

# Concrete Pavement Preservation Essentials

(Giving New Life to Aging Concrete Pavements)



**Jerod Gross P.E.**

**National Concrete Pavement Technology Center**

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# Service/Investment



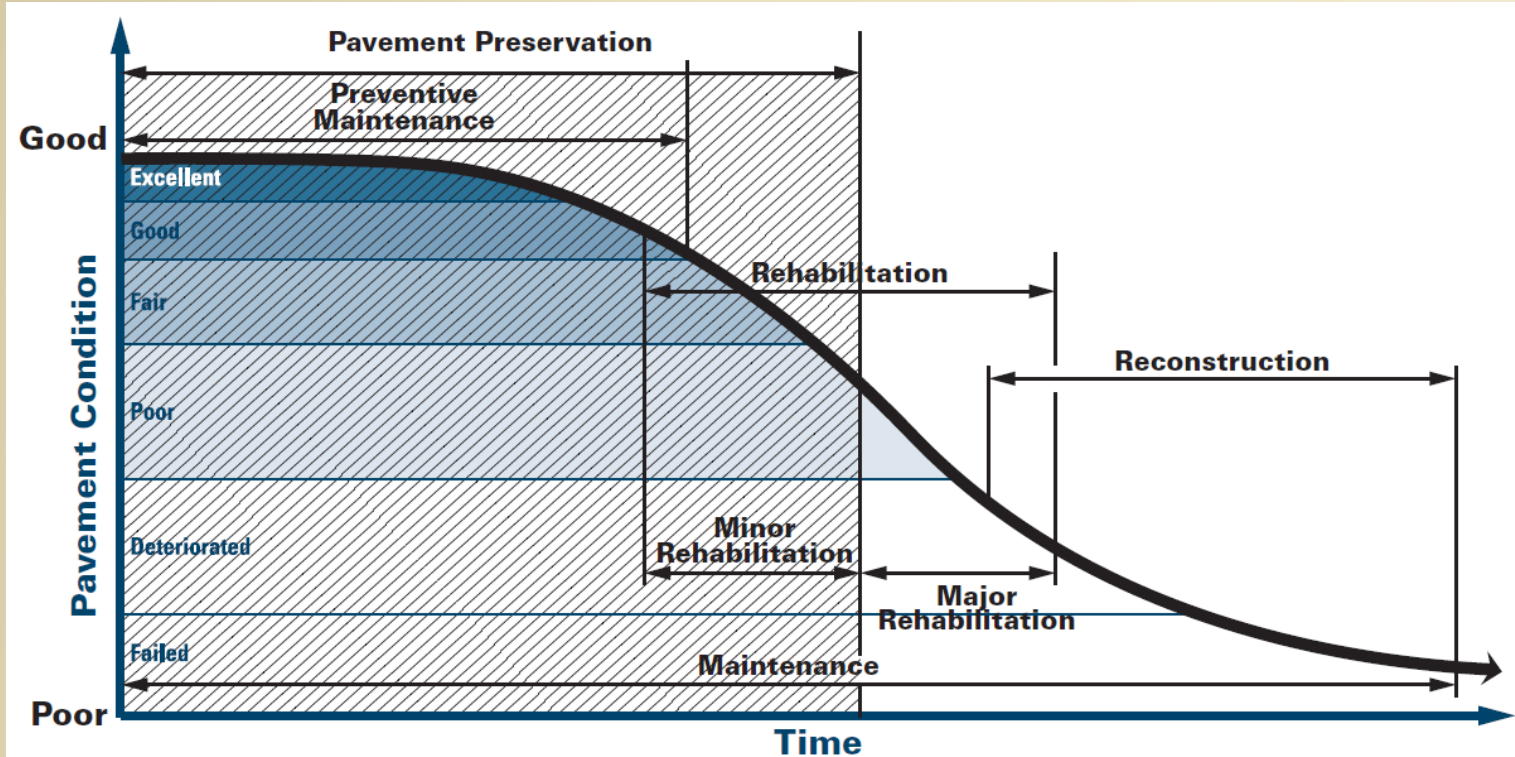
Maintaining the Service and Investment of the  
Highway by Implementing Pavement Management  
Into Cost-Effective  
**PAVEMENT PRESERVATION MEASURES**

# Determining Treatment Selection

- Preservation Policy- Stating what the goal is for pavement condition and/or service life.
- In order to select the right treatment, for the right pavement, at the right time, the following information must be compiled and analyzed:
  - Expected performance of the pavement.
  - The treatment and expected costs (initial and life-cycle), both direct (agency costs) and indirect (user costs).
  - Does it meet the goal ?

# What is Pavement Preservation?

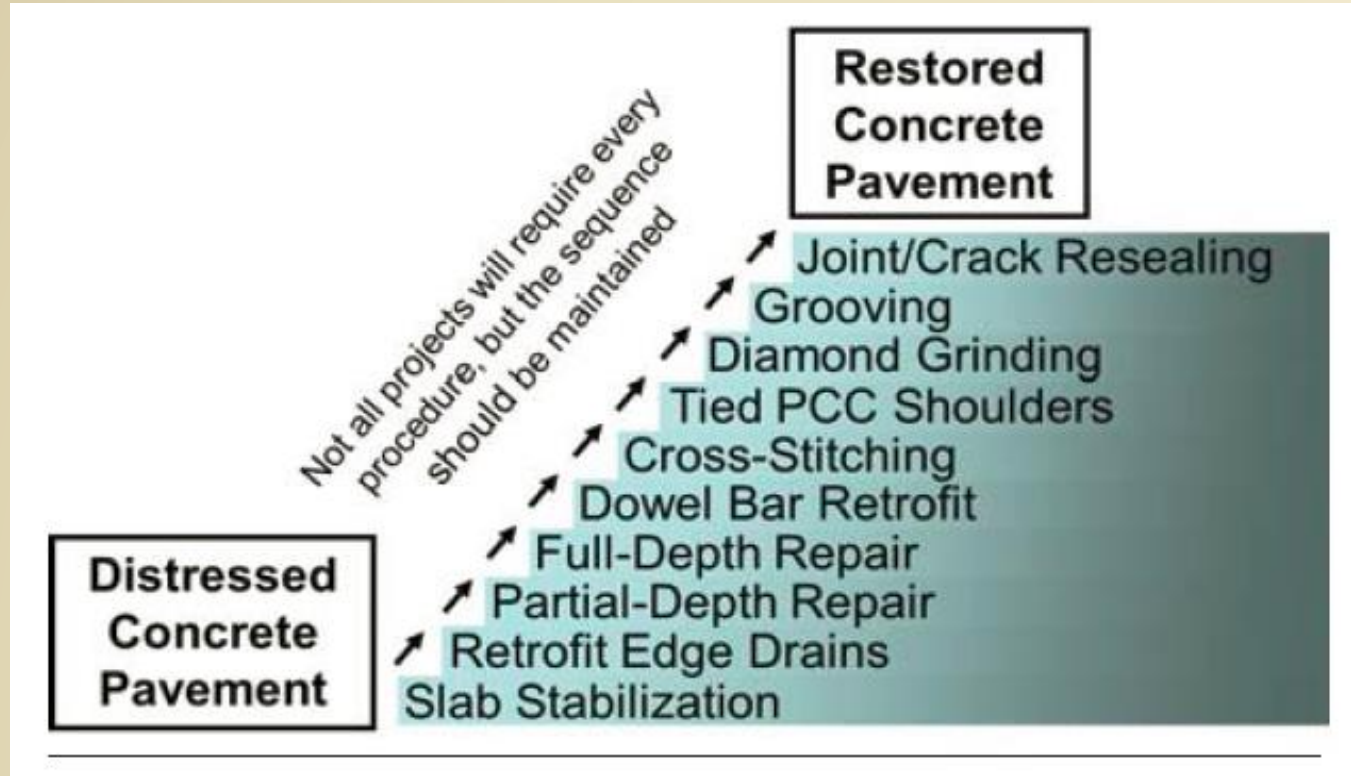
1. Tools to preserve concrete
2. Concrete is a tool for preservation





# Pavement Preservation

## Tools to Preserve Concrete Pavement



# Pavement Preservation

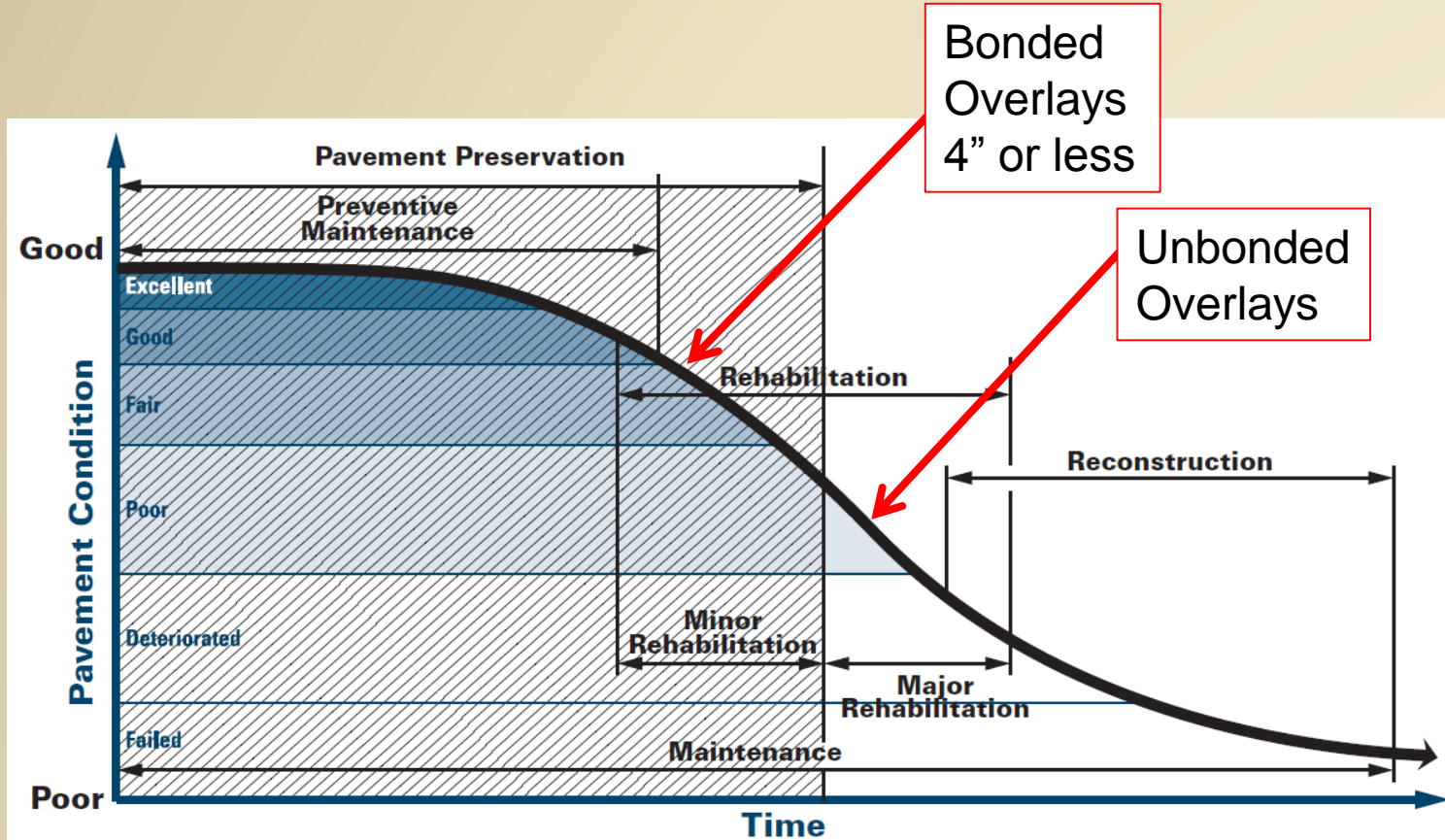
## Concrete is a Tool for Preservation

Bonded overlays (BCOC & BCOA)  $\leq 4"$

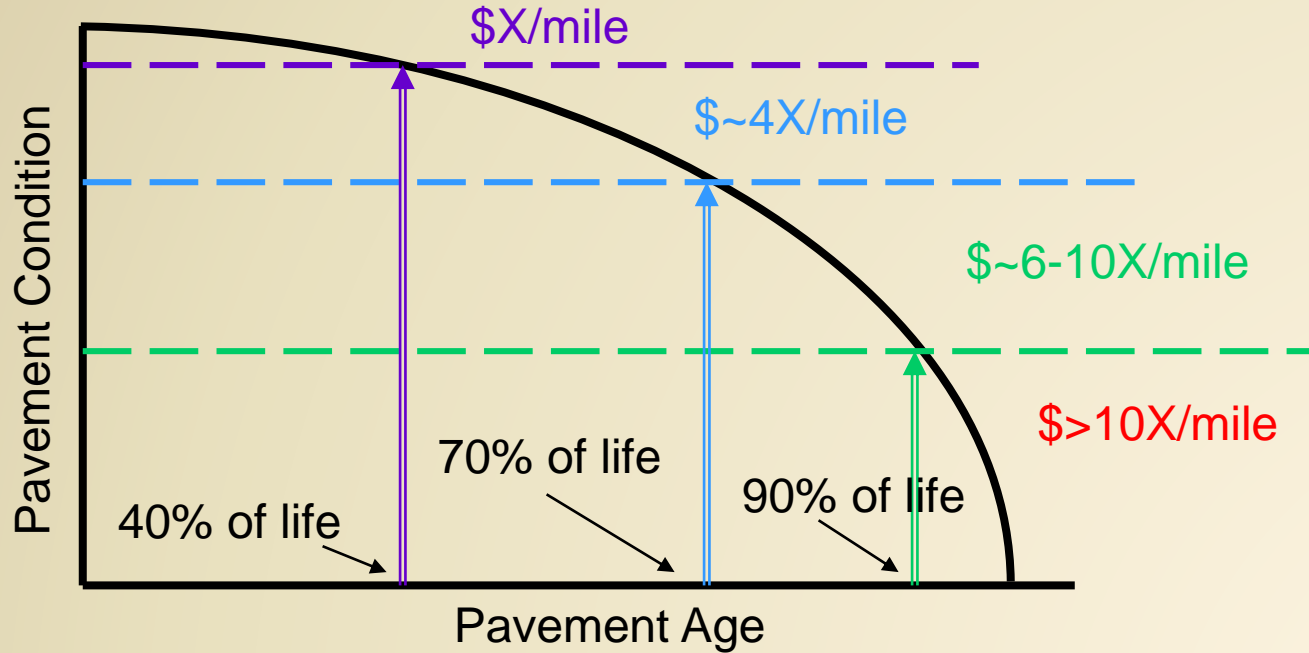
Milling surface distresses and establishing a new bonded surface

- Converts existing pavement from fair/poor to good condition via milling
- Returns pavement to original function
  - Ridability
  - Friction
  - Removes surface distresses
- Extends service life

# Pavement Preservation



# Pavement Management Concept





# 5 Core Questions

## 1. What is the current state of our pavements?

- What do we own?
- Where is it?
- What condition is it in?
- What is the remaining service life and economic value?

**Condition Analysis**

## 5 Core Questions

### 2. What is the level of service to be provided?

- What do owners and public expect?
- How different is this from actual conditions?

**Involve City Officials**

## 5 Core Questions

### 3. What level of deterioration is acceptable?

- How do these assets deteriorate?
- What are the likelihood and consequences of deterioration?

**Pavement Management Model**

## 5 Core Questions

### 4. What are the feasible options to consider?

- What repair options are most feasible for our agency?
- How do these strategies impact system performance?

**Pavement Management Model**

## 5 Core Questions

### 5. Which long-term funding option should be selected?

- Does the selected strategy align with policy goals?

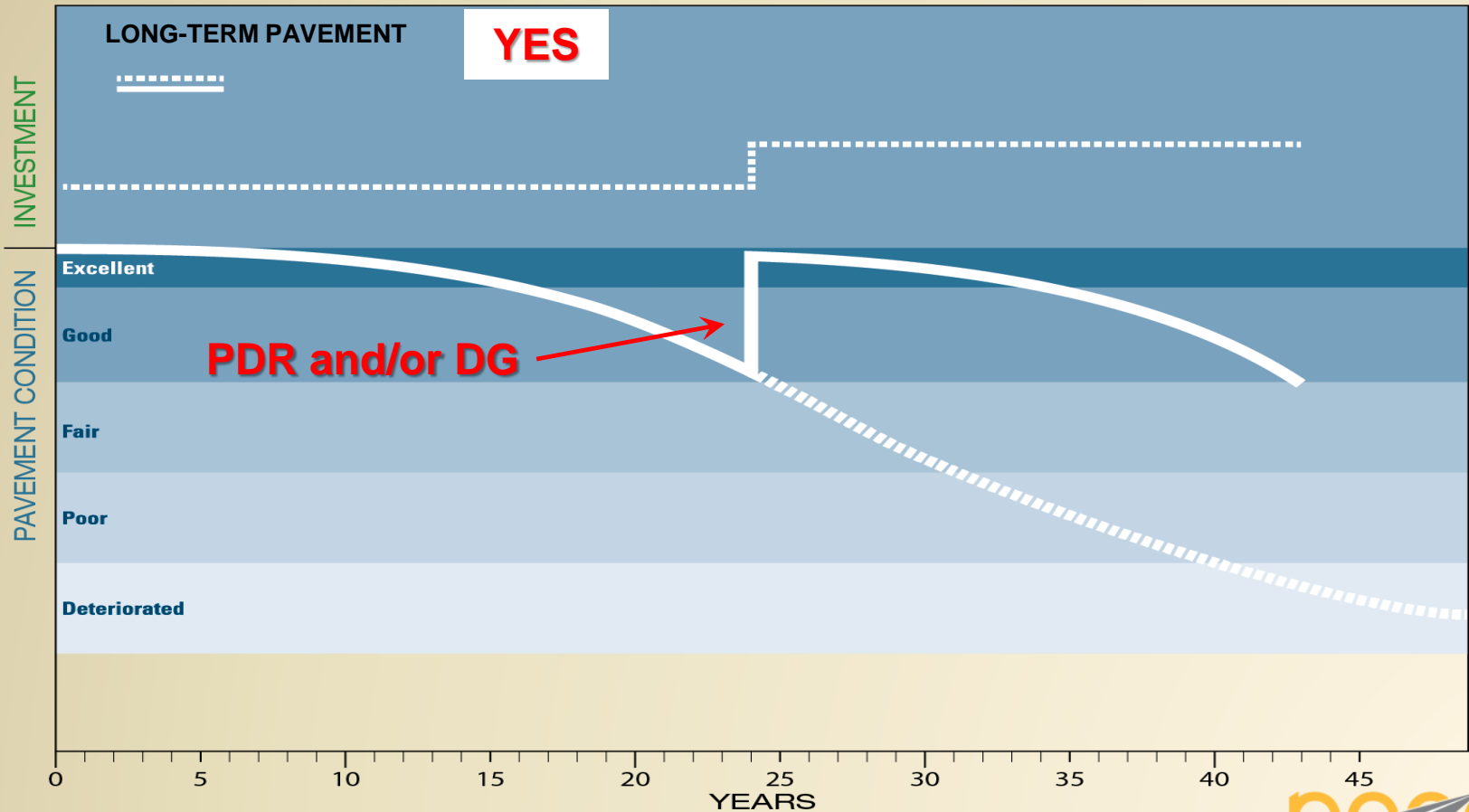
**Pavement Management Model**



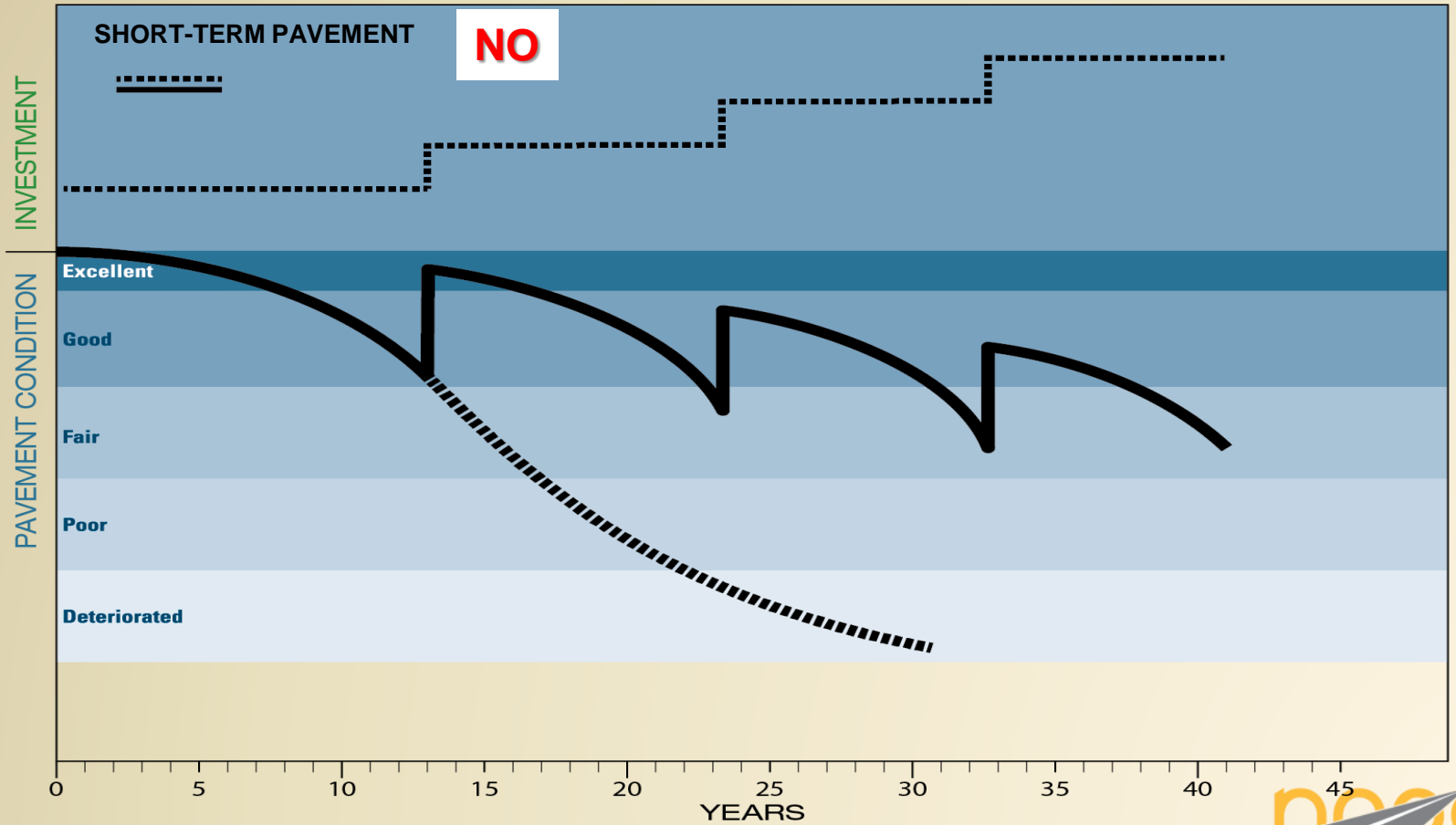
# What Pavement Preservation is Not

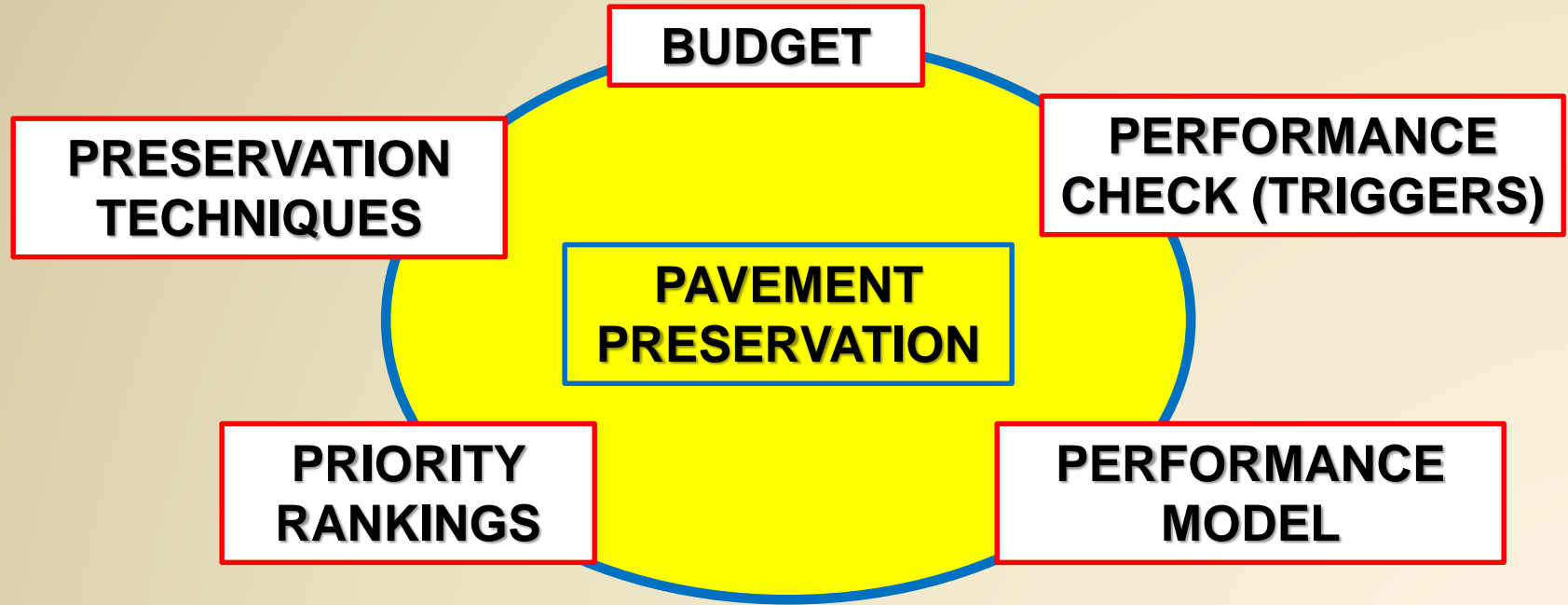
- **Worst first**
- **Cover up problems**

# Service Life



# Service Life





# Trigger/Limit Values for Pavement Preservation (JPCP)

Performance Indicator	Trigger Value	Limit Value
Transverse Cracking	1.5 % - 2.5% of slabs cracked	5% - 15% of slabs cracked
Joint Spalling	1.5% - 2.5% of joints	15% - 20% of joints
Joint Faulting	0.10 inches	0.50-0.70 inches
Roughness	63-90 in/mi	160-220 in/mi



**Table 2.3. Michigan DOT Criteria for Preservation Strategies (Scofield et al. 2011)**

<b>Strategy</b>	<b>Minimum RSL</b>	<b>DI</b>	<b>RQI</b>	<b>IRI</b>
FDR	7	< 20	< 54	< 107
Joint Resealing	10	< 15	< 54	< 107
Crack Sealing	10	< 15	< 54	< 107
Diamond Grinding	12	< 10	< 54	< 107
Dowel Bar Retrofit	10	< 15	< 54	< 107
Concrete Pavement Restoration*	3	< 40	< 80	< 212

\*Consists of full-depth concrete repairs, diamond grinding, and other.

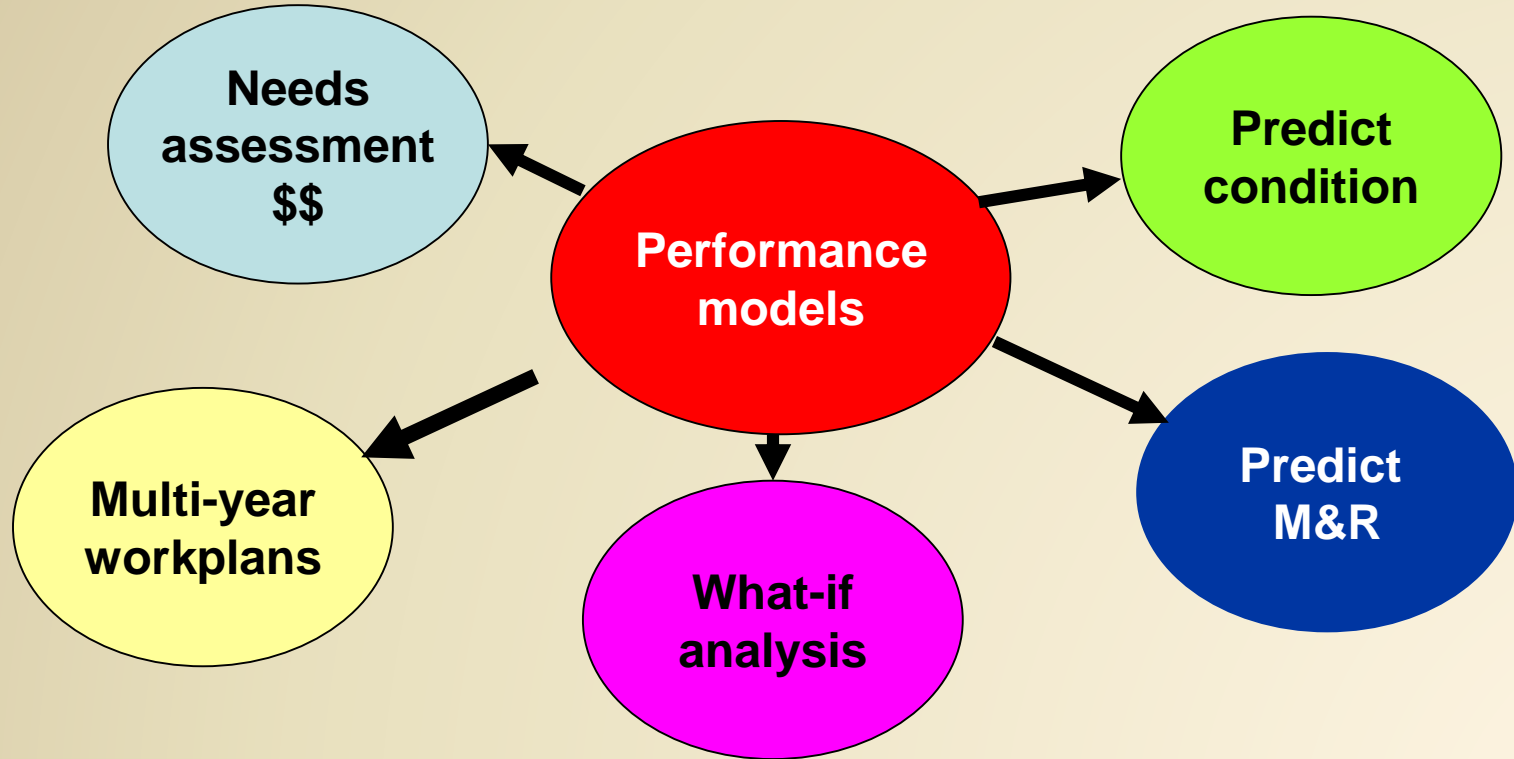
RSL: Remaining service life

DI: Distress index

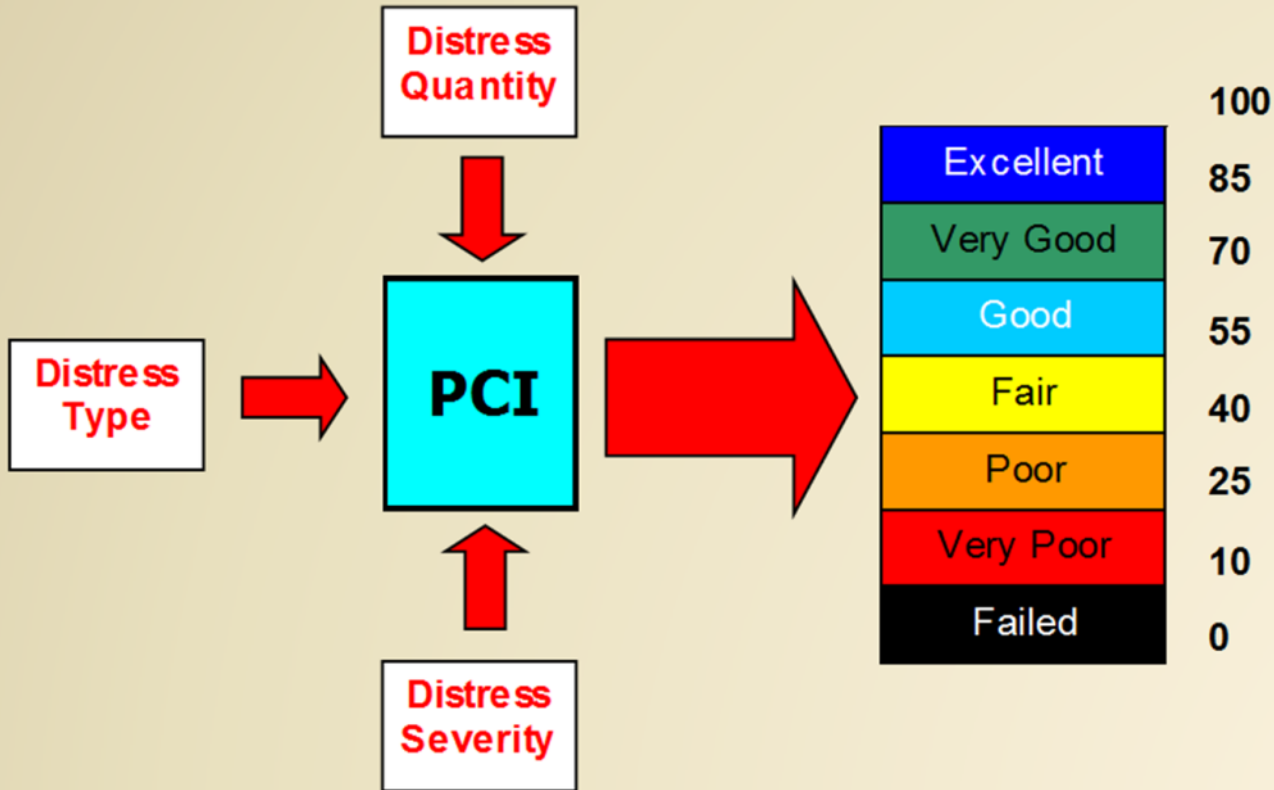
RQI: Ride quality index

IRI: International roughness index

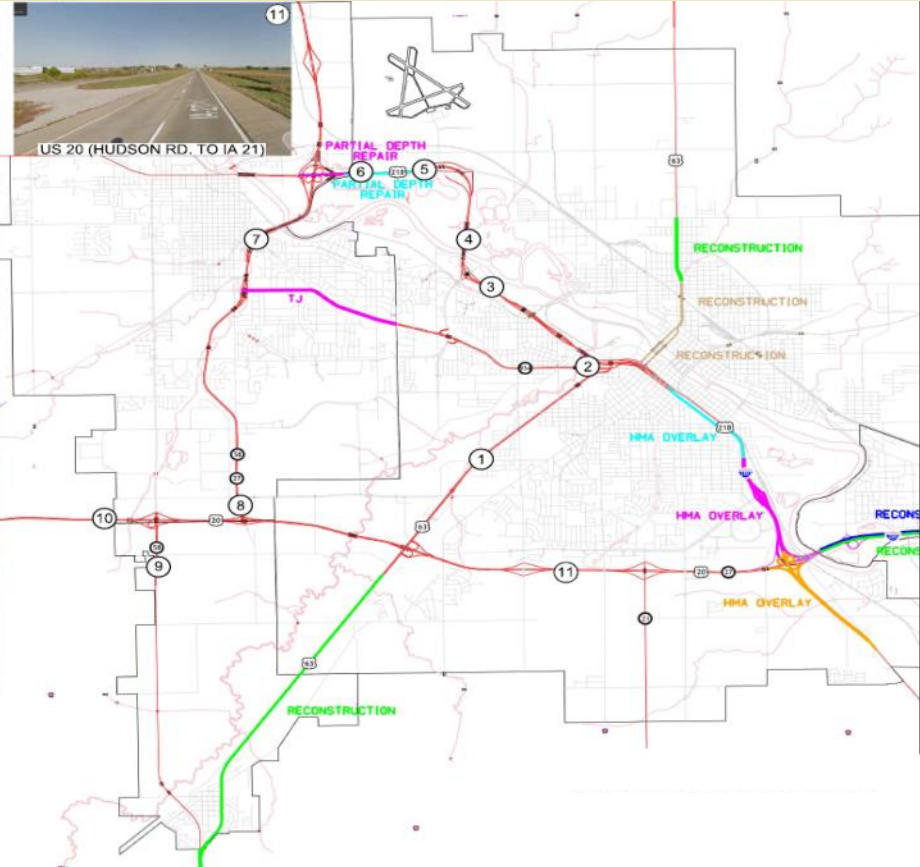
# Why Use Performance Models?



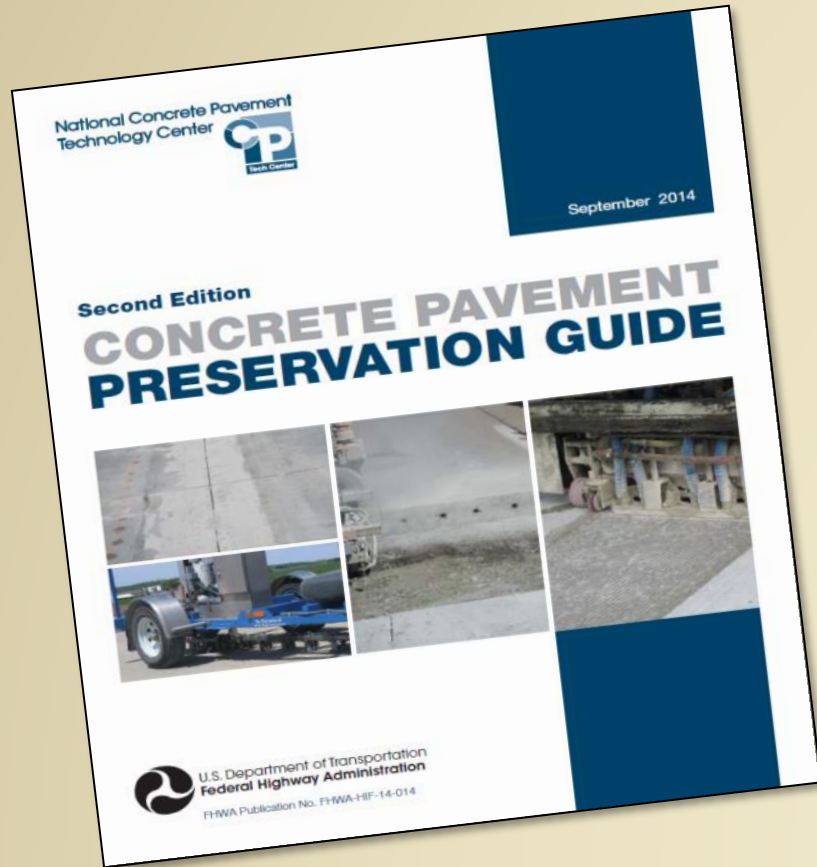
# Pavement Condition Index (PCI) Concept



# Priority Rankings



# Concrete Pavement Preservation Techniques

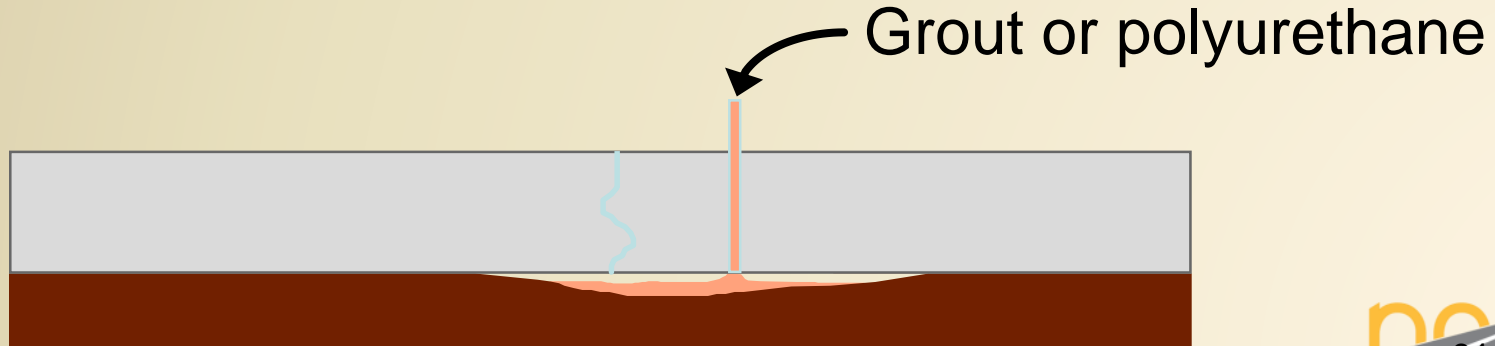


- Contains 12 Chapters on Preservation Techniques
- Added Overlay Chapter
- Working on 11 Training Modules and Instructor Guide
- Plan on 20 future workshops in next two years.
- Technical Assistance to State DOTs



# Slab Stabilization vs. Slab Jacking

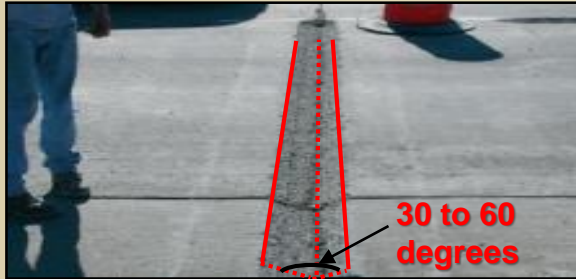
- Slab Stabilization:
  - Pressure insertion of grout/polyurethane to fill void beneath slab
- Slab Jacking:
  - Pressure insertion of grout/polyurethane to raise slab



# Concrete Removal

## Cold Milling Heads

### “V” Shape Milling Head and Pattern



### Rock Saw and Rounded Pattern



### Vertical Edge Mill Head and Pattern



# PCC PARTIAL DEPTH PATCH

## City of West Des Moines

### Investigation



### Design



- Plans
- Standard Specification
- Standard detail (MN)

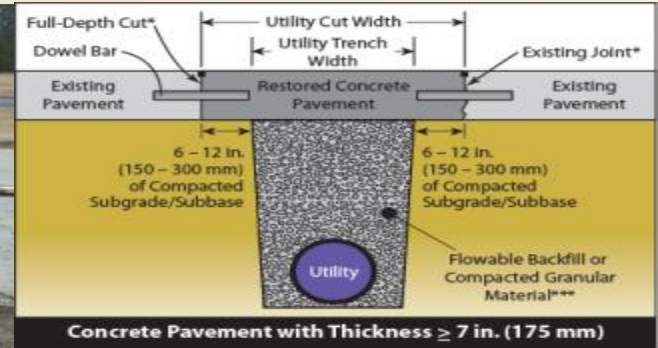
### Construction



# Full Depth Repairs

## New Additions to the Preservation Manual:

- Precast Repairs
- Utility Cuts
- CRCP Guidelines

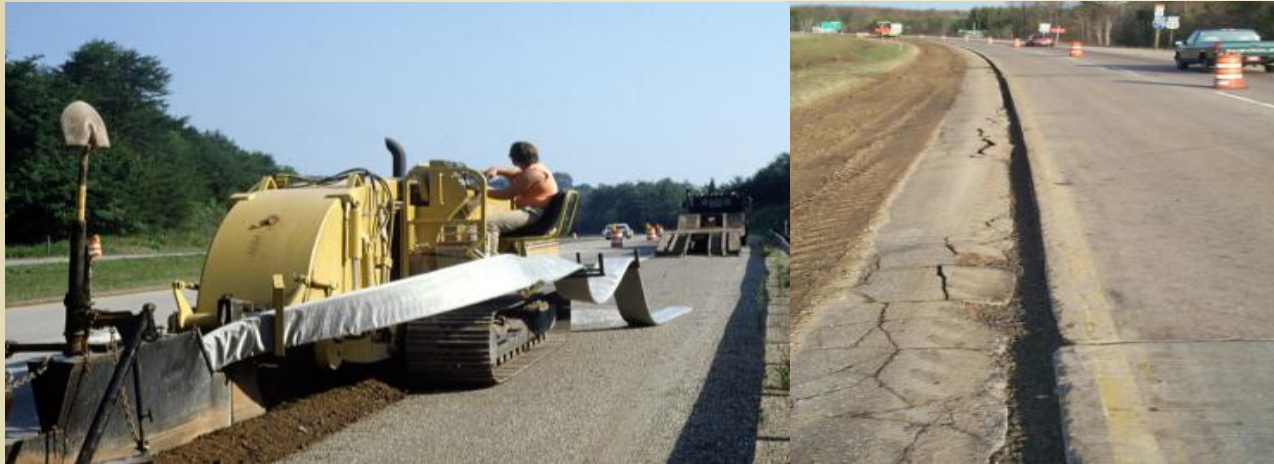




# Retrofitted Edge Drains

## New Additions:

- Streamlining of Information
- Importance of Maintenance





# Dowel Bar Retrofit

- Restores load transfer
- Reduces probability of pumping, faulting, and corner breaks
- Improves long-term rideability
- Increases service life



# New Surface Textures

- Optimized Texture for City Streets (OTCS)
  - Similar to diamond grinding but reduced land heights/widths
- Next Generation Concrete Surface (NGCS)
  - Manufactured, low-noise surface consisting of flush grinding and grooving



**OTCS**



**NGCS**

# Joint Resealing and Crack Sealing

## New Additions:

- General Chapter Update
- Improve Troubleshooting



# Concrete Overlays

## New Additions:

- New Chapter
- Information from 2014 Overlay Guide Update
- Lessons Learned From Projects (2008 to 2014)



# THANK YOU!

## Representing the National Concrete Pavement Technology Center

<http://www.cptechcenter.org/>  
[jgross@snyder-accociates.com](mailto:jgross@snyder-accociates.com)

