



# Pavement Preservation Timing

## Preventive Maintenance Activities

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## Introduction

- Definition of Preventive Maintenance
- Training Opportunities
- Pavement Distress Indicators
- Preventive Maintenance Treatment Toolbox



# Definition

“Preventive Maintenance (PM) treatments are part of the overall pavement preservation program. A PM project is intended to arrest light deterioration, retard progressive damage, and reduce the need for routine maintenance. PM treatments typically do not add structural strength to the pavement. The proper time for PM is before the pavement experiences severe distress, structural problems, and moisture- or aging-related damage.”



*Source: Indiana Design Manual, Chapter 52-11*

# Definition

## Preventive Maintenance:

- Part of the overall pavement preservation program
- Arrests light deterioration
- Retards progressive damage
- Reduces the need for routine maintenance
- Does not add structural strength to the pavement



# Upcoming Training

- NHI “Design and Construction of Quality Preventive Maintenance Treatments”
  - Will conduct a 2-day session in each District.
  - Focus will be on project level treatments for Maintenance and Construction



# Upcoming Training

- NHI Preventive Maintenance Training Schedule
  - May 7-8 = Crawfordsville District
  - May 12-13 = Seymour District
  - May 14-15 = Greenfield District
  - May 20-21 = Fort Wayne District
  - May 22-23 = LaPorte District

Vincennes – DONE!



# Upcoming Training (cont'd)

- “Pavement Preservation with Asphalt Emulsions”
  - Will do three 1-day sessions (north, central, and south)
  - Focus on manufacture, handling, and applications of asphalt emulsions





# Upcoming Training (cont'd)

## ■ Emulsion Workshop Schedule

- April 1 = Spring Mill St. Park (Seymour/Vincennes)
- April 15 = Warsaw Unit (Fort Wayne/LaPorte)
- April 17 = Indianapolis Sub (Crawfordsville/Greenfield)



# Upcoming Training (cont'd)

- **INDOT Maintenance Conference**
  - April 29-May 1 in Jeffersonville
  - Theme will be Pavement Preservation

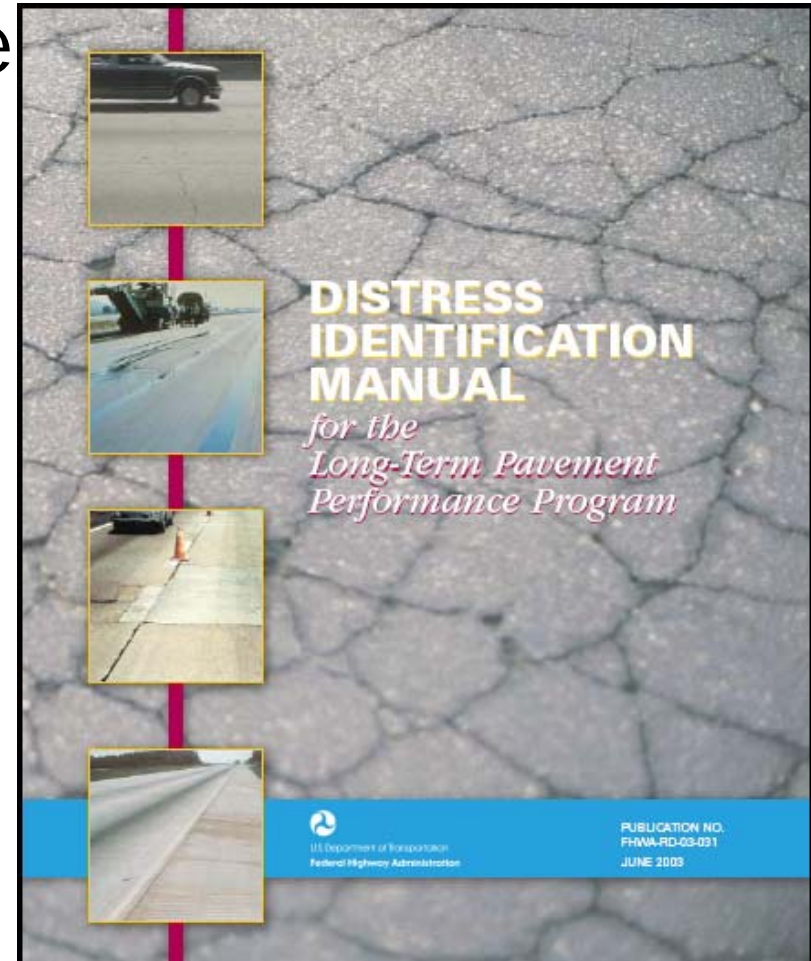


Remember:  
Timing is  
everything.



# Pavement Distress Identification

- Preventive Maintenance does not address structural problems
- Need to be able to distinguish structural versus age/environmental related distresses
- Manual/CD available



# Structural Distresses

- Structural, fatigue, or load related distresses are caused by inadequate pavement structure to carry the traffic loadings.
  - Pavement is “broken”
  - Preservation and preventive maintenance do not address structural problems, HOWEVER
  - If done at the proper time, preservation will prevent structural problems from occurring



# Structural Distresses

- Alligator Cracking
- Rutting
- Shoving





# Age Related Distresses

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# Age Related Distresses



# Age Related Distresses

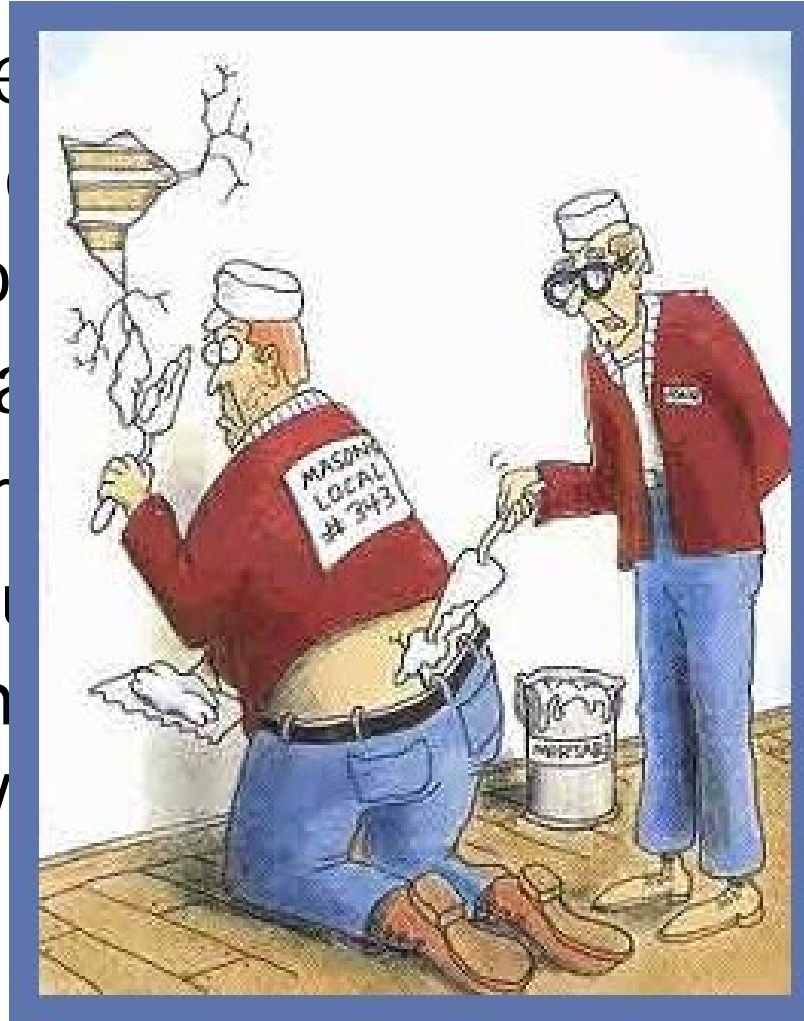
- Block Cracking
- Longitudinal Joint Cracking
- Reflective Cracking
- Raveling





# Treatment Selection and Timing

- Crack Seal
  - Emulsion
  - Hot Pot
- Chip Seal
- Thin surface
  - Microseal
  - Ultrathin
- Thin HMA
  - Mill/fill



(5 years)

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***Pavements age at different rates!***

# Sources of Information

## INDIANA DEPARTMENT OF TRANSPORTATION



## FIELD OPERATIONS HANDBOOK

FOR CREW LEADERS

OPERATIONS SUPPORT DIVISION

January 2001



### 52-11.6 PREVENTATIVE MAINTENANCE

Preventative Maintenance (PM) is a pavement surface treatment used to preserve and extend the service life of pavements. PM projects are intended to arrest light deterioration, retard progressive damage and reduce the need for routine maintenance. The proper time for PM is before the pavement experiences severe distress, structural problems, and moisture or aging related damage. These activities can be cyclical in nature and may correct minor deficiencies as a secondary benefit. PM projects should improve high stress areas or localized problems.

Preventative Maintenance treatments are typically not used where the scope of work is to correct pavement cross slopes, horizontal alignments, vertical alignments, superelevation problems, placement of turn lanes or auxiliary lanes, improvement of public approaches or drives, or guardrail adjustments or repair. PM projects may include various incidental enhancements or combinations at isolated locations in accordance with Chapter Fifty-six.

The most commonly used PM treatments are as follows:

1. **Chip Sealing.** Chip sealing is the full width treatment of the surface with hot asphalt material and coarse aggregate to prevent deterioration of the surface. It provides waterproofing, low severity crack sealing, and improved friction. Sections should show no structural deficiencies prior to chip sealing. For PM, the seal coat should be placed at a time before cracks become braided, depressed, or any patching is needed. A previously chip sealed surface may be chip sealed a second time. Criteria for selecting sections for chip sealing are as follows:
  - a. AADT < 2000 (higher volume, if traffic can be controlled);
  - b. on alligator cracking;
  - c. Pavement Condition Rating (PCR) between 80 and 90 with only moderate cracking;
  - d. roughness (PSI) > 3.0;
  - e. rutting < 6 mm; and
  - f. typical surface age of 5 to 8 years.
2. **Crack Sealing.** Crack sealing is the cleaning and sealing of open cracks or joints in asphalt pavement and shoulders to prevent the entry of moisture and debris. Cracks or joints should be cleaned out and sealed on a 1- to 3-year cycle. Cleaning may be accomplished by sawing or routing. This work should be scheduled in the cooler months when the pavement has contracted and the cracks or joints have widened.

# Crack Seal

- Emulsion (AE-90 or AE-90S)
  - More daily production (can cover more road)
  - Less durable (won't last as long), typically 1-2 years
  - Useful on roads where there are significant amounts of cracking
- Hot Pour (Crumb Rubber)
  - Less daily production (takes longer to apply)
  - More durable, typical life 3-5 years
  - Useful for transverse (working) cracks
  - Routing cracks makes for most effective seal



# Crack Seal

- Crack seal is most effective early in a pavement's life.
- Seal cracks (especially transverse, reflective, or "working" cracks) as they appear.
- Rule of thumb – reflective cracks will migrate ~1" per year in new asphalt.





# Crack Seal

- Effective crack seal?





# Crack Seal

- Effective crack seal?





# Crack Seal

- Best Practice – “V” squeegee



# Crack Seal



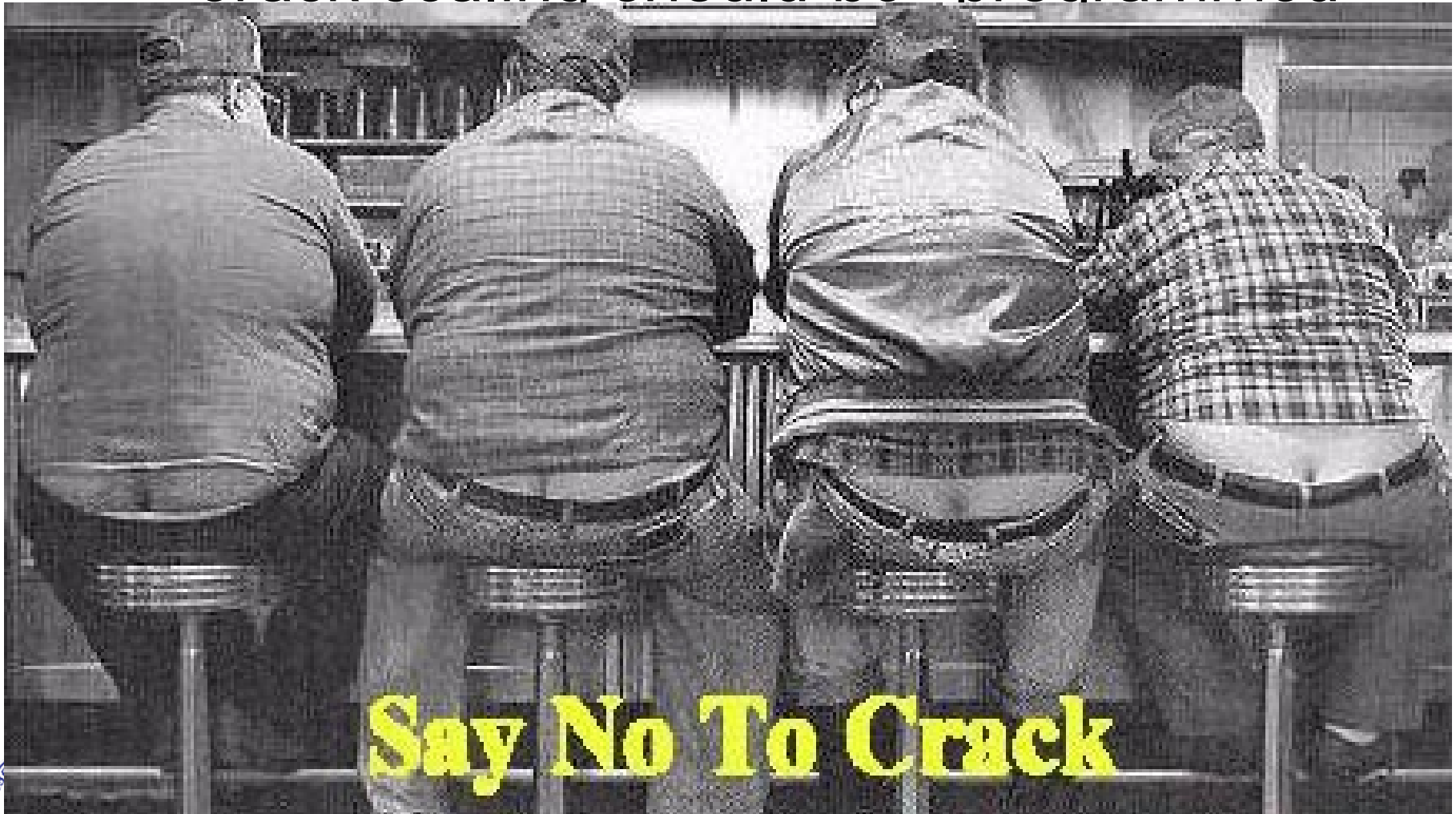
Versus





# Crack Seal

- Crack sealing should be “programmed”



# Chip Seal

- Chip sealing is effective later in a pavements life; before age related distresses become severe.
- Provides a new wearing surface.
- Can improve friction.
- Seals original surface and protects from further deterioration.
- Typical life 5 years



# Chip Seal

- Applications
  - Rural roads
  - Non-structural distresses
  - “Dry”, oxidized, brittle surface with minimal raveling
- Pre-sealing needs
  - Cracks sealed
  - Structural problems repaired



# Chip Seal

- Good candidate?





# Chip Seal

- Good candidate?



- How about this one?



# Chip Seal

- Good candidate?



# Other Thin Surface Treatments

- Microsurface
  - Thin layer, polymer modified asphalt emulsion mixture
  - Provides a new surface wearing course
  - Improves friction for the life of the treatment
  - Typical life is 6 years (can be longer if used in the correct application)





# Microsurface





# Other Thin Surface Treatments

- Ultrathin Bonded Wearing Course (UBWC)
  - Thin, gap graded hot mix asphalt layer placed over a polymer modified emulsion membrane.
  - Provides a new wearing course with good friction properties.
  - Emulsion membrane seals underlying cracks and bonds asphalt layer to the underlying pavement.
  - Typical life is 8 years (can be longer if used in the correct application)



# Ultrathin Bonded Wearing Course



# Thin HMA Inlay

- “Mill and Fill” typically consists of milling 1” (minimum is scarification) and resurfacing with 1.5” HMA
  - Can correct minor cross slope deficiencies, and provides increased smoothness
  - Typical life is 10 years
- Mill and fill is considered the “end” of pavement preservation.
- Treatments beyond mill and fill are structural in nature – the underlying pavement is beyond preventive maintenance



# Treatment Life Summary

<b>Treatment</b>	<b>Life (years)</b>
Emulsion Crack Seal	1
Hot Pour Crack Seal	3
Chip Seal	5
Microsurface	6
UBWC	8
HMA Inlay	10



# Questions???



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Thanks for coming.

