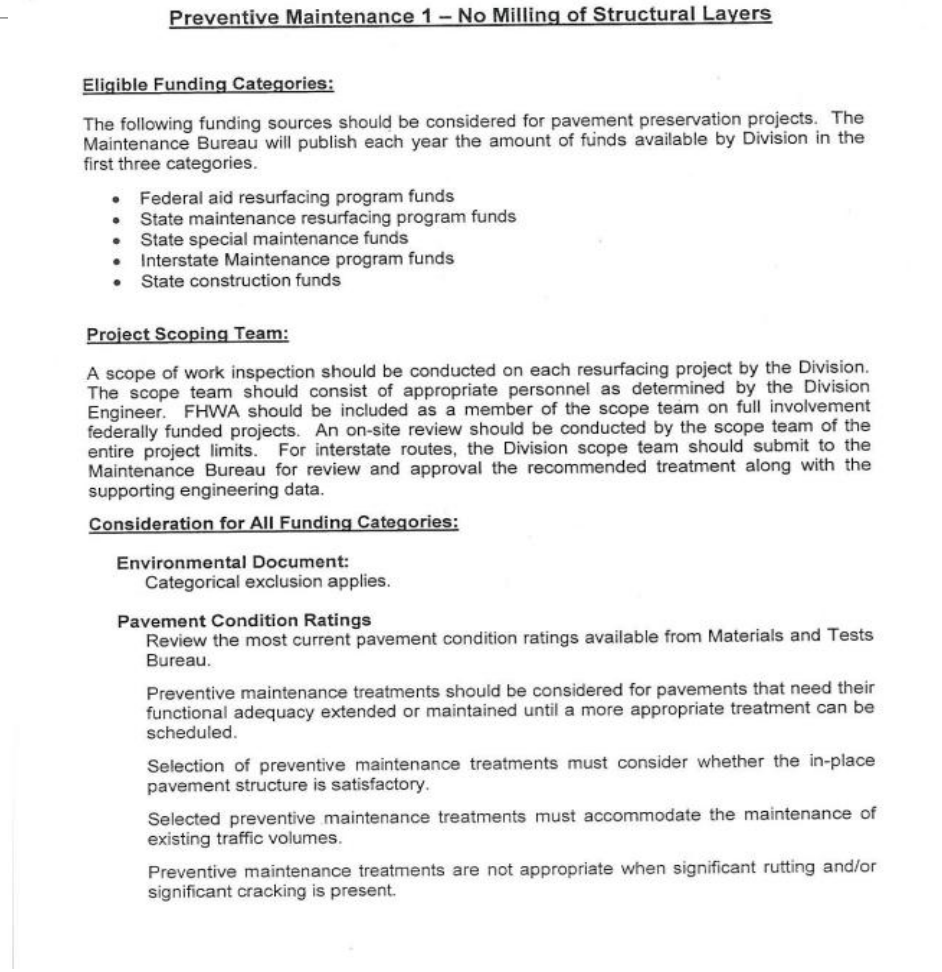

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WHY PAVEMENT PRESERVATION?

It also established a Preventative Maintenance Category *PM2*.

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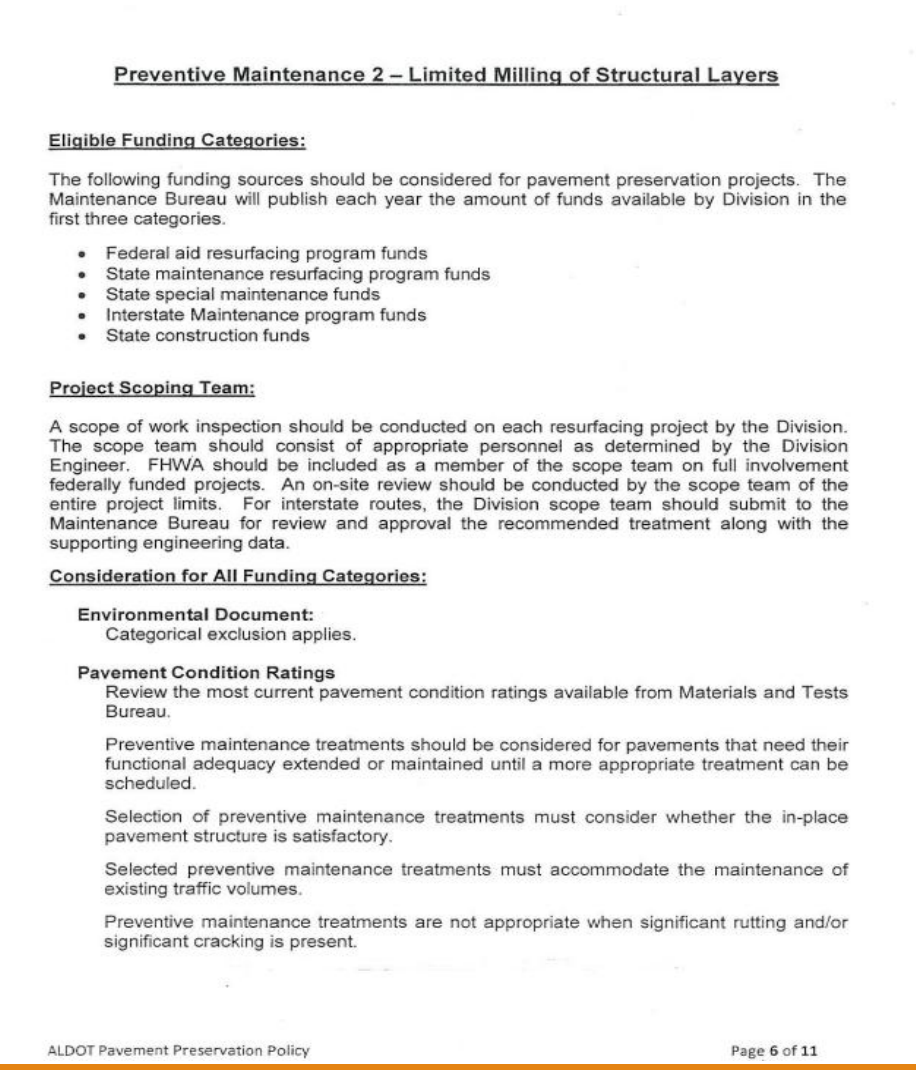

Preventive Maintenance 2 – Limited Milling of Structural Layers

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ALDOT Pavement Preservation Policy Page 6 of 11

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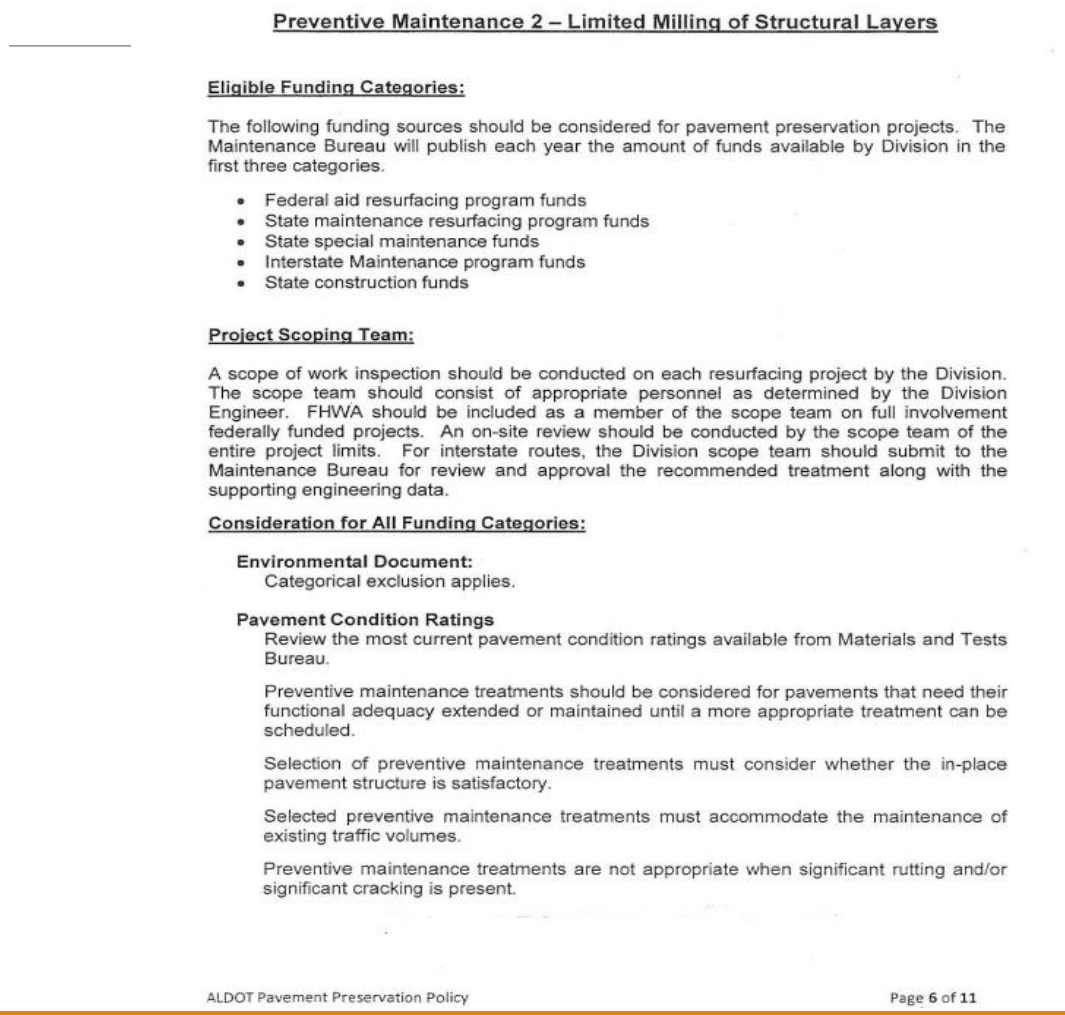

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IM and FM Project Development

Trends - IM & FM Preservation Projects (PM 1, PM 2, MR) since 2014

FY	Total IM	IM PM1 %	IM PM2 %	IM MR %	Total FM	FM PM1 %	FM PM 2 %	FM MR %
2014	12	0/0%	2/17%	10/83%	124	3/2%	29/23%	92/75%
2015	16	3/18%	3/18%	10/64%	109	0/0%	52/48%	57/52%
2016	12	6/50%	2/17%	4/33%	114	1/1%	53/46%	60/53%
2017	18	8/44%	0/0%	10/56%	127	6/5%	64/50%	57/45%
2018	20	6/30%	8/40%	6/30%	110	7/6%	50/46%	53/48%
Total	78	23/30%	15/19%	40/51%	584	17/3%	248/42%	319/55%

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2017	18	8/44%	0/0%	10/56%
2018	20	6/30%	8/40%	6/30%
Total	78	23/30%	15/19%	40/51%

IM and FM Project Development

Trends - FM Preservation Projects (PM 1, PM 2, MR) since 2014

FY	Total FM	FM PM1 %	FM PM 2 %	FM MR %
2014	124	3/2%	29/23%	92/75%
2015	109	0/0%	52/48%	57/52%
2016	114	1/1%	53/46%	60/53%
2017	127	6/5%	64/50%	57/45%
2018	110	7/6%	50/46%	53/48%
Total	584	17/3%	248/42%	319/55%

IM and FM Project Development

Trends - What does this mean?

FY	IM PM1/PM2/MR	IM Lane Mile Cost	FM PM1/PM2/MR	FM Lane Mile Cost	Total Lane Mile Cost
2014	0/2/10= 12	$357K	3/29/92	$150K	$212K
2015	3/3/10= 16	$313K	0/52/57	160	$196K
2016	6/2/4= 12	$257	1/53/60	$150K	$172K
2017	8/0/10= 18	$257	6/64/57	$142K	$175K
2018	6/8/6= 20	Not to Let	7/50/53	Not to Let	Not to Let

IM and FM Project Development

Trends - Can I make a plan for Pavement (asset) Management?

FY	IM PM1/PM2/MR	IM Lane Mile Cost	FM PM1/PM2/MR	FM Lane Mile Cost	Total Lane Mile Cost
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IM and FM Project Development

Trends - Can I make a plan for Pavement (asset) Management?

YES! Using Lane Mile Cost, Current PCR, curve of pavement decline, and projected budget

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IM and FM Project Development

- **Asset Management plan - IM**
  - Using Lane Mile Cost, PCR, Pavement Deterioration Curve, etc.

FY	PCR	Budget	PM 1	PM 2	MR	Actual IM Budget
2018	**82.6**	$179M	$23.5M (13%)	$58.6M (33%)	$98.9M (54%)	**$192M** ($179M for pavement/ $13M for other)
2019	86.5	$132M	$20M (15%)	$95M (72%)	$17M (13%)	**$174M** ($132M flexible/$30M Conc/$12M other)
2020	87.9	$110M	$40M (36%)	$70M (64%)	$0 (0%)	**$176M** ($78M flexible/$120M Conc)
2021	88.3	$130M	$124M (95%)	$6M (5%)	$0 (0%)	
2022	91.1	$131M	$125M (96%)	$6M (4%)	$0 (0%)	
2023	**92.9**	$137M	$132M (96%)	$5M (4%)	$0 (0%)	

IM and FM Project Development

- **Asset Management plan - IM**
  - **PCR Improves from 82 to 93 in a 5 year plan**

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2022	91.1	$131M	$125M (96%)	$6M (4%)	$0 (0%)	
2023	**92.9**	$137M	$132M (96%)	$5M (4%)	$0 (0%)	

FY 2019 – FY 2022 Overview
Amount spent on IM preservation projects

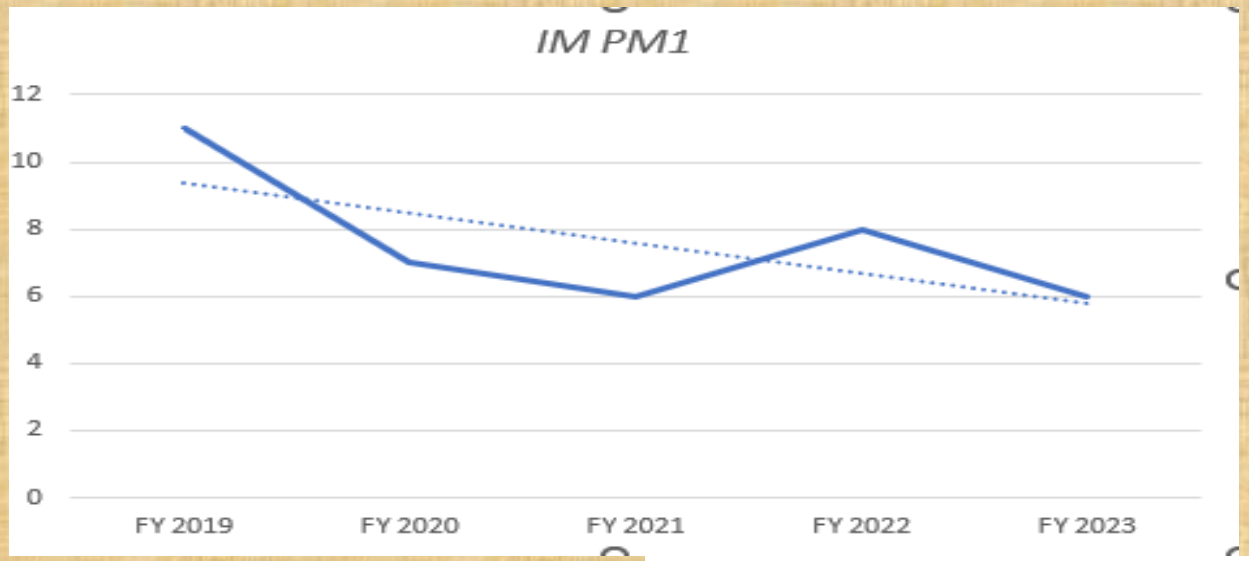
IM Resurfacing FY 2019 - FY2022				
	PM 1	PM 2	MR	total
FY 2019	11	4	6	21
Amount Spent	$40.60	$46.10	$92	$178.70
FY 2020	7	6	6	20
Amount Spent	$41.20	$41.90	$67.40	$150.50
FY 2021	6	5	3	14
Amount Spent	$26.50	$54.60	$42.30	$123.40
FY 2022	8	8	2	18
Amount Spent	$32.10	$56.90	$46.10	$135.10
Total:	32	23	17	$587.70

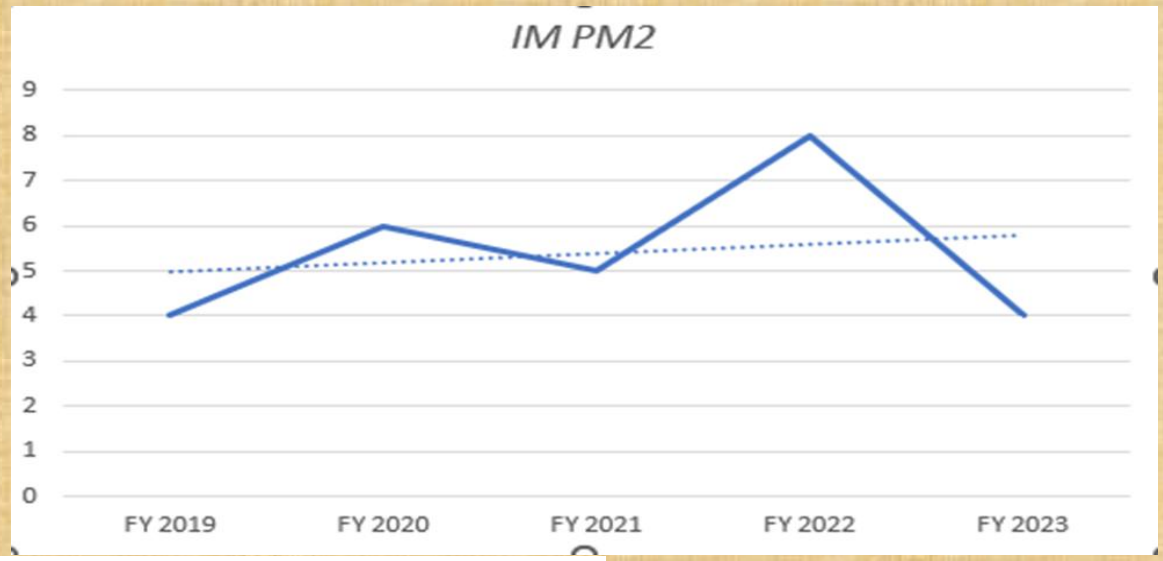
FY 2019 – FY 2022 Overview
Amount spent on IM preservation projects

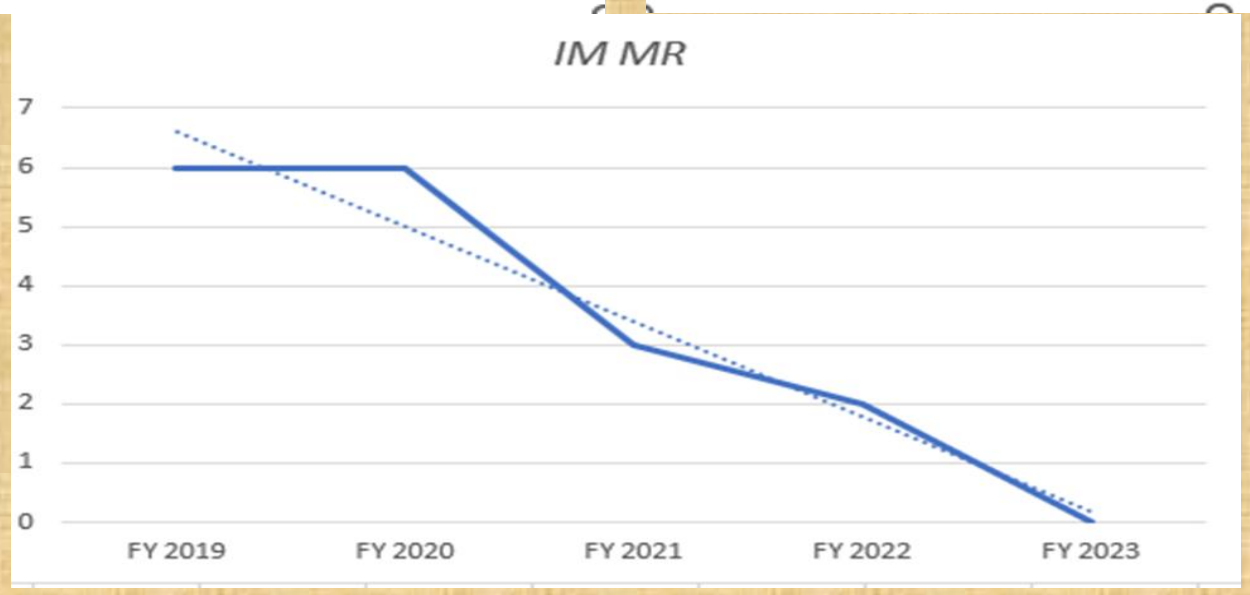
- **24%** of the $587.7m used for IM Pavement management, from 2019-2022, was spent on **PM1**

IM Resurfacing FY 2019 - FY2022				
	PM 1	PM 2	MR	total
FY 2019	11	4	6	21
Amount Spent	$40.60	$46.10	$92	$178.70
FY 2020	7	6	6	20
Amount Spent	$41.20	$41.90	$67.40	$150.50
FY 2021	6	5	3	14
Amount Spent	$26.50	$54.60	$42.30	$123.40
FY 2022	8	8	2	18
Amount Spent	$32.10	$56.90	$46.10	$135.10
Total:	32	23	17	$587.70

FY 2019 – FY 2022 Overview
Amount spent on IM preservation projects







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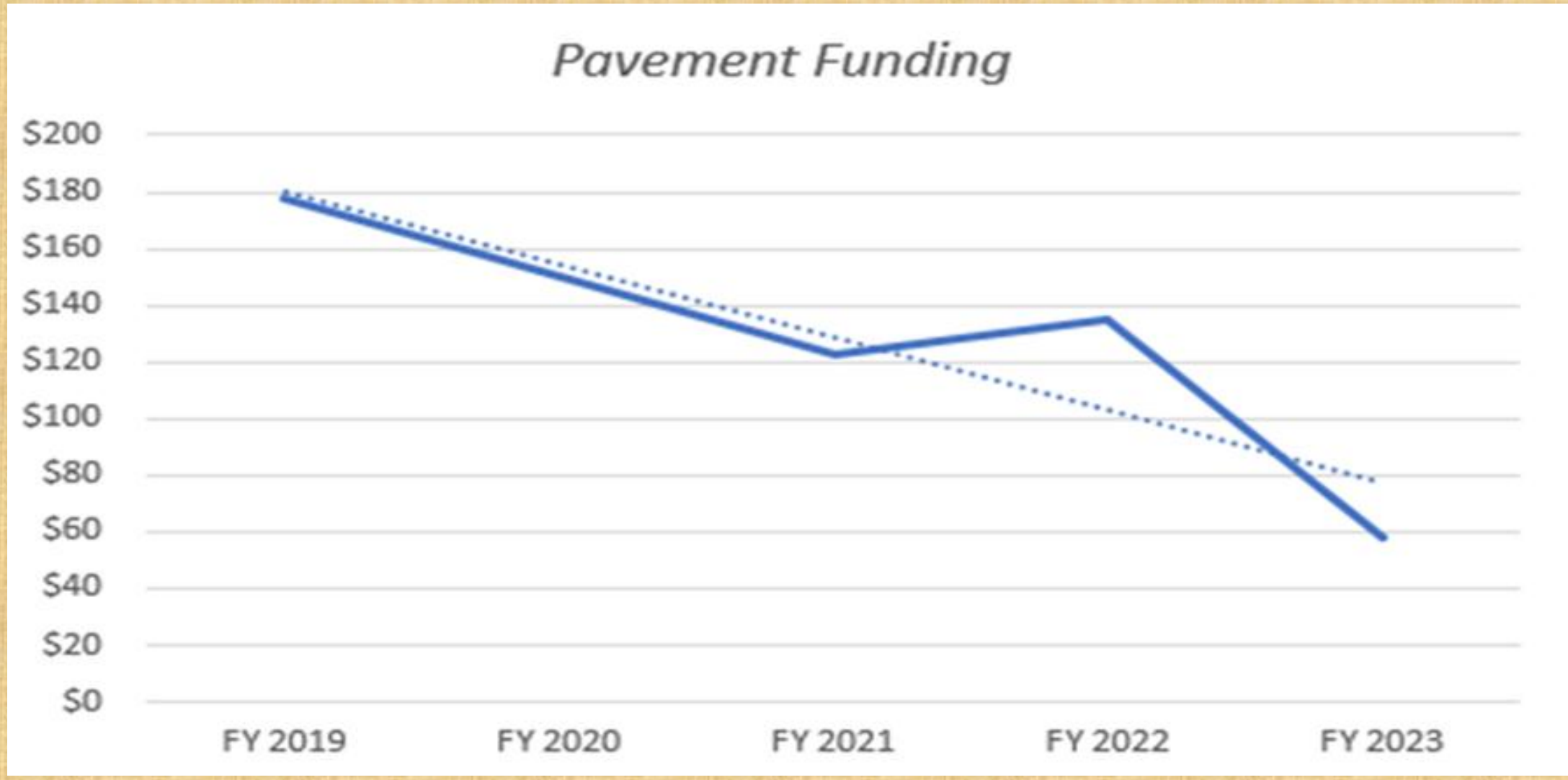


IM and FM Project Development

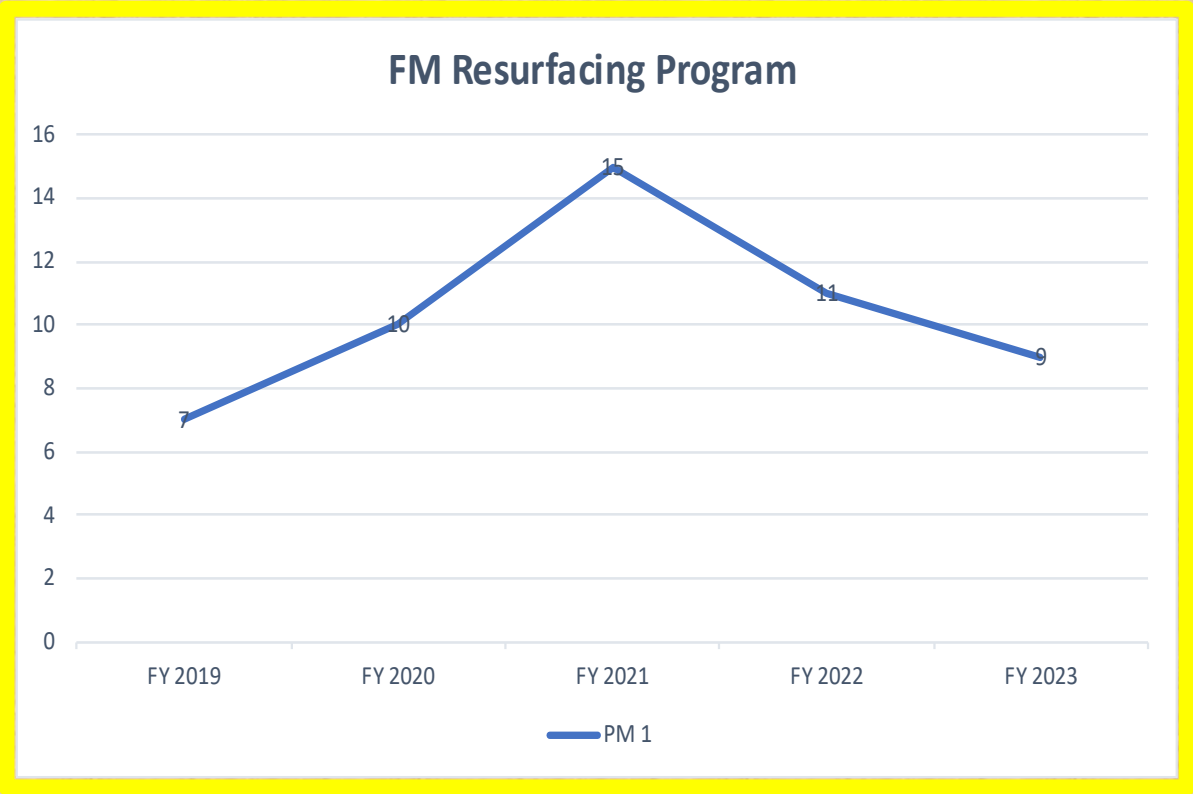
Trends - FM Preservation Projects (PM 1, PM 2, MR) since 2014

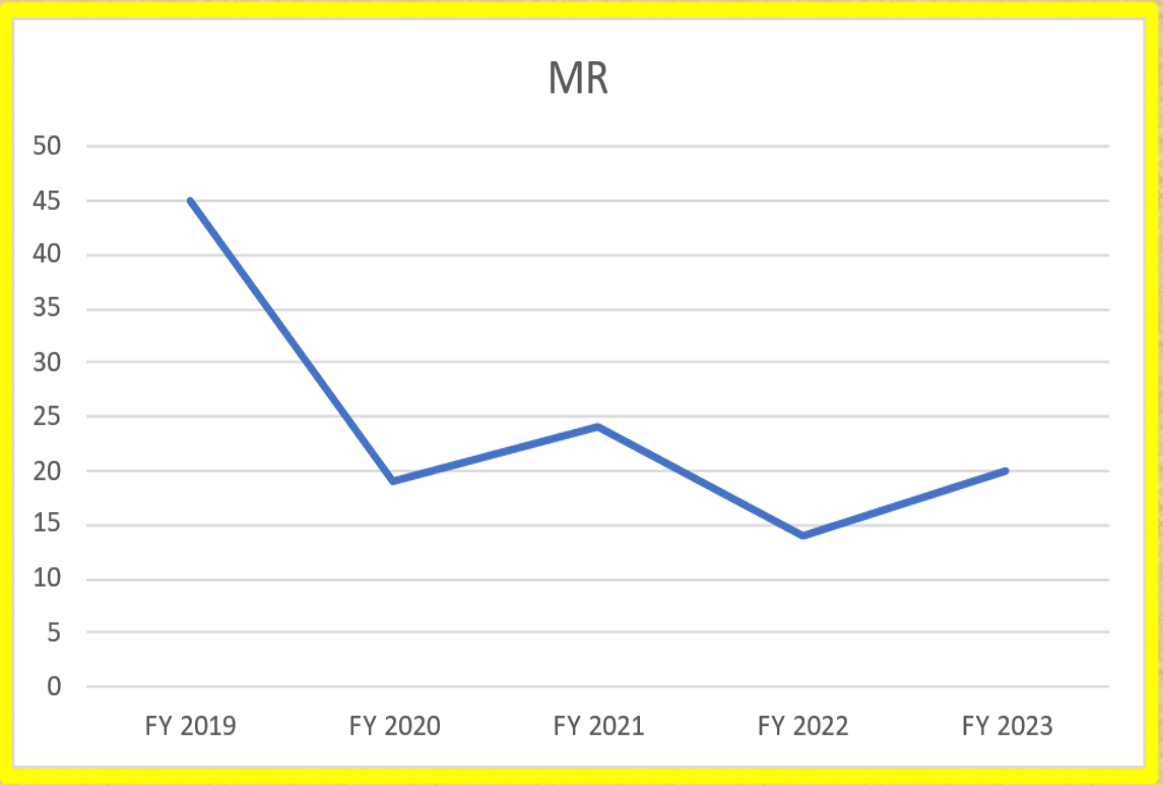
FY	Total FM	FM PM1 %	FM PM 2 %	FM MR %
2014	124	3/2%	29/23%	92/75%
2015	109	0/0%	52/48%	57/52%
2016	114	1/1%	53/46%	60/53%
2017	127	6/5%	64/50%	57/45%
2018	110	7/6%	50/46%	53/48%
Total	584	17/3%	248/42%	319/55%

Impact of 2017 PP Training

FM Resurfacing Program			
	PM 1	PM 2	MR
FY 2019	7	55	45
FY 2020	10	76	19
FY 2021	15	70	24
FY 2022	11	72	14
FY 2023	9	63	20

- Impact of 2017 PP Training
- *Time for training again?*



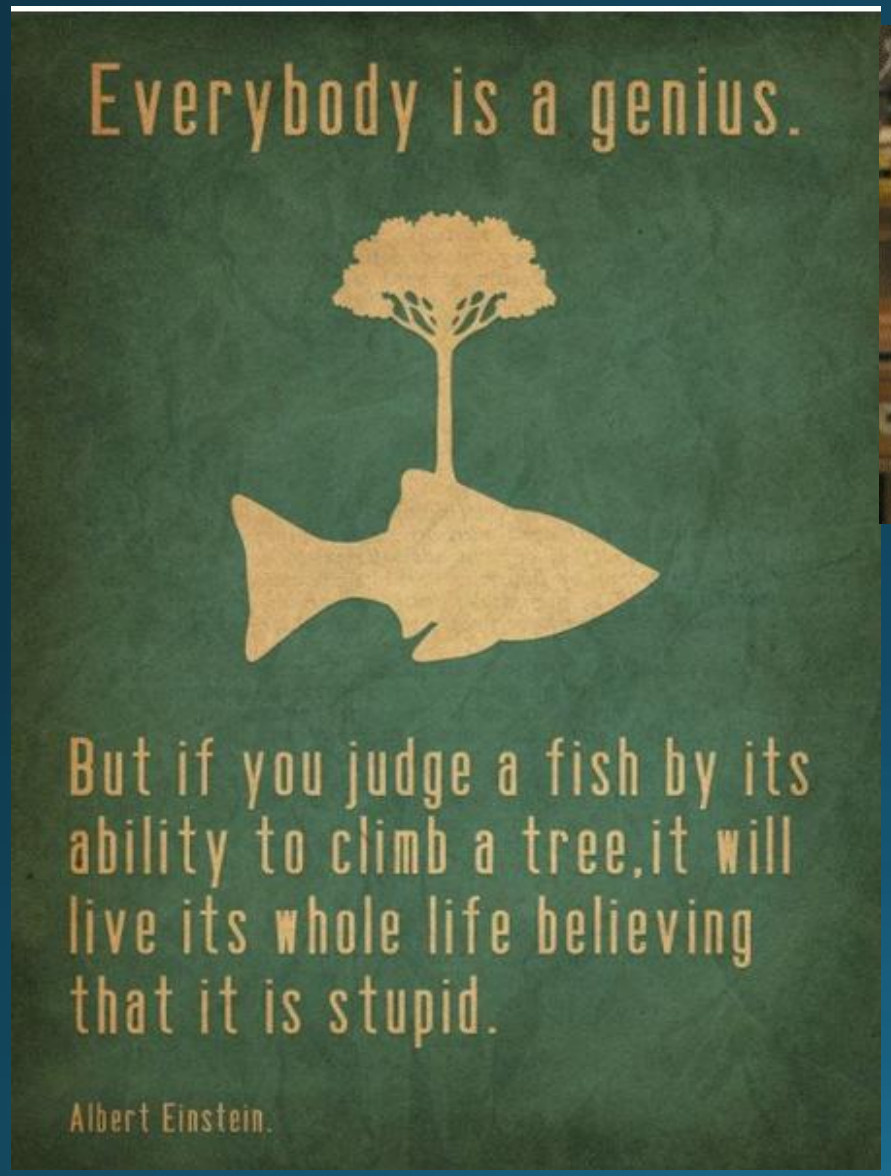


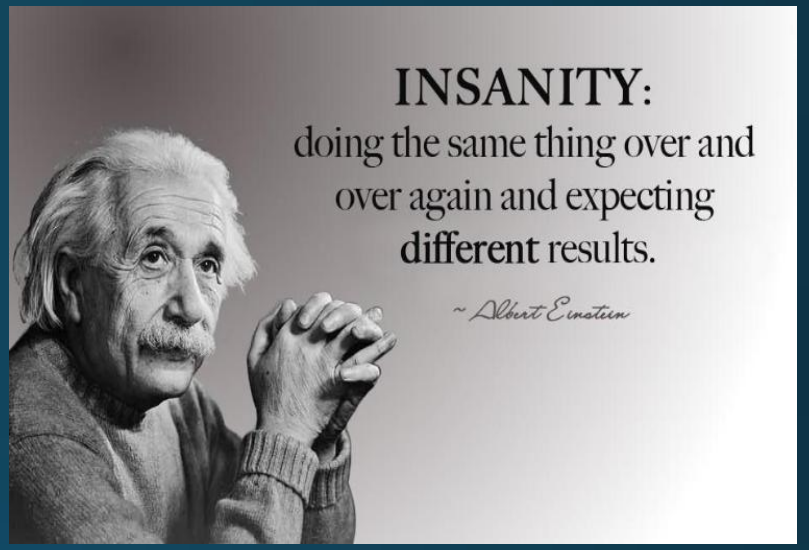
FY 2024 FM submittal

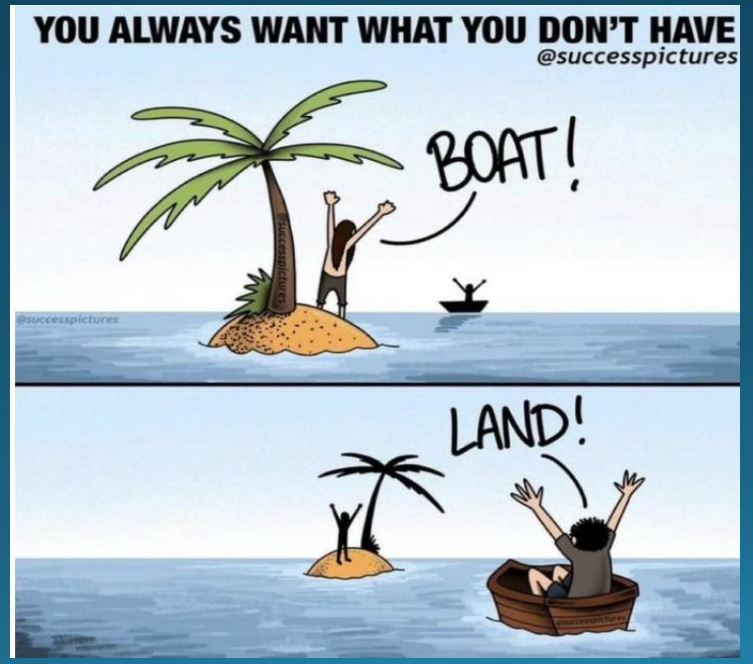
FY 2024 FM Program				
Type	Number	Est. Total	% of program	% of Budget
PM1	19	$29.2m	18%	11%
PM2	77	$168m	72%	67%
PMR	12	$54m	11%	22%
Total	108	$251m	100%	93%

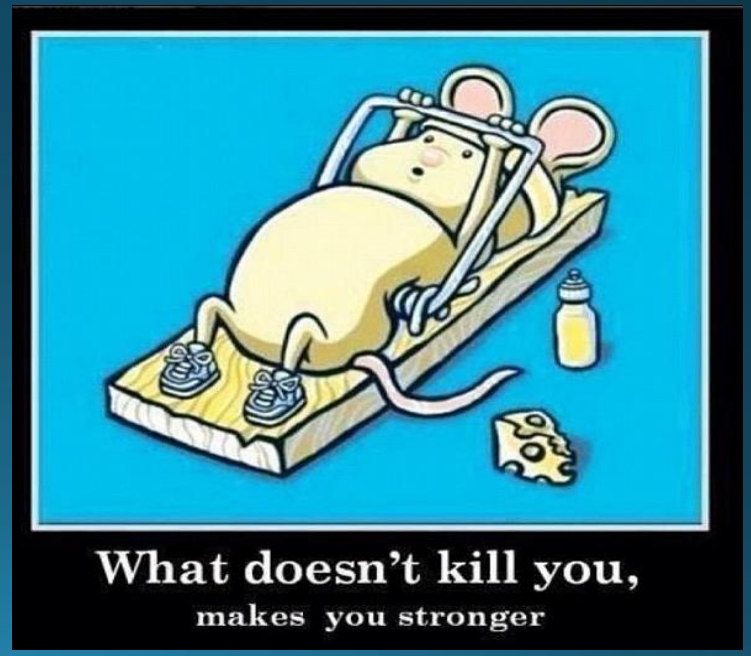
Alabama DOT Fills Ruts, Saves $2.3 Million With Micro Surfacing

Food For Thought









We Must be doing something right?

Nov 7, 2023, AL.COM article

https://www.al.com/news/2023/11/alabama-has-the-third-best-roads-in-the-us-survey-says.html

Alabama has the 3rd best roads in the US, survey says

Updated: Nov. 07, 2023, 11:26 a.m. | Published: Nov. 07, 2023, 11:22 a.m.

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By William Thornton | wthornton@al.com

Alabama has the third best road system in the United States, according to a new analysis by Insider Monkey, a financial services website.

The survey compiled a list of 15 states with the best roads, with four of the top five in the South.

Leading the way was Georgia, followed by Florida, then Alabama. North Carolina placed fourth, followed by Nevada.

According to the analysis, Alabama's urban pavement has a roughness of 5%, while its rural roughness is 1%.

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According to the analysis, the state has undertaken 140 road improvements since 2020.

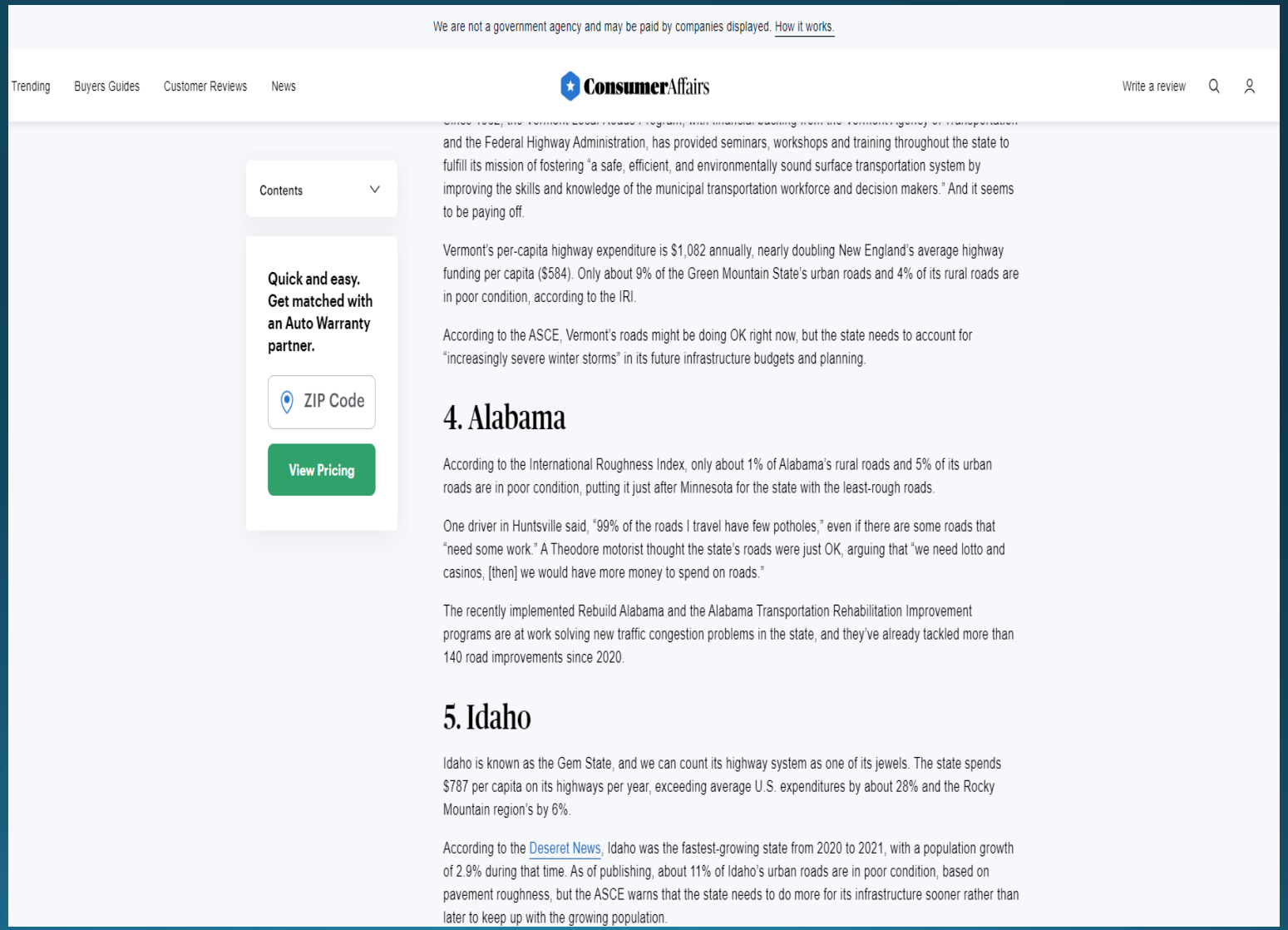
To rank the states, the site looked at 2020 highway statistics from the Federal Highway Association dealing with road quality, according to the International Roughness Index, which is calculated using several data points.

The analysis studied both rural and urban roads, with priority to rural pavement roughness, as urban roads are generally in better condition and crashes on rural roads also tend to be severe.

We Must be doing something right?

March 20, 2023, Consumer Affairs article

https://www.al.com/news/2023/11/alabama-has-the-third-best-roads-in-the-us-survey-says.html



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and the Federal Highway Administration, has provided seminars, workshops and training throughout the state to fulfill its mission of fostering "a safe, efficient, and environmentally sound surface transportation system by improving the skills and knowledge of the municipal transportation workforce and decision makers." And it seems to be paying off.

Vermont's per-capita highway expenditure is $1,082 annually, nearly doubling New England's average highway funding per capita ($584). Only about 9% of the Green Mountain State's urban roads and 4% of its rural roads are in poor condition, according to the IRI.

According to the ASCE, Vermont's roads might be doing OK right now, but the state needs to account for "increasingly severe winter storms" in its future infrastructure budgets and planning.

4. Alabama

According to the International Roughness Index, only about 1% of Alabama's rural roads and 5% of its urban roads are in poor condition, putting it just after Minnesota for the state with the least-rough roads.

One driver in Huntsville said, "99% of the roads I travel have few potholes," even if there are some roads that "need some work." A Theodore motorist thought the state's roads were just OK, arguing that "we need lotto and casinos, [then] we would have more money to spend on roads."

The recently implemented Rebuild Alabama and the Alabama Transportation Rehabilitation Improvement programs are at work solving new traffic congestion problems in the state, and they've already tackled more than 140 road improvements since 2020.

5. Idaho

Idaho is known as the Gem State, and we can count its highway system as one of its jewels. The state spends $787 per capita on its highways per year, exceeding average U.S. expenditures by about 28% and the Rocky Mountain region's by 6%.

According to the Deseret News, Idaho was the fastest-growing state from 2020 to 2021, with a population growth of 2.9% during that time. As of publishing, about 11% of Idaho's urban roads are in poor condition, based on pavement roughness, but the ASCE warns that the state needs to do more for its infrastructure sooner rather than later to keep up with the growing population.

We Must be doing something right?

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WHY PAVEMENT PRESERVATION?

States with the worst (and best) road conditions

Updated 21 February 2025

By: En

ConsumerAffairs
JOURNAL OF CONSUMER RESEARCH

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Whether you're one to take the road less traveled or are more prone to thinking that "life is a highway," chances are you've hit at least a few potholes over the years. Depending on where you live, poor road conditions may be an occasional inconvenience or a daily frustration. Either way, they accelerate wear and tear on your car, leading to costly repairs that may not be covered by an extended auto warranty.

In fact, the American Society of Civil Engineers estimates that nationwide, drivers spend a whopping $130 billion each year on extra vehicle repairs and operating costs because of deteriorating roads. The price tag for poor-quality roadways doesn't stop there: the U.S. has a backlog of approximately $435 billion in projects to repair existing roads, and by 2040, rising temperatures are expected to add an estimated $19 billion each year to pavement repair costs. But where are our roads the roughest?

The ConsumerAffairs Research Team identified the states with the worst roads by analyzing metrics including rural and urban road roughness and traffic fatalities. Read on to see how we conducted our analysis.

2. Alabama

Alabama ranks second in overall road conditions, with 96.5% of its urban roads and 98.7% of its rural roads in acceptable condition. This strong road quality aligns with ongoing infrastructure investments, including the Rebuild Alabama Act, which has generated $320 million annually for road and bridge improvements since 2019.

In 2024, Gov. Kay Ivey announced over $40 million in additional state funding through the ATRIP-II program, supporting infrastructure projects across Alabama. These continued investments contribute to the state's ability to maintain its extensive road network.

Check out these metrics:

- **Percentage of urban roads in poor condition:** 3.5%
- **Percentage of rural roads in poor condition:** 1.3%
- **Traffic fatalities per 100M miles traveled:** 1.38

Questions!