

Concrete Pavement Preservation

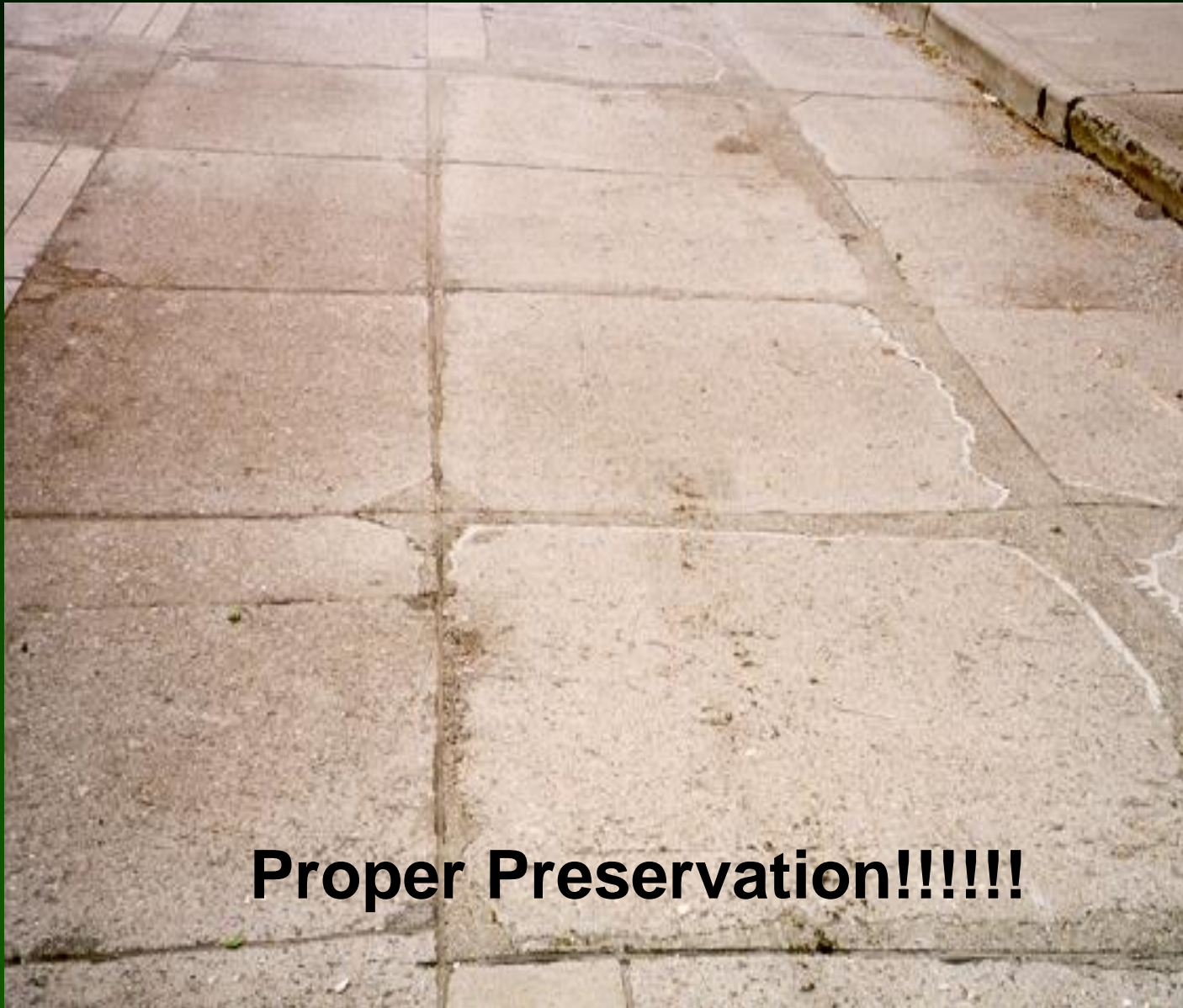
Larry Scofield, P.E.

IGGA



Your Pavement Preservation Resource® since 1972

Preservation Can Work (120 Years)



Proper Preservation!!!!!!

You Need Strategies



How Did We Get Here



DENELO 98

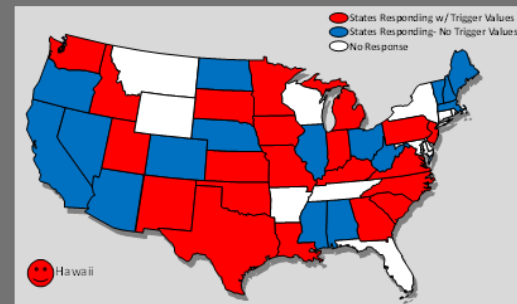
Programming---When to Preserve Pavements

2011

Survey of State DOT PMS Trigger Values for Concrete Pavement Preservation

Preliminary Draft Not for Distribution

The FHWA Pavement Preservation ETG Rigid Subcommittee conducted a survey of the state DOT PMS practices to determine the state-of-the-practice of concrete pavement preservation. Thirty eight states responded to the survey and 23 states (61%) used trigger values for managing concrete pavements within the PMS system. Recommendations for follow up activities are included.



FHWA ETG
Pavement Preservation
--Rigid Subcommittee--

Rigid Subcommittee
L. Scofield, C. Hennings, S. Varnedoe, S. Healow, D. Harrington
4/30/2011

SHRP 2 R26 Report

The Second
STRATEGIC HIGHWAY RESEARCH PROGRAM

SHRP 2 REPORT S2-R26-RR-2

Guidelines for the Preservation of High-Traffic-Volume Roadways

D. PESHKIN, K. L. SMITH, A. WOLTERS, AND J. KRSTULOVICH
Applied Pavement Technology, Inc.
Urbana, Illinois

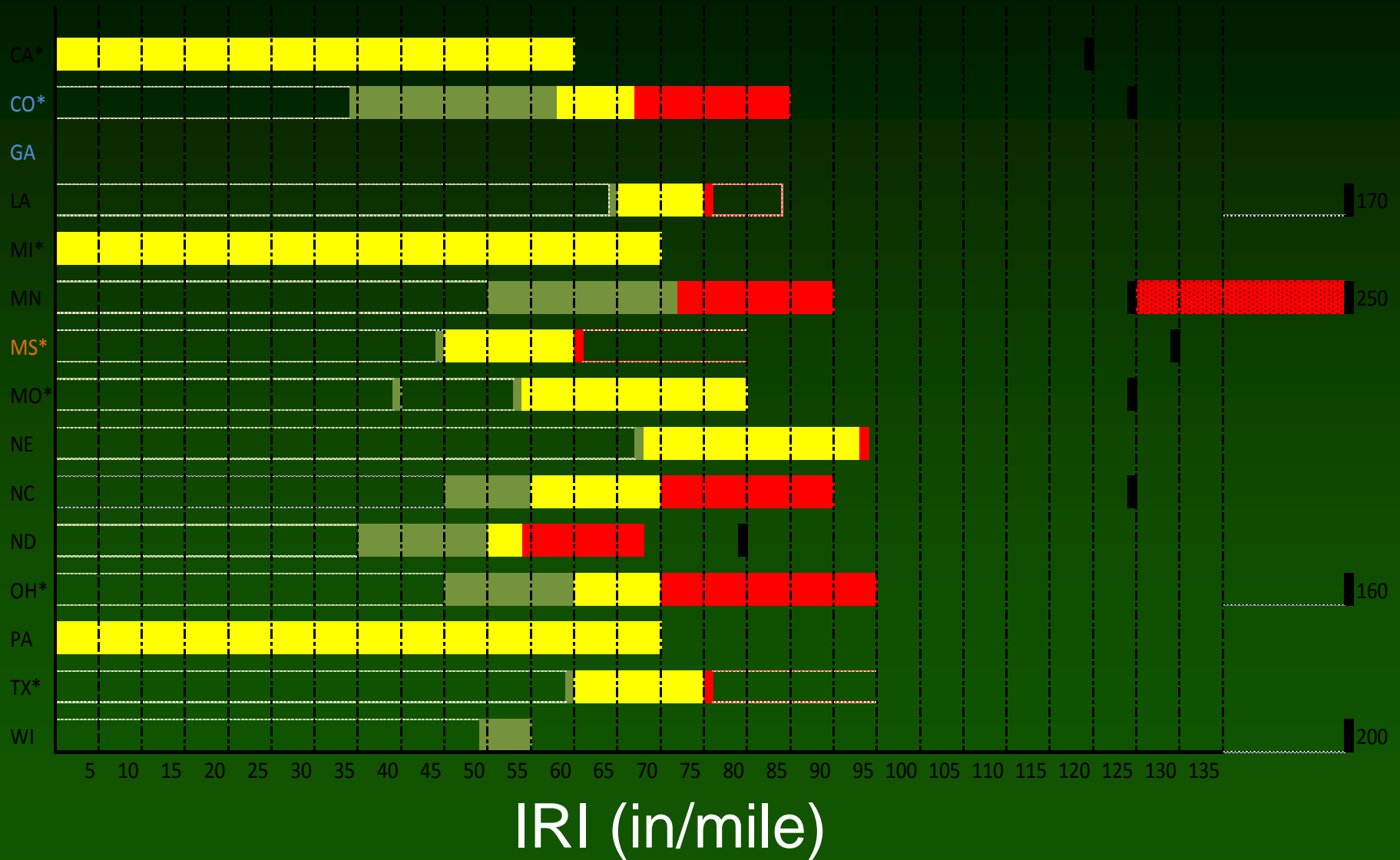
J. MOULTHROP AND C. ALVARADO
Pugro Consultants, Inc.
Austin, Texas

TRANSPORTATION RESEARCH BOARD

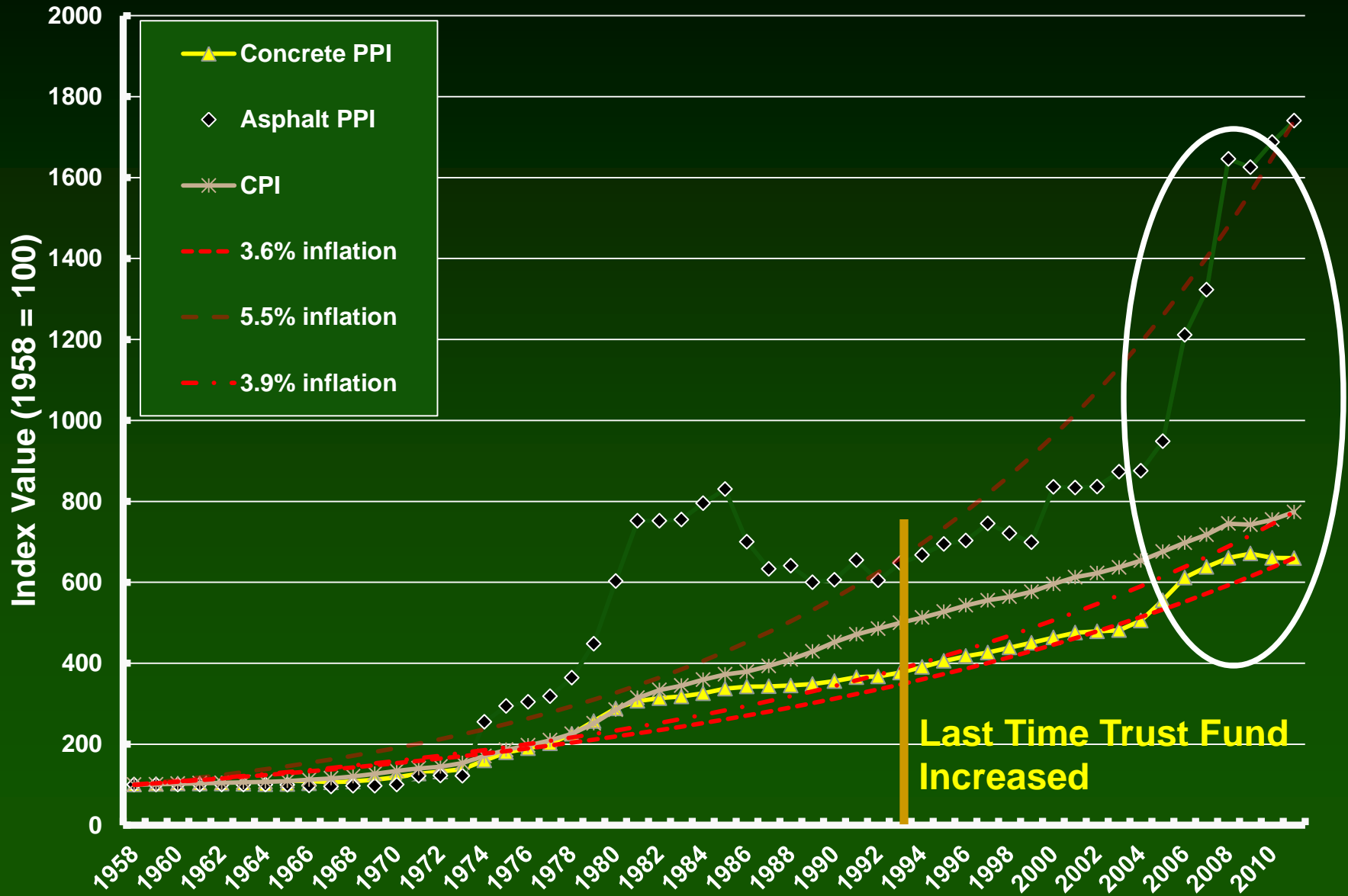
WASHINGTON, D.C.
2011
www.TRB.org

Treatment	Expected Performance	
	Treatment Life (yr)	Pavement Life Extension (yr)
Concrete joint resealing	2–8	5–6
Concrete crack sealing	4–7	NA
Diamond grinding	8–15	NA
Diamond grooving	10–15	NA
Partial-depth concrete patching	5–15	NA
Full-depth concrete patching	5–15	NA
Dowel bar retrofitting	10–15	NA
Ultra-thin bonded wearing course	6–10	NA
Thin HMA overlay	6–10	NA

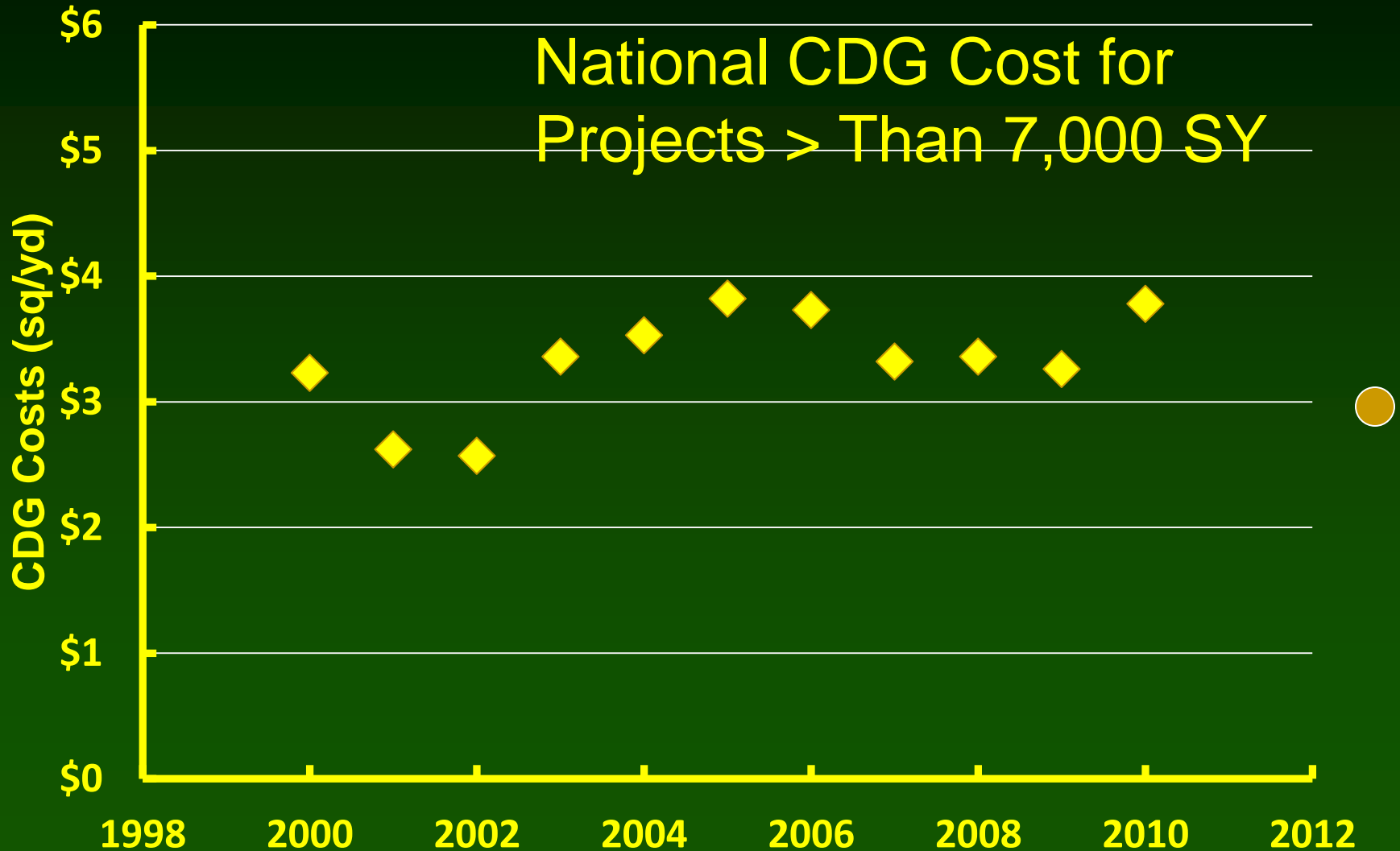
Smoothness



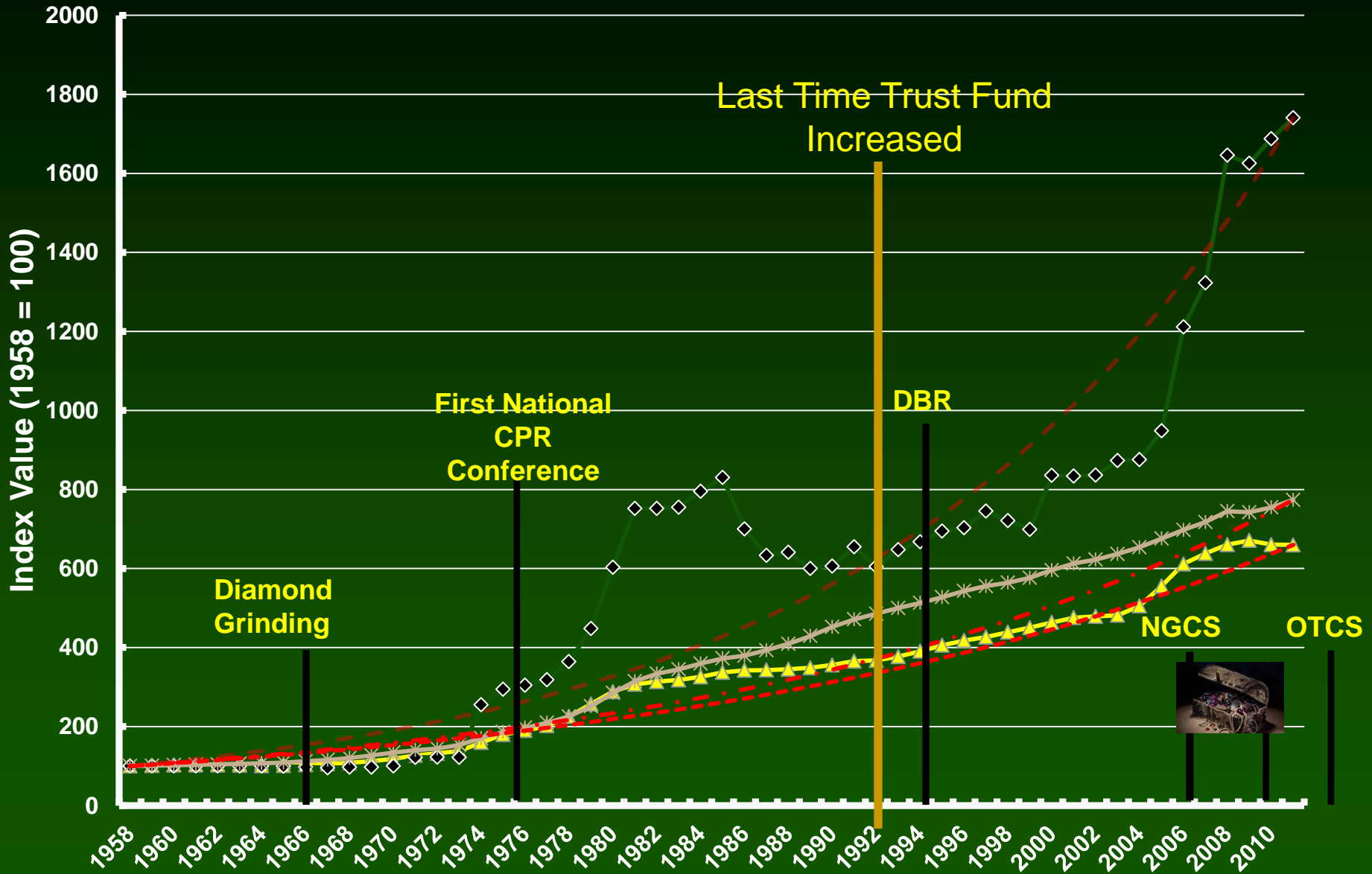
Commodity Price Increases



Diamond Grinding is Cost Effective and Predictable



Commodity Price Increases



Factors to Consider In Preservation Strategy Selections

- Ride
- Skid
- Noise
- Distress Types
- Durability/Longevity
- **VALUE.....**

Concrete Pavement Preservation

- First Level of Response for Deteriorating Concrete Pavements Should Always be Preservation
 - Best Value
 - Least Service Disruption
 - Increases Safety
 - Least Use of Non Renewable Resources
 - Ensures Customer Satisfaction

Purpose of Concrete Pavement Preservation

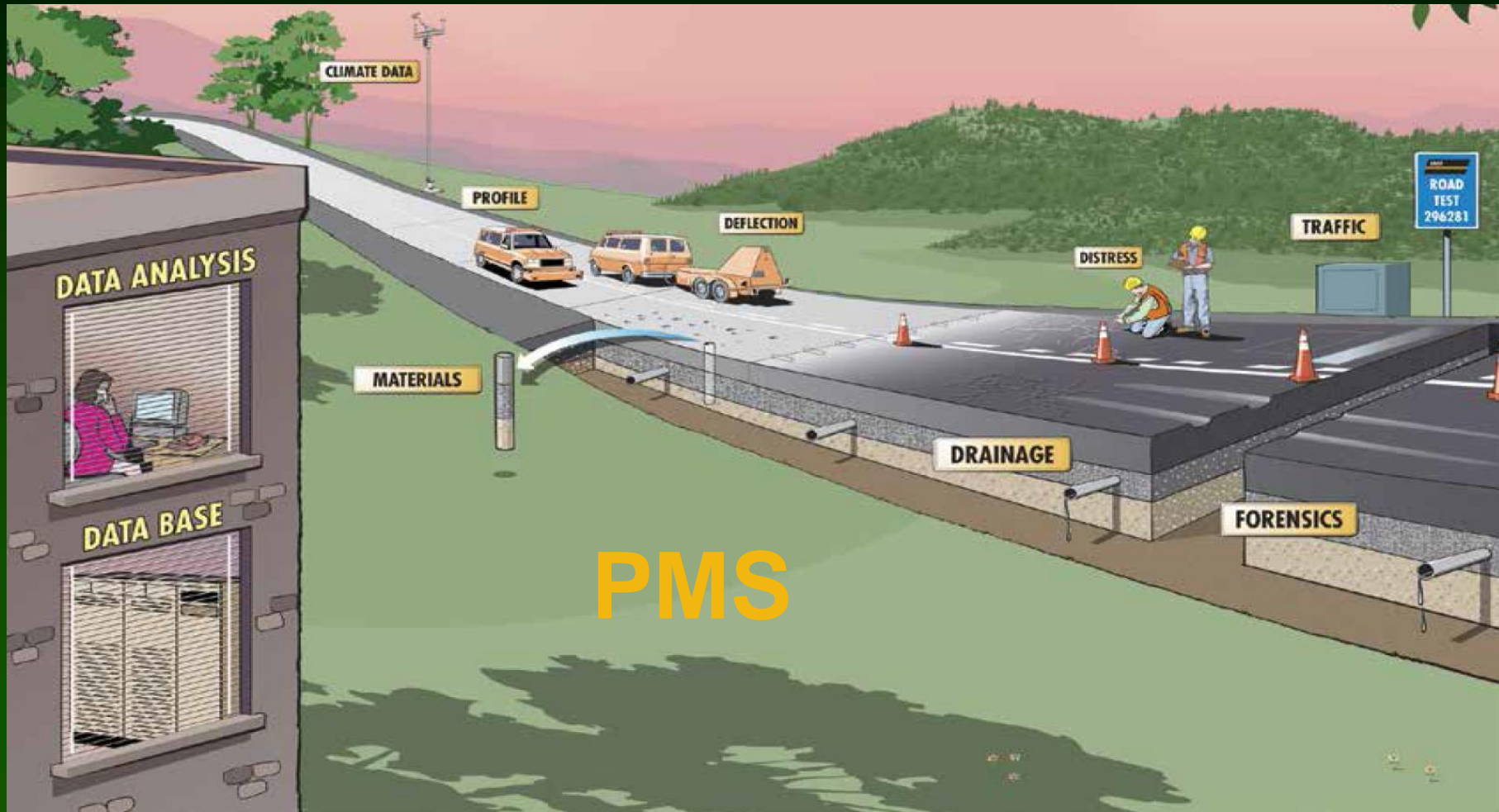
- Used early when pavement has little deterioration.
 - Repairs isolated areas of distress.
 - Repairs some construction defects.
 - Manages the rate of deterioration.



Where is the VALUE



So How Do You Ensure Value



Why You Want Data In Lieu of Opinions



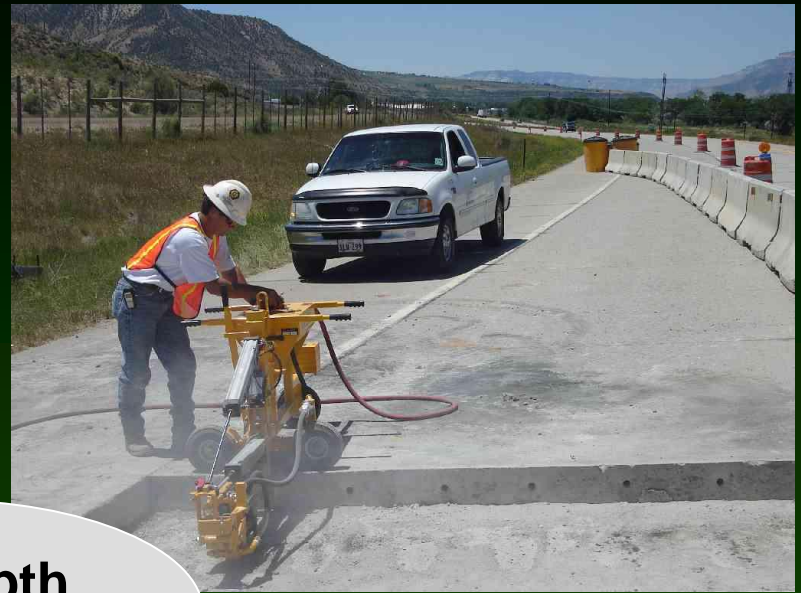
Preservation Strategy Selection

Determining correct strategy is NOT complicated.

- Determine the cause of distress.
 - Structural, Functional , Material, Drainage
- Consider multiple perspectives
 - Ride Quality, Traffic, Noise, Maintenance Requirements, Lane-Condition Uniformity, Future Performance, Cost

Concrete Pavement Preservation Techniques

- Full-depth repair
- Partial-depth repair
- Slab stabilization
- Retrofitting dowels
- Cross-stitching longitudinal cracks/joints
- Diamond grinding
- Joint & crack resealing

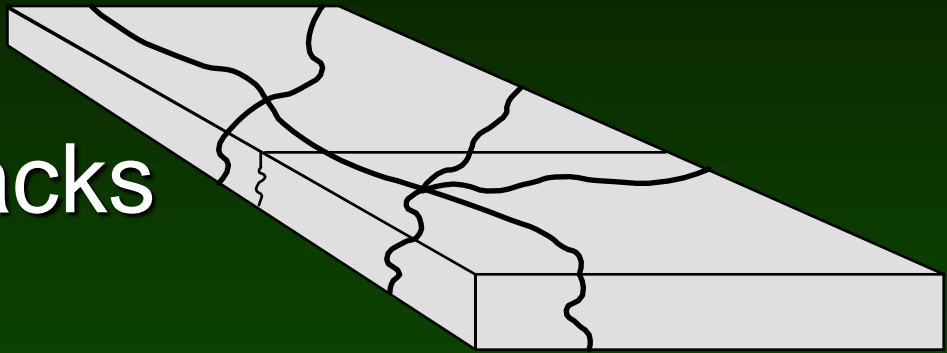


**Full Depth
Repairs**

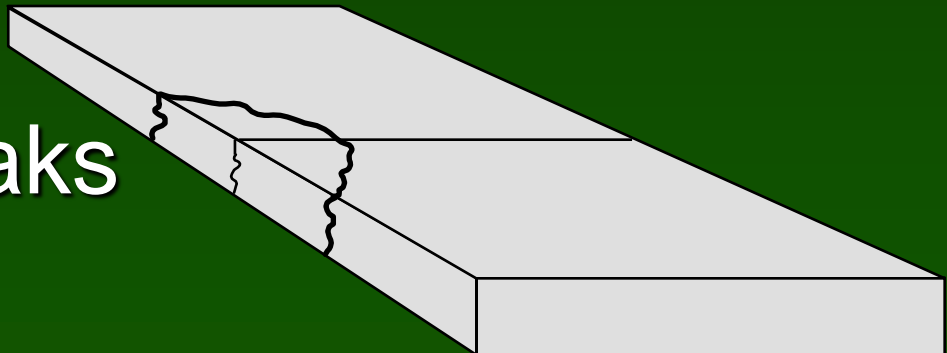


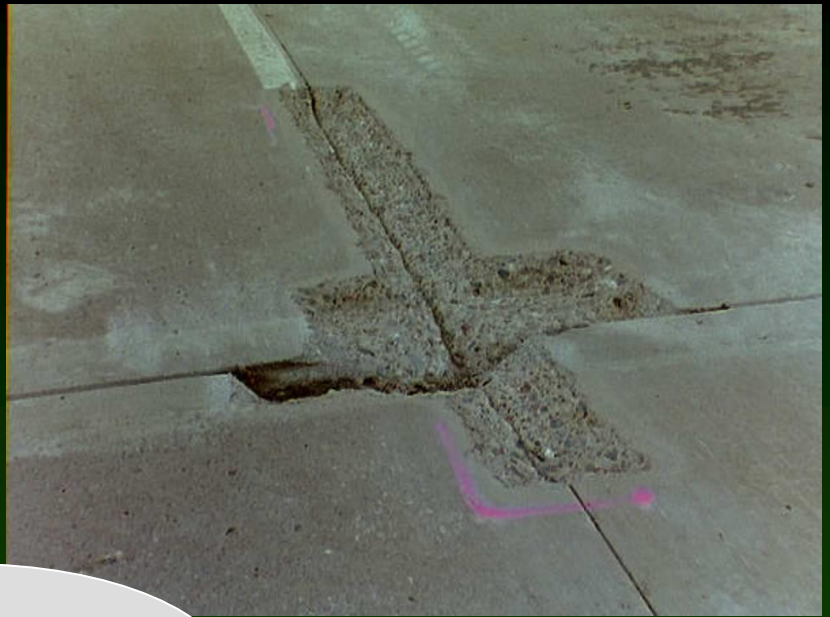
Full-Depth Repair

Multiple Cracks



Corner Breaks



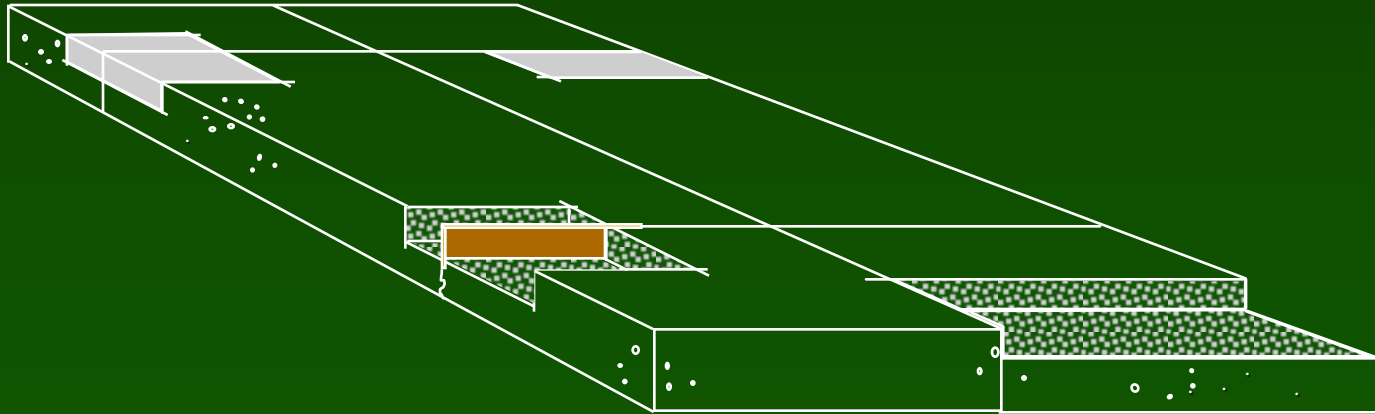


**Partial Depth
Patching**



Partial Depth Repairs

- Repairs deterioration in the top 1/3 of the slab.
- Generally located at joints, but can be placed anywhere surface defects occur.



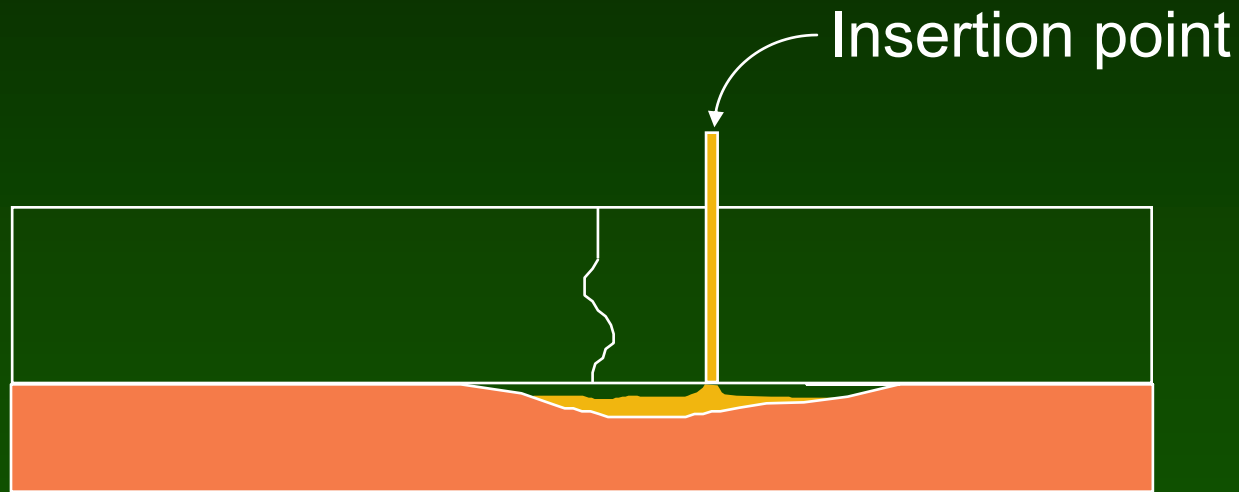


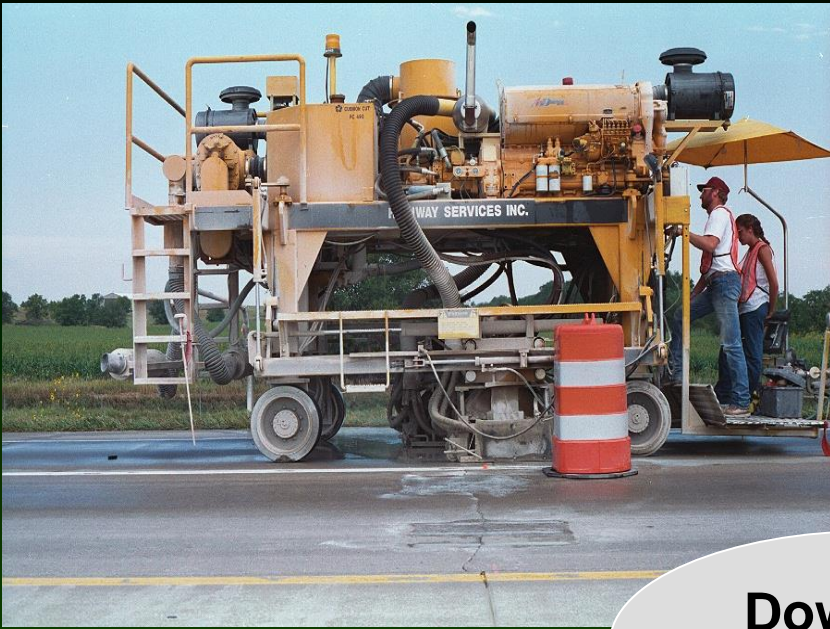
**Slab
Stabilization/
Jacking**



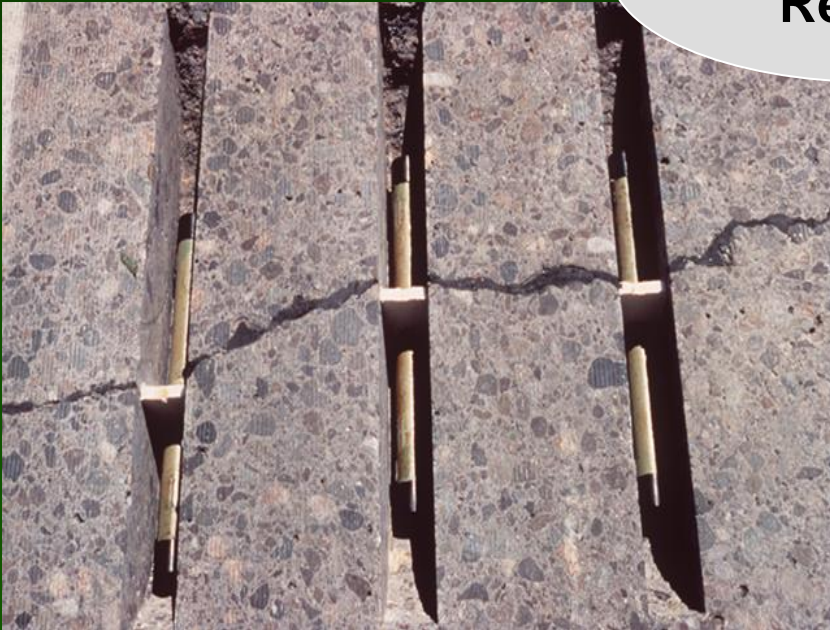
Slab Stabilization / Slab Jacking

Pressure insertion of flowable material beneath the PCC slab



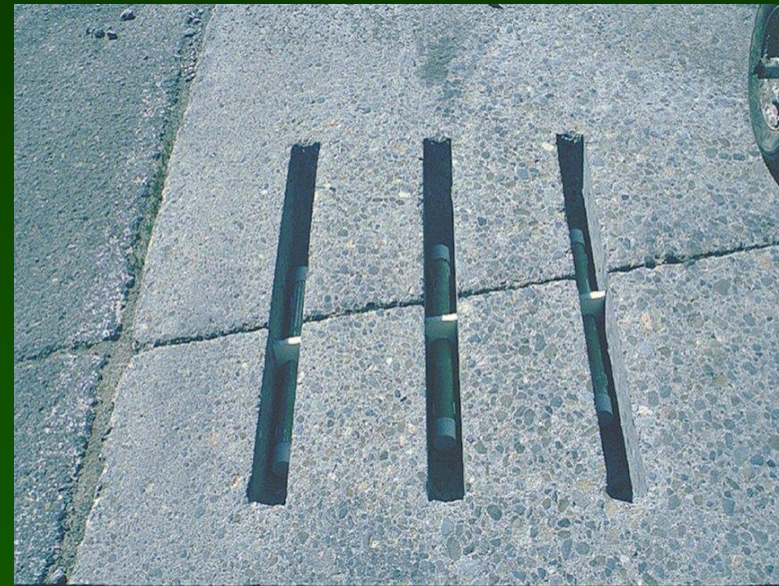


**Dowel Bar
Retrofit**



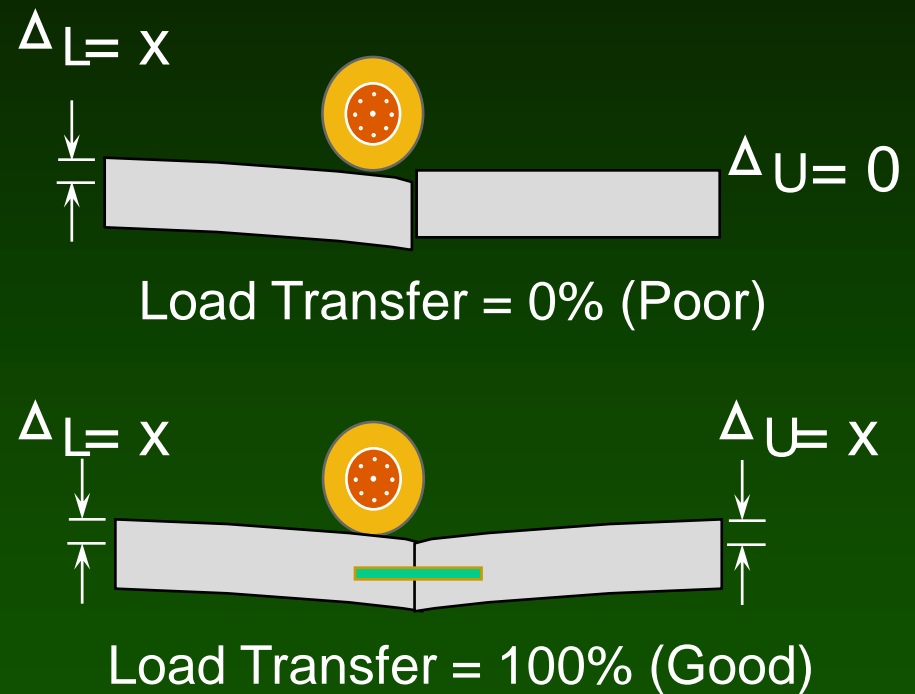
Load Transfer Restoration

- Placement of load transfer devices across joints or cracks of existing pavements
- Candidate projects
 - Poor load transfer (< 70 %)
 - Pumping
 - Faulting
 - Corner breaks



Purpose of Load Transfer Restoration

- Reestablish load-transfer across joints or cracks
 - Load-transfer is a slab's ability to transfer part of its load to its neighboring slab
- Used in JRC and JPC pavements to limit future faulting

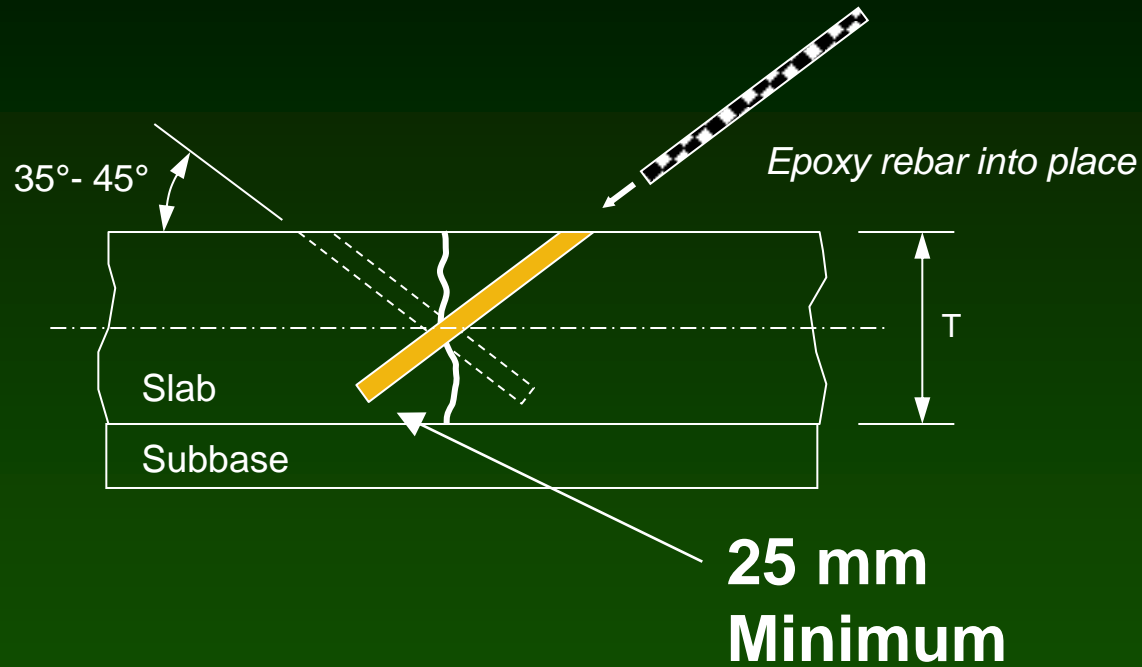




**Cross
Stitching**

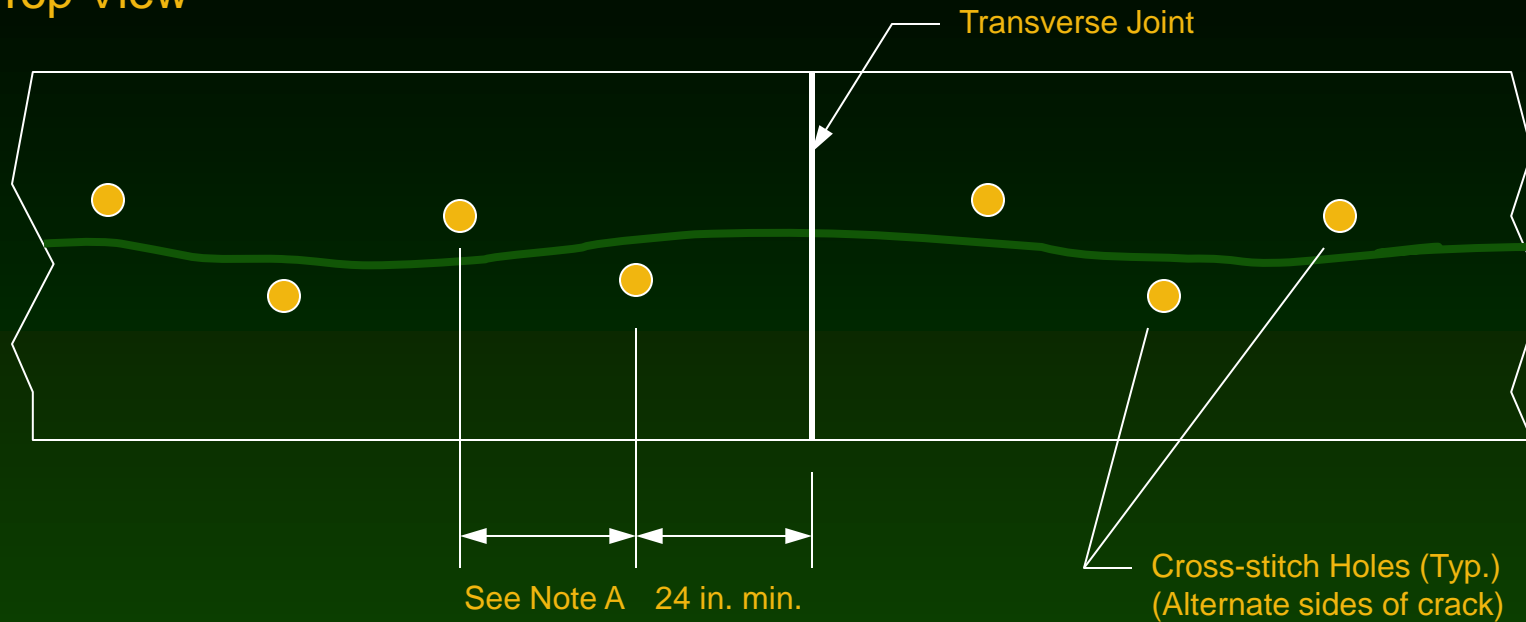


Cross Stitching

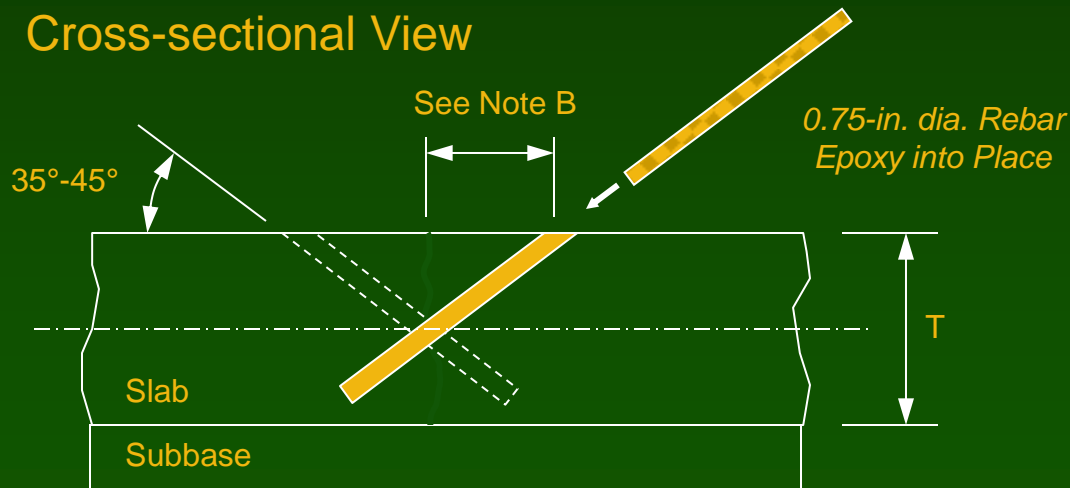


Cross-sectional View

Top View



Cross-sectional View

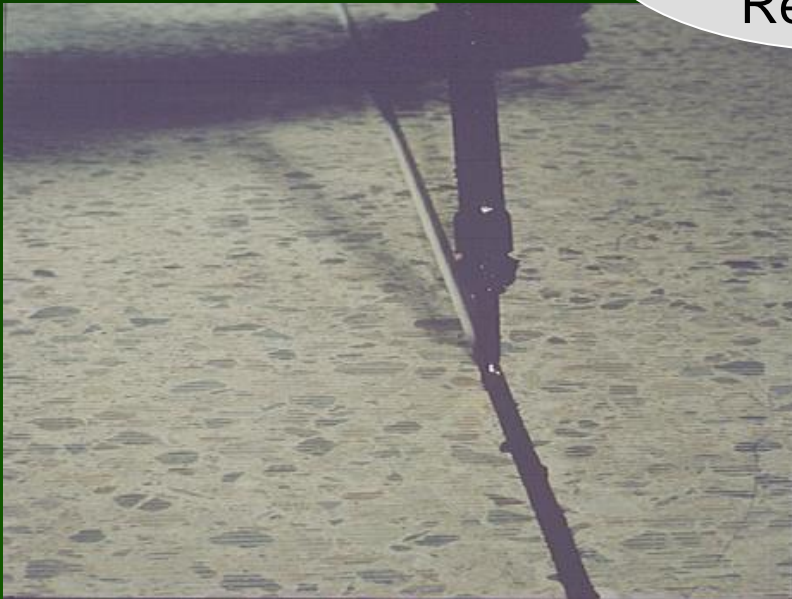


Note A: Distance between holes is 24 in. for heavy traffic; 36 in. for light traffic

Note B: Determine distance from longitudinal crack to hole based on slab thickness T and drill angle. Slabs less than 12 inches thick require a 35° insertion angle.

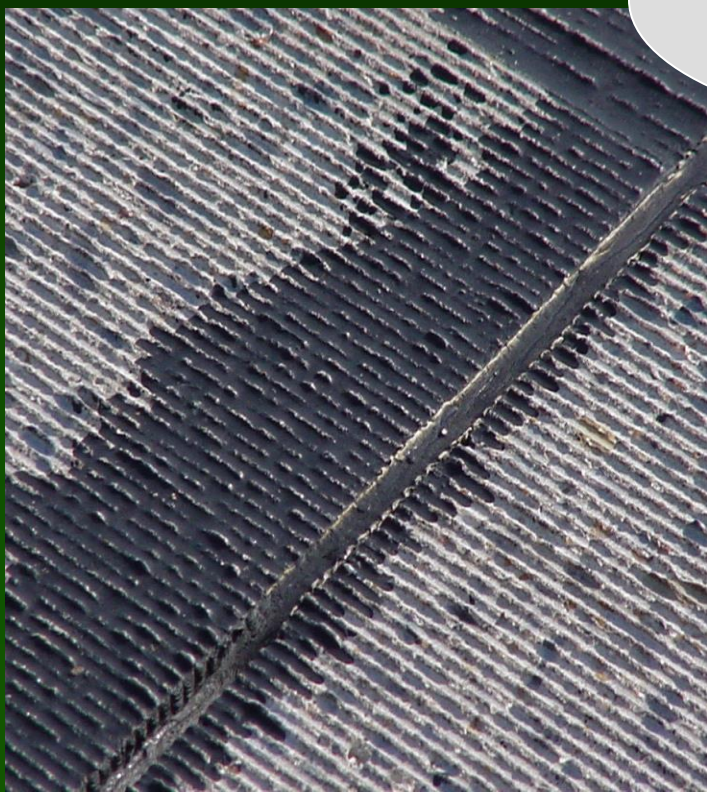


Joint and Crack Resealing





Diamond Grinding



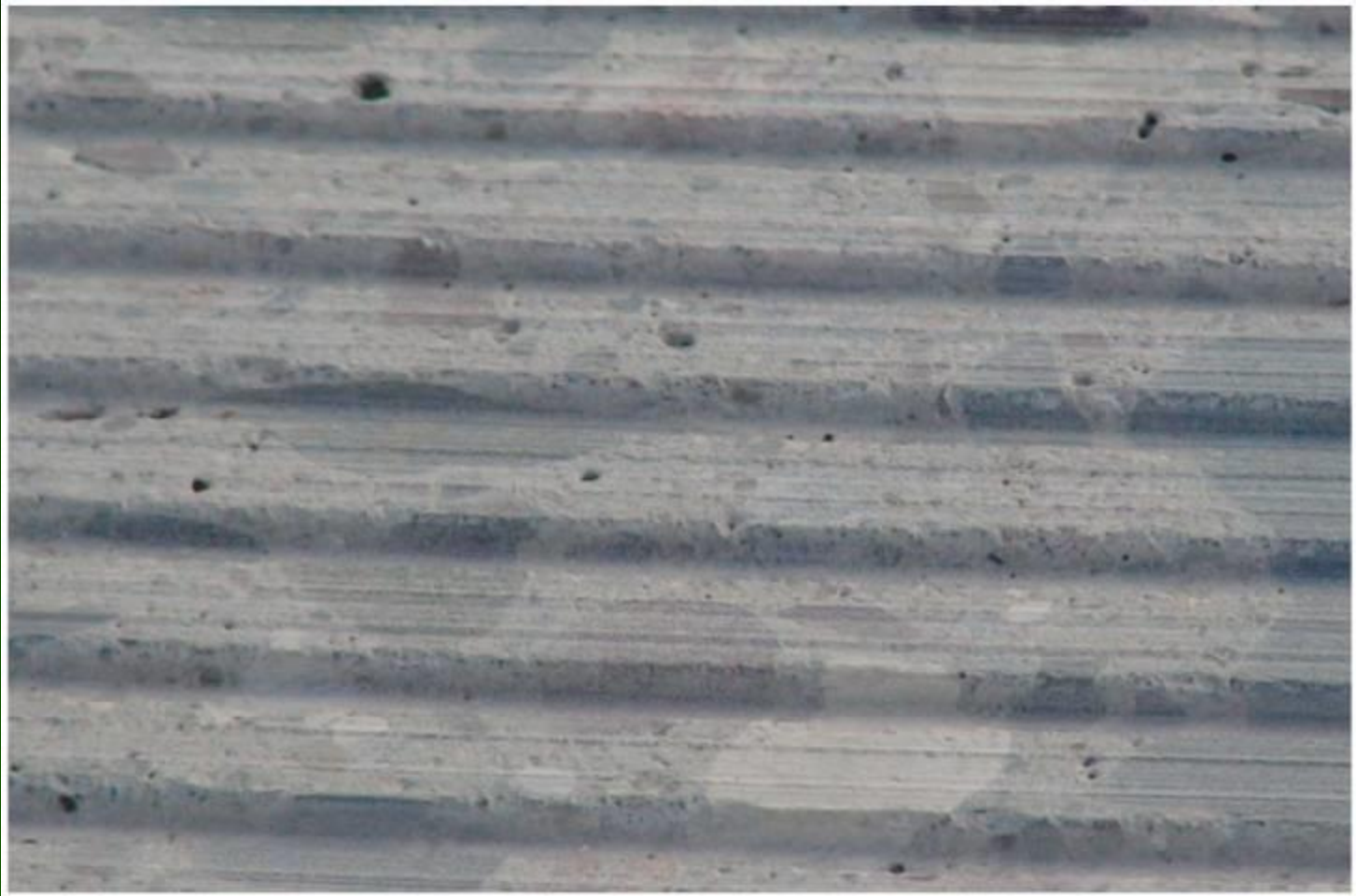
What is Diamond Grinding?

- Removal of thin surface layer of hardened PCC using closely spaced diamond saw blades;
- Results in smooth, level pavement surface;
- Longitudinal texture with desirable friction and low noise characteristics;
- **Comprehensive part of any PCC Pavement Preservation program**

Conventional Diamond Surface




Next Generation Concrete Surface (NGCS)





Effectiveness of Diamond Grinding - CALTRANS

- CALTRANS has determined that the average life of a diamond ground pavement surface is 17 years and that a pavement can be ground at least three times without affecting pavement structurally.

 **STATE OF CALIFORNIA**
DEPARTMENT of TRANSPORTATION

**DIVISION OF
ENGINEERING SERVICES**
**MATERIALS ENGINEERING
AND TESTING SERVICES**
**OFFICE OF RIGID PAVEMENT
AND STRUCTURAL CONCRETE**

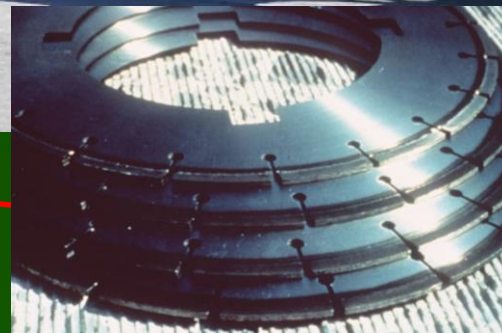
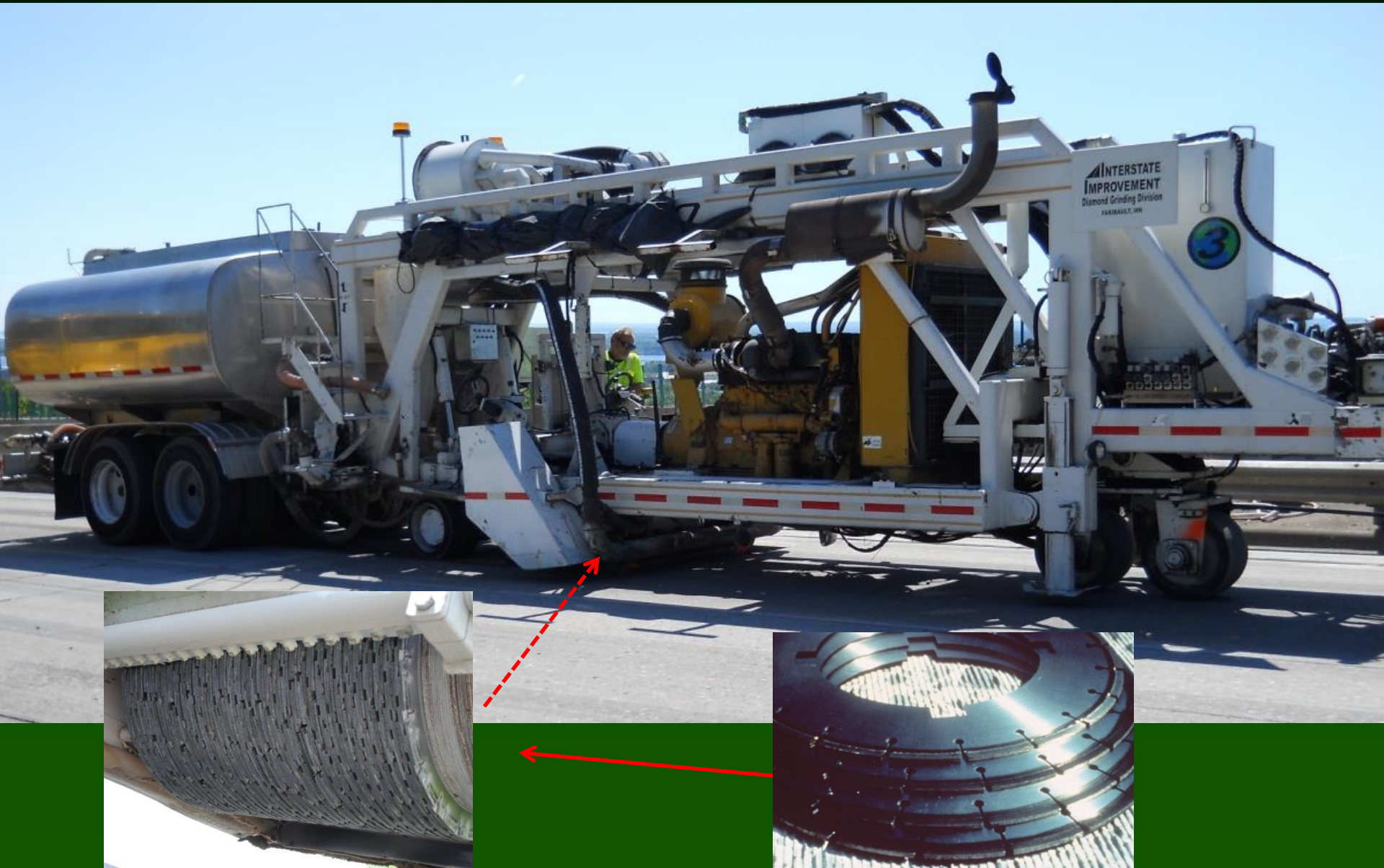
**5900 Folsom Boulevard
Sacramento, California 95819**

**THE EFFECTIVENESS OF DIAMOND GRINDING
CONCRETE PAVEMENTS IN CALIFORNIA**

November 2004

Diamond Grinding Equipment



References

CONCRETE PAVEMENT PRESERVATION WORKSHOP

February 2008

Reference Manual



U.S. Department of Transportation
Federal Highway Administration



Prepared for
Federal Highway Administration Office of Pavement Technology
400 7th Street NW
HFT 20
Washington, D.C. 20590

Prepared by
National Concrete Pavement Technology Center
at Iowa State University
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Ames, IA 50010-8564

References

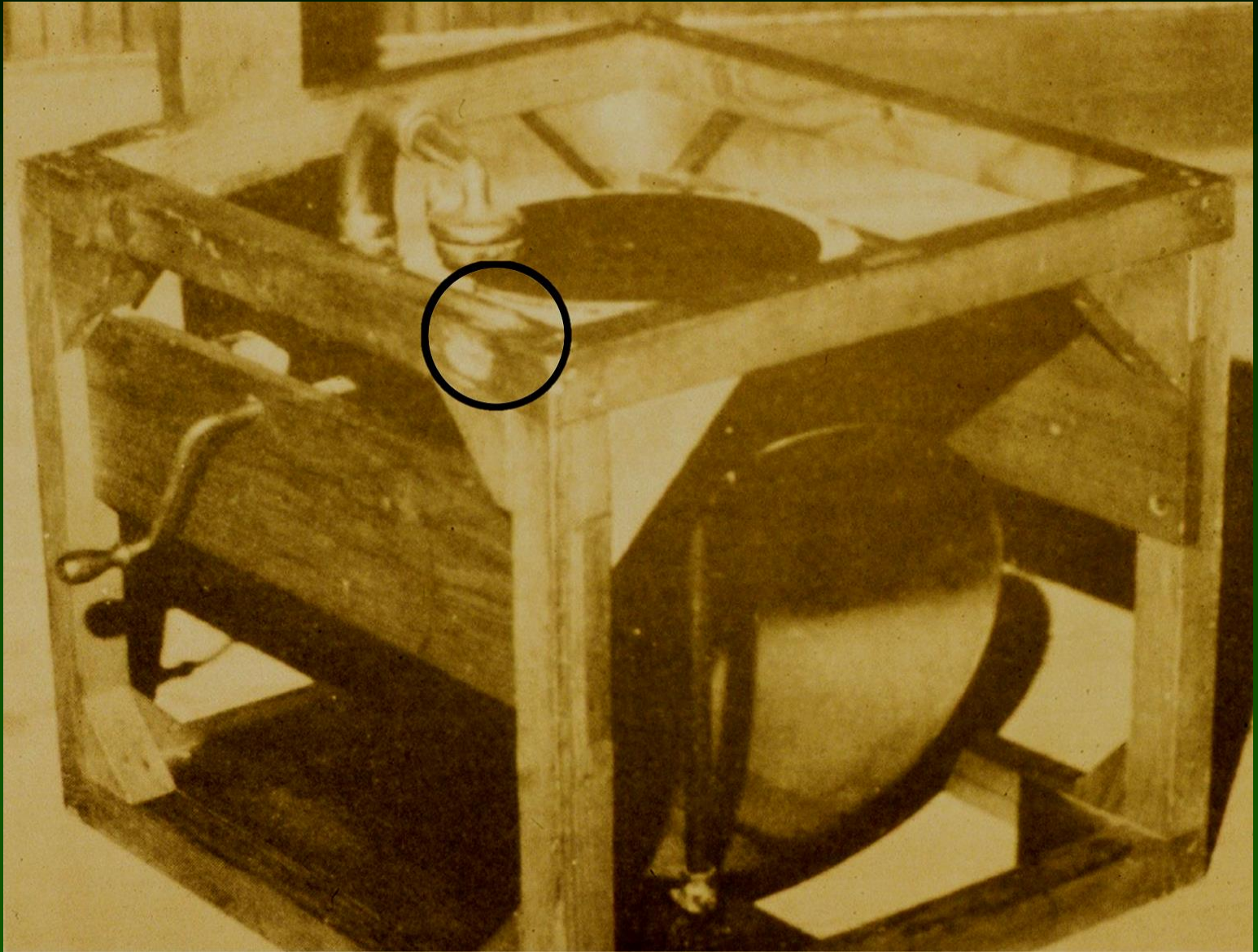
GUIDE FOR _____

PARTIAL-DEPTH REPAIR OF CONCRETE PAVEMENTS

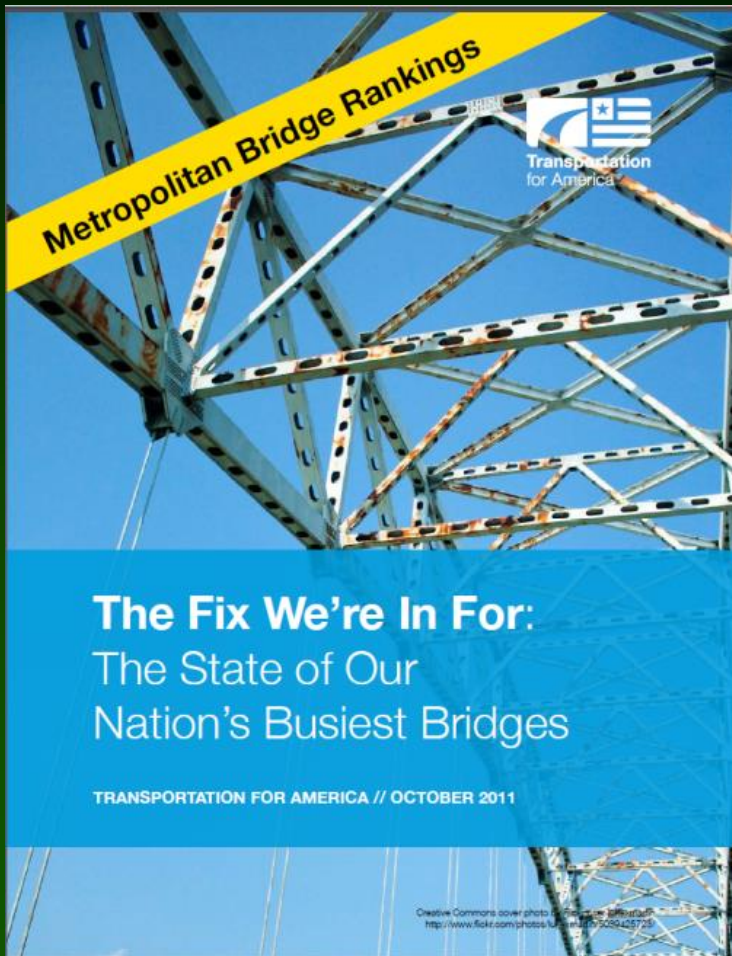
April 2012



Audience Participation Time



Bridge Deck Communications



McDonald's vs. deficient bridges in 102 largest US metropolitan areas



~14,000

Number of US locations



18,239

Number of deficient bridges



64 million

Daily customers served worldwide



210 million

Trips taken daily on deficient bridges

Questions?

