

# **Pavement Preservation**

## ***Protecting the Investment***

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**Austin, TX**

**NEAUPG Annual meeting**  
**Wilkes-Barre, PA**  
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# What's a Fugro-BRE?

- Fugro is an international geotechnical consulting firm headquartered in Amsterdam
- **US headquarters in Houston**
- **Offices in LA, TX, AZ, CA**
- **Geotechnical and Superpave® laboratory in Austin, TX**
- BRE is a pavement engineering and research firm located in Austin, TX



# Presentation Outline

- Introduction
- **State-of-the-Practice**
- Definitions



# Presentation Outline

- **Elements of an Ideal Pavement Preservation Program**
- **Protecting the Investment**
- **Issues and Barriers**
- **Summary**



- **$1+1 = 2$**

- **PP = Common Sense**



# Introduction

<i><b>Jurisdiction</b></i>	<i><b>Miles (Thousand)</b></i>	<i><b>Percentage</b></i>
<i><b>Federal</b></i>	<b>118</b>	<b>3.0</b>
<i><b>States</b></i>	<b>775</b>	<b>19.6</b>
<i><b>Locals</b></i>	<b>3,055</b>	<b>77.4</b>
<i><b>Total</b></i>	<b>3,948</b>	<b>100.0</b>

## Public Highway Ownership by Miles



# Introduction

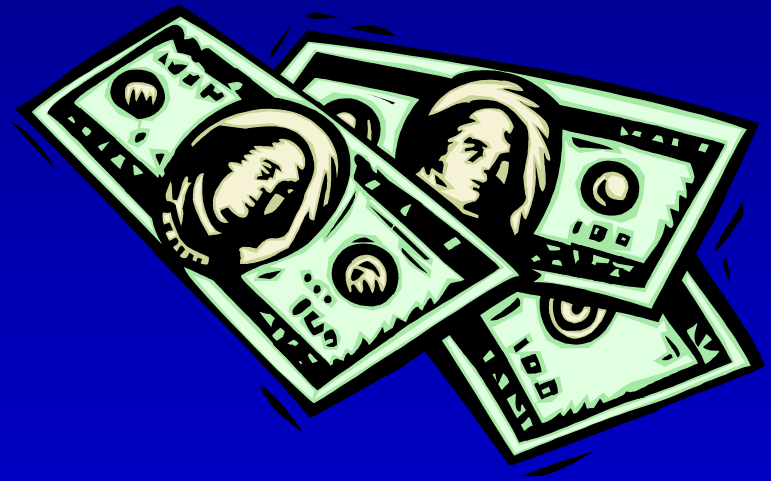
<b>Area</b>	<b>Miles (Thousand)</b>	<b>Percentage</b>	<b>Lane Miles (Thousand)</b>	<b>Percentage</b>
<b>Rural</b> ( <i>&lt;5,000 population</i> )	<b>3,091</b>	<b>78.2</b>	<b>6,324</b>	<b>76.6</b>
<b>Small Urban</b> ( <i>5,000 – 49,999 pop</i> )	<b>176</b>	<b>4.5</b>	<b>378</b>	<b>4.6</b>
<b>Large Urban</b> ( <i>50,000 &gt; population</i> )	<b>683</b>	<b>17.3</b>	<b>1,552</b>	<b>18.8</b>
<b>Total</b>	<b>3,950</b>	<b>100.0</b>	<b>8,254</b>	<b>100.0</b>

## Highway Areas by Miles



# Value of highway assets

**\$ 75 Billion spent by  
State and locals in 1997**



**Trillion Dollar investment  
in the Interstate System alone**



# Introduction

- Agencies continue to face increasing demands with decreasing resources
- **Operating revenues can't keep pace with needs**
- 29% increase in usage in the '90's
- **Truck traffic increased by 40% - 3% increase/year in the next 20**



# Introduction

- Traditionally little research into techniques or methods
  - **Some progress in materials research**
    - work done on patching and sealing during SHRP
  - **Recent trends indicate more investment in new techniques and practices**
    - Caltrans slurry/microsurfacing pooled fund study



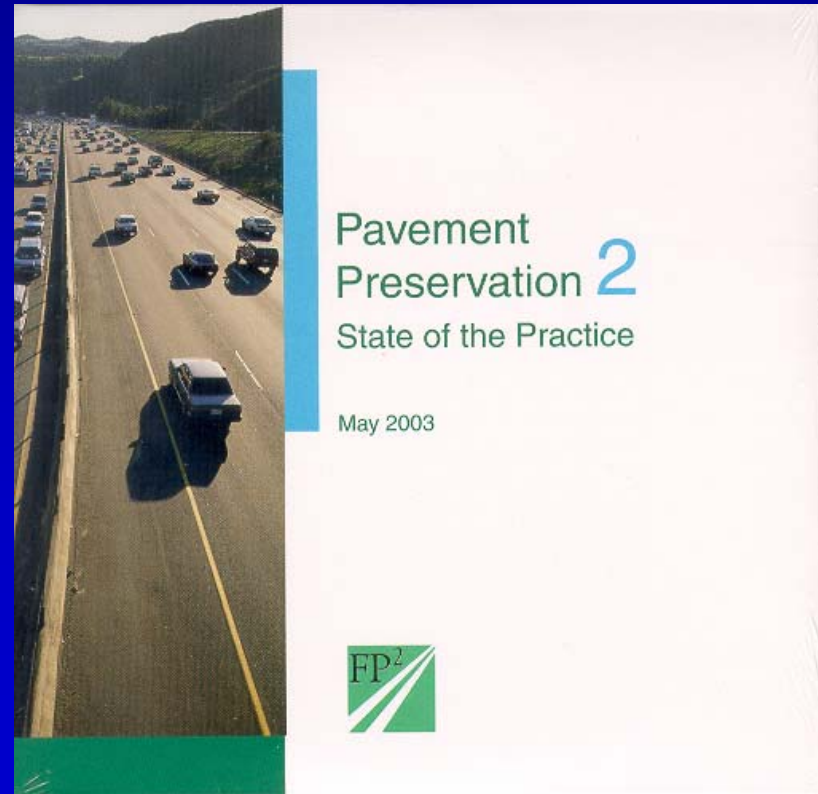
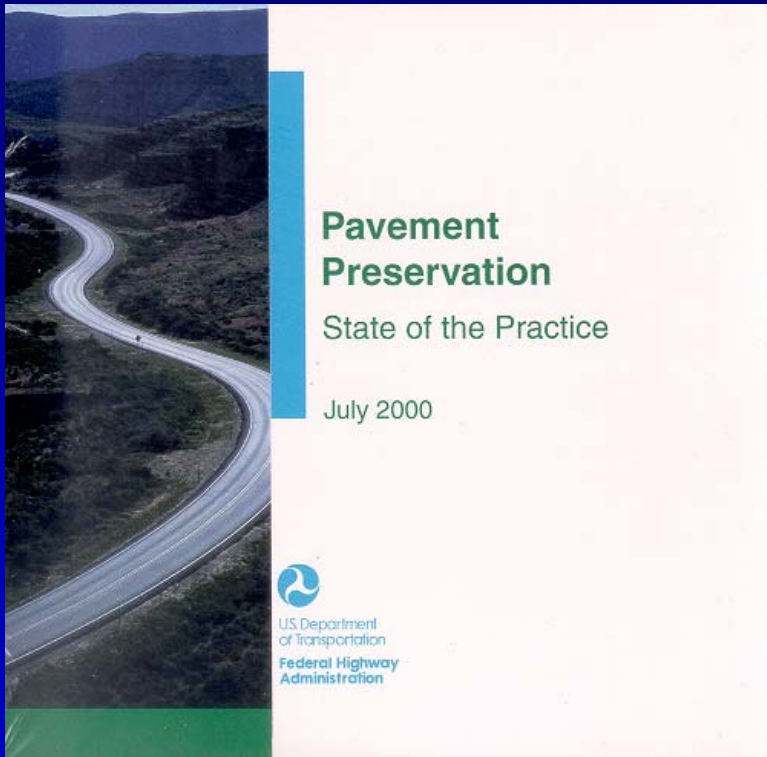
# State-of-the-Practice

- 34 states report having a PP program
- **FHWA and FP<sup>2</sup> Workshops**
- NHI training courses on pavement preservation
- **NCHRP Studies**
  - 14-14, 20-50(02), 20-50(03)



# State-of-the-Practice

CD's



# State-of-the-Practice



## International Preservation Scanning Tour

# State-of-the-Practice

## Pocket Guides



# Definitions

- **What is Pavement Preservation?**
  - **Sum of all activities to provide and maintain serviceable roadways**
  - **Includes corrective and preventive maintenance**
  - **minor and major rehab**



# Definitions

- Does *NOT* include
  - Capacity improvements
  - New or reconstructed pavements

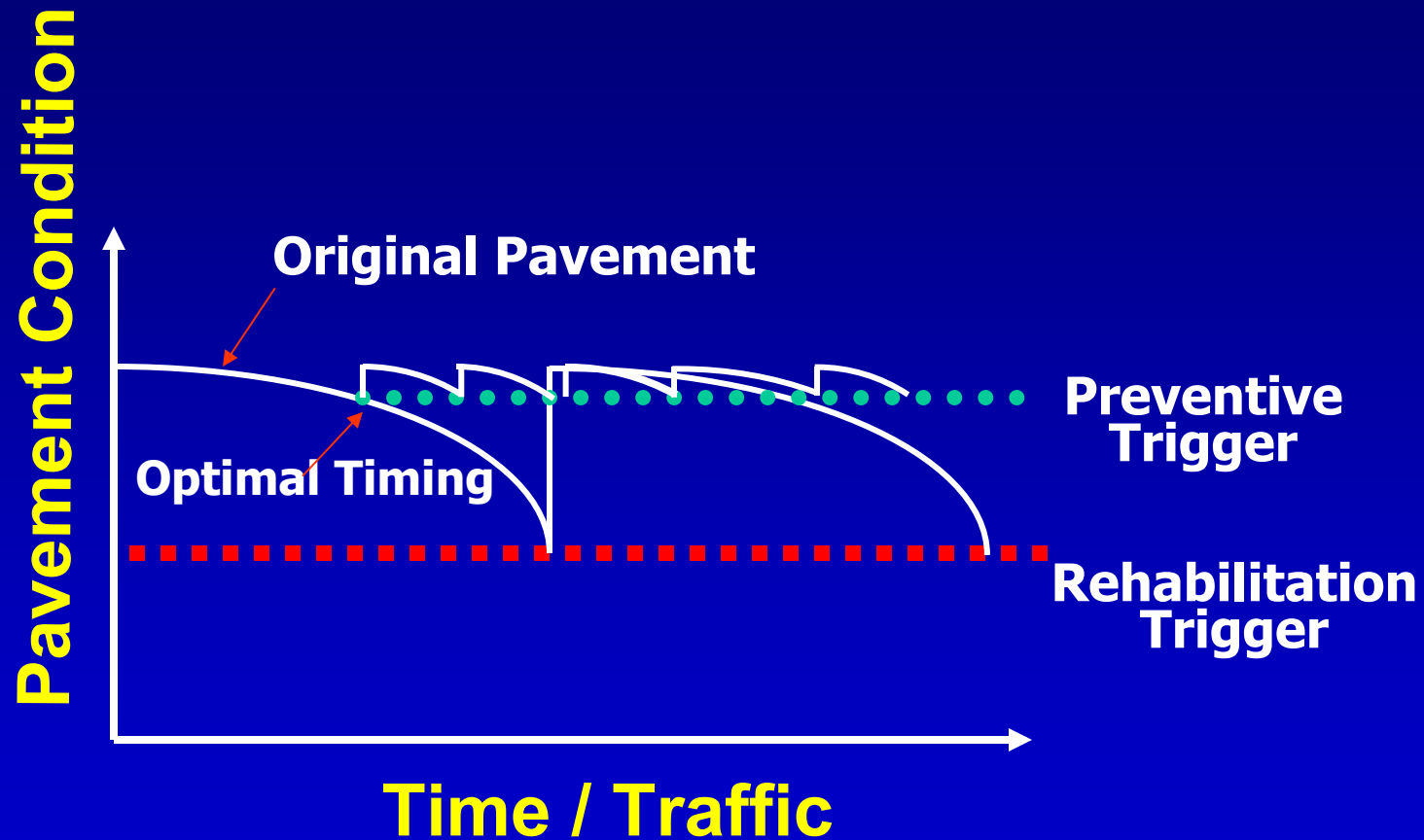




# Definitions

- What is Preventive Maintenance?
  - Defined by AASHTO
    - planned strategy
    - cost-effective treatments
    - existing system
    - retards deterioration
    - maintains or improves functional condition
    - does *not* increase structural capacity

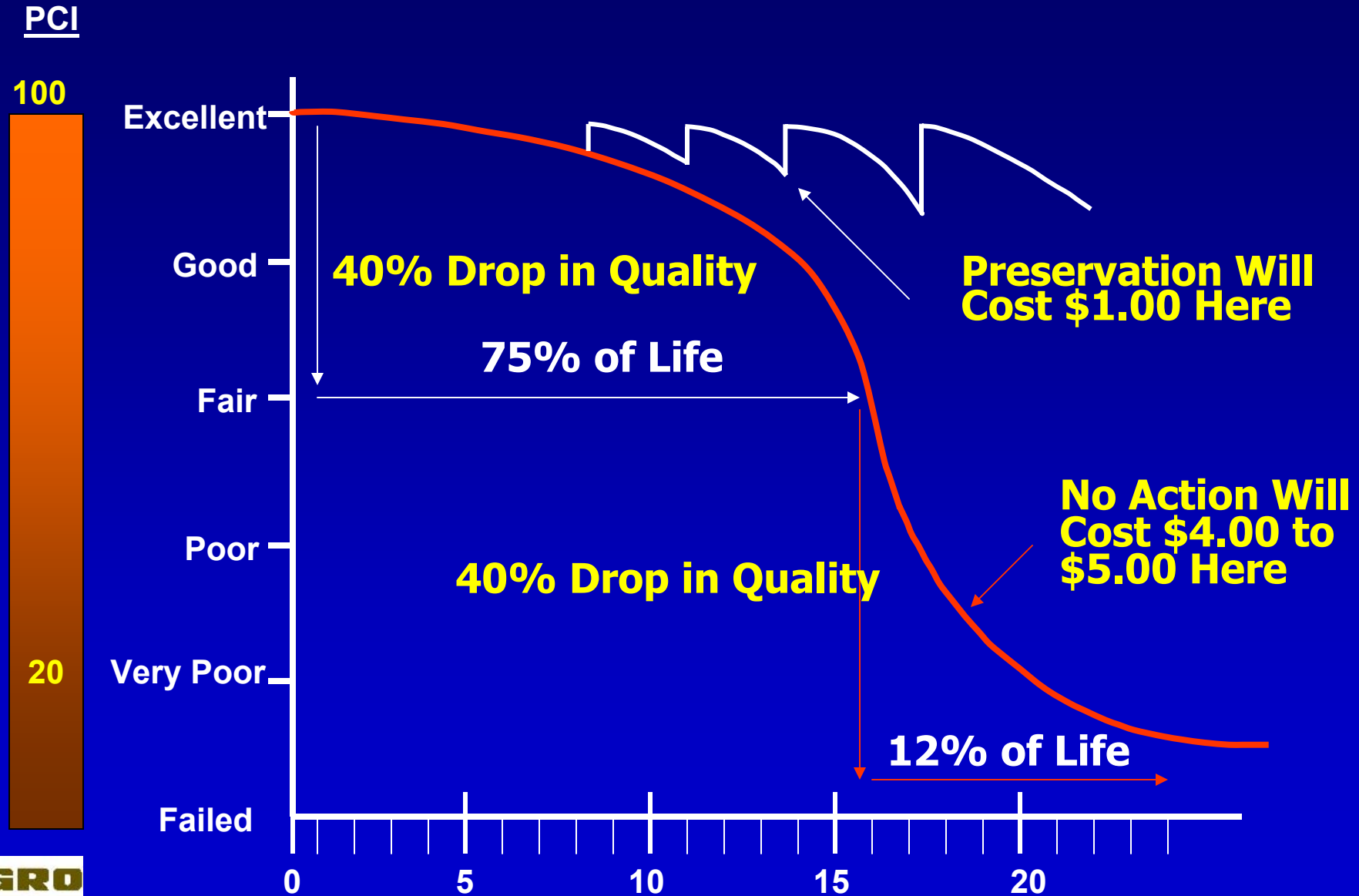




## The Pavement Preservation Concept



# Example of a Pavement Option Curve



# Definitions

## Pavement Preservation

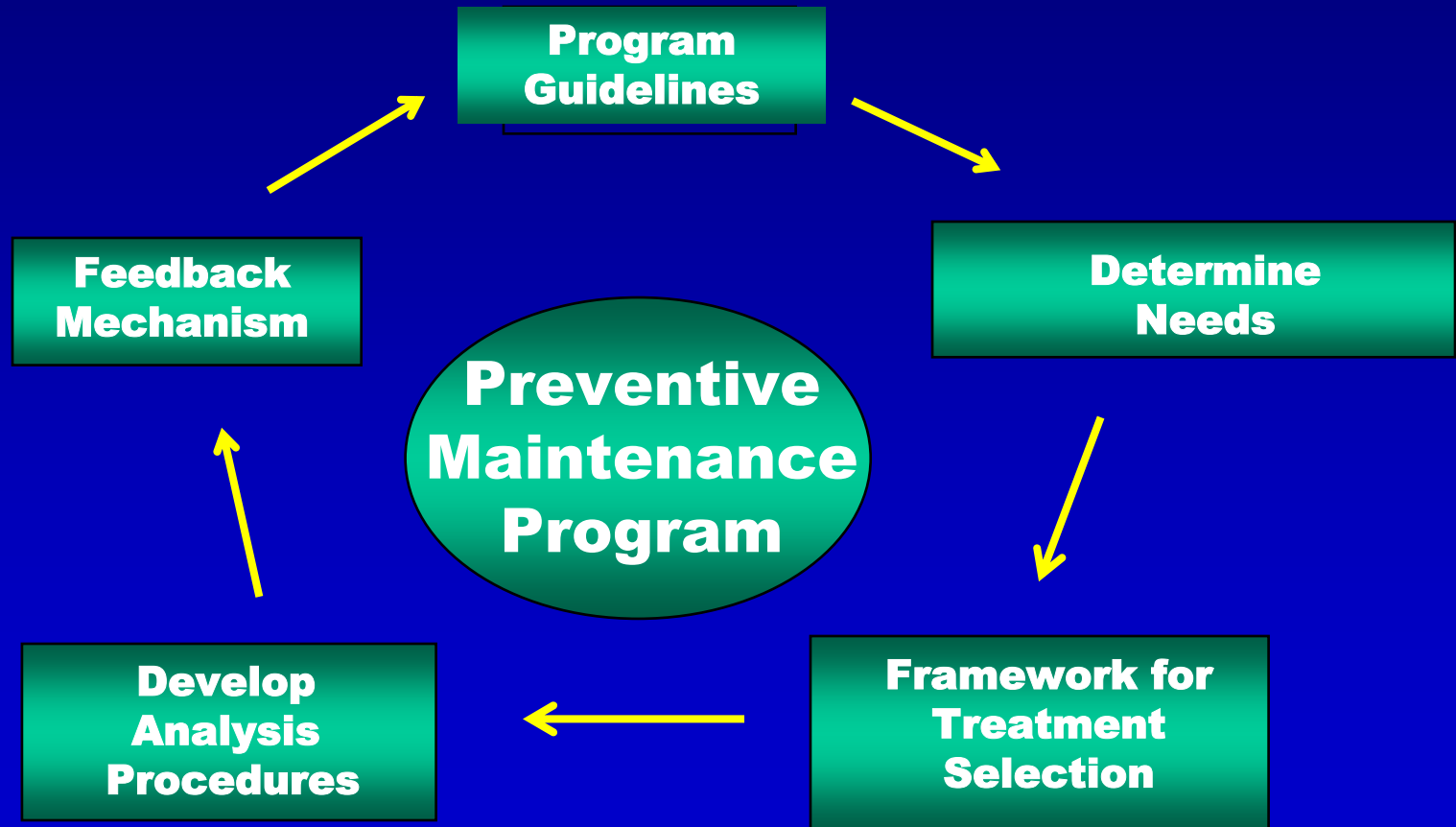
**The Right Treatment**

**On the Right Road**

**"Keeping Good Roads Good"**  
**At the Right Time**



# Elements of an Ideal Pavement Preservation Program



# 1. Establish Program Guidelines

- “Policy Manual”
- Contains overall strategies and goals
  - Safety issues
  - Environmental issues
- Program coordinator named
- Technical elements
- Feedback loop



## **2. Determine Maintenance Needs**

- **Condition Survey**
  - **Trained observers**
  - **Automated vehicles**
  - **Non-destructive testing (FWD, Friction, GPR)**
  - **Cores, slabs**
- **Project data**
  - **Location, ADT, % trucks, environment, etc.**



# **3. Framework for Treatment Selection**

- **The “right” treatment at the “right” time on the “right” project**





## 4. Develop Analysis Procedures for the Most Effective Treatment

- A number of procedures for determining **cost** effectiveness exist and should be used
- **Cost** should be part of the decision process but not the only consideration
- Use of decision trees is a viable method



## 5. Feedback Mechanism

- Generally a weakness in many management processes
- **Need to know how the system is working**
- A tool to adjust the program when needed

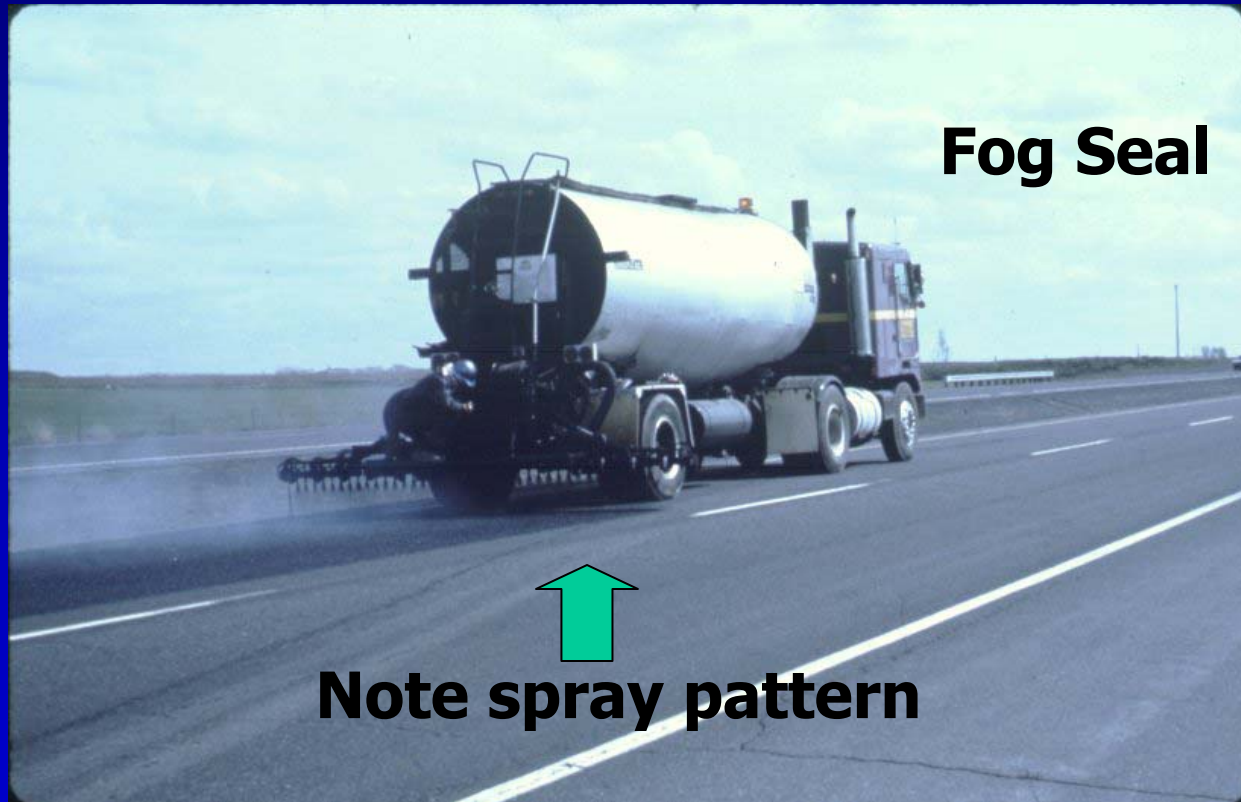


# Preservation Treatments for Flexible Pavements



**Crack filling and sealing**

# Preservation Treatments for Flexible Pavements



# Preservation Treatments for Flexible Pavements



Cold Seals

# Preservation Treatments for Flexible Pavements

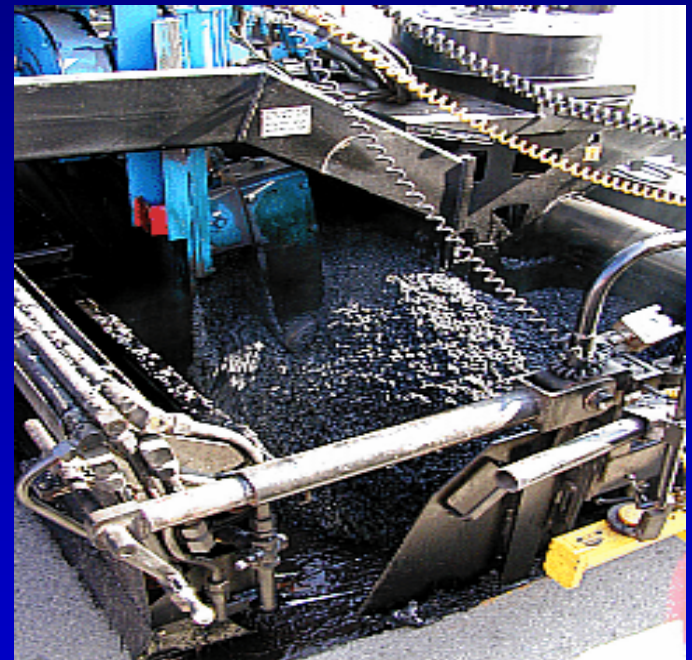


Cold Seals



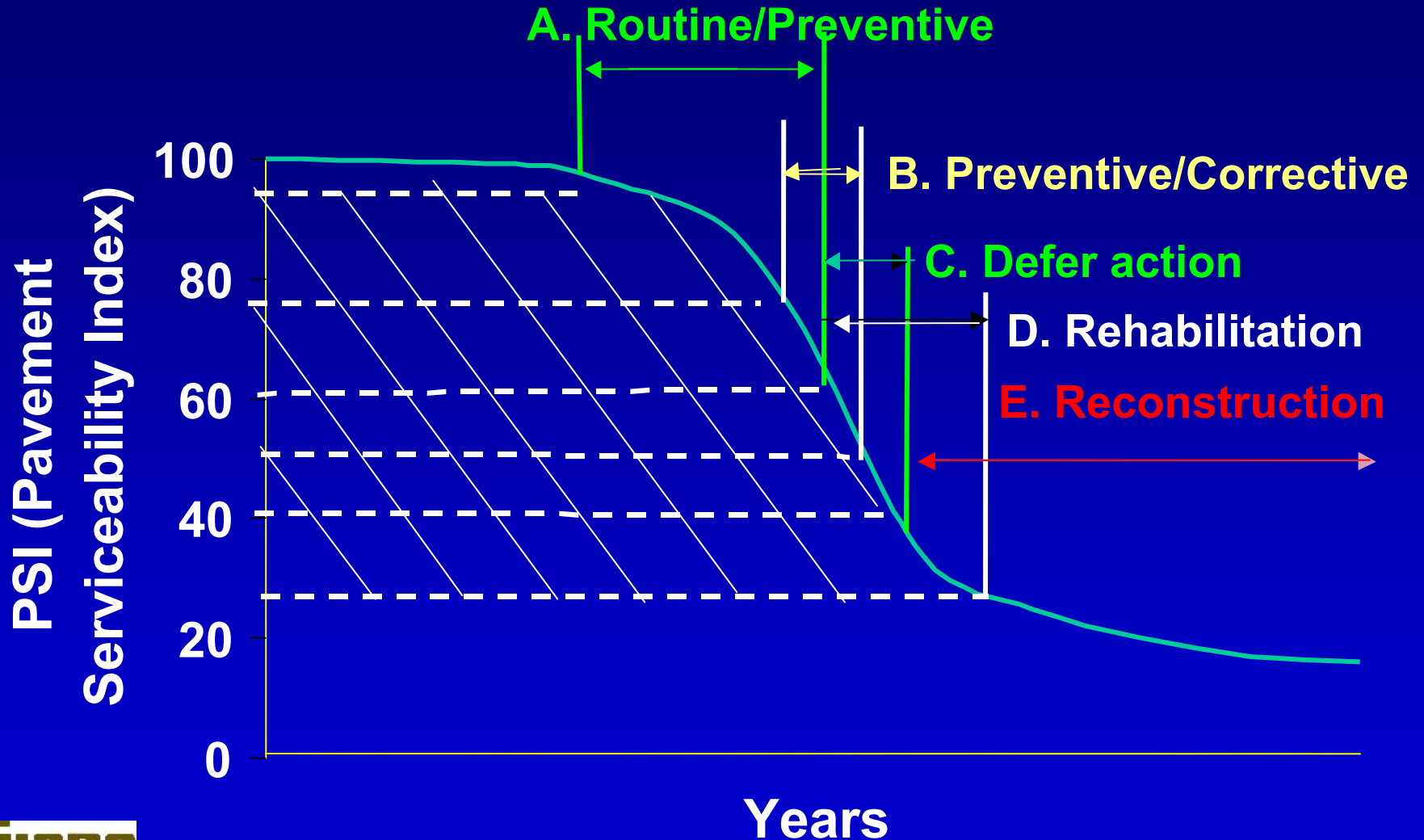


# Preservation Treatments for Flexible Pavements



HMA  
Overlays

# Strategies-Timing





# Protecting the Investment

ACTIVITY	D.I. (Before)	D.I. (After)	AGE	LIFE EXTENDED (Years)	R.S.L. (Years)	COST (Lane-Mile)	COMMENTS
New Construction		0	0		25	\$508,000 \$ 21,000	Construct Cost User Cost
Major Reconstruct	51	0	25		25	\$ 490,000 \$ 19,000	Construct Cost User Cost
Total						\$ 998,000 \$ 40,000	Construct Cost User Cost

*D.I. – is distress index, a measure of pavement condition. Scale values: 0=no distress, 50=when reconstruction is required.*

*R.S.L. – is remaining service life, the time remaining that a pavement can be preserved.*

## Traditional Alternative - Project Life Cycle Cost



ACTIVITY	D.I. (Before )	D.I. (After)	AGE	LIFE EXTEN D (Years)	R.S.L (Year s)	COST (Lane-Mile)	COMMENTS
New Construction		0	0		25	\$508,000 \$ 21,000	Construct Cost User Cost
First Preservation	11	6	5	2	22	\$ 15,000 \$ 350	Construct Cost User Cost
Second Preservation	21	0	10	8	25	\$ 39,500 \$ 350	Construct Cost User Cost
Third Preservation	16	8	14	1	22	\$ 15,000 \$ 350	Construct Cost User Cost
Fourth Preservation	33	0	20	5	21	\$ 55,500 \$ 700	Construct Cost User Cost
Fifth Preservation	14	7	25	2	18	\$ 15,000 \$ 350	Construct Cost User Cost
Total						\$ 648,000 \$ 23,100	Construct Cost User Cost



## Preservation Alternative - Project Life Cycle Cost

# Protecting the Investment

- \$998k vs. \$648k
- **\$350k saved**
- 18 year life extension for \$140k
- **Funds for additional PP work or capital improvements**



# Issues and Barriers

- From the Agency Perspective
  - Need top management commitment
  - Need a champion
  - Paradigm shift from “worst first” to “best first”
  - Need a compelling message



# Issues and Barriers

- From the Agency Perspective
  - Show early benefits
  - Right treatment-right road-right time



# Issues and Barriers

- From the Industry Perspective
  - Impact on market share for traditional suppliers
  - Innovative products



# Issues and Barriers

- From the Public's Perspective
  - **Why fix good roads?**
  - Reduce delays and vehicle operating costs with smoother roads
  - **Improved safety**



# Summary

- **Pavement Preservation is a “state of mind”**
  - Maintaining your house or vehicle
- **An agency PP program can be effective *if***
  - The management team is on board
  - **The right elements are in place**
  - Funds are committed and continuous





# Need more information?

- **Contact**

- **The National Center for Pavement Preservation at Michigan State University**
- [www.pavementpreservation.org](http://www.pavementpreservation.org)
- **The Foundation for Pavement Preservation**
- [www.fp2.org](http://www.fp2.org)



**Thank You**

