

# Distress Identification and Scoping of Concrete Pavements

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# Historical Pavement Cross-Section is helpful for determining cause of distress

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Jointed Reinforced  
Concrete Pavement  
(JRCP) constructed up  
to the early 2000's

Jointed Plain Concrete  
Pavement (JPCP)  
constructed from the  
late 1990's to present.

Continually Reinforced  
Concrete Pavement  
(CRCP) constructed  
from 1958 to 1979.

Unbonded Concrete  
Overlay on Concrete  
(UBCOC) constructed  
from 1984 to present.



## JOINT DURABILTY DISTRESS

*Re-Seal Joints with Silane* pre-treatment if spalling has not occurred.

*Mastic with Silane* pre-treatment for spalled joints.

*Full Depth Repair* for extensive spalling across the joint.



Figure 2: Core 1, at transverse joint, near shoulder.



## TRANSVERSE CRACKING

*Full Depth Repair if faulting or spalling  
Dowel Bar Retrofit and/or Crack Sealing if stable.*



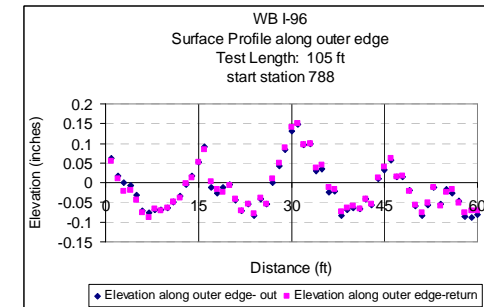
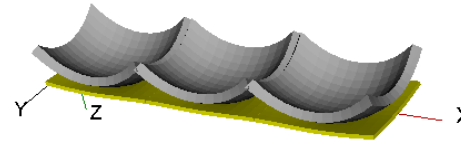


# TRANSVERSE CRACKING

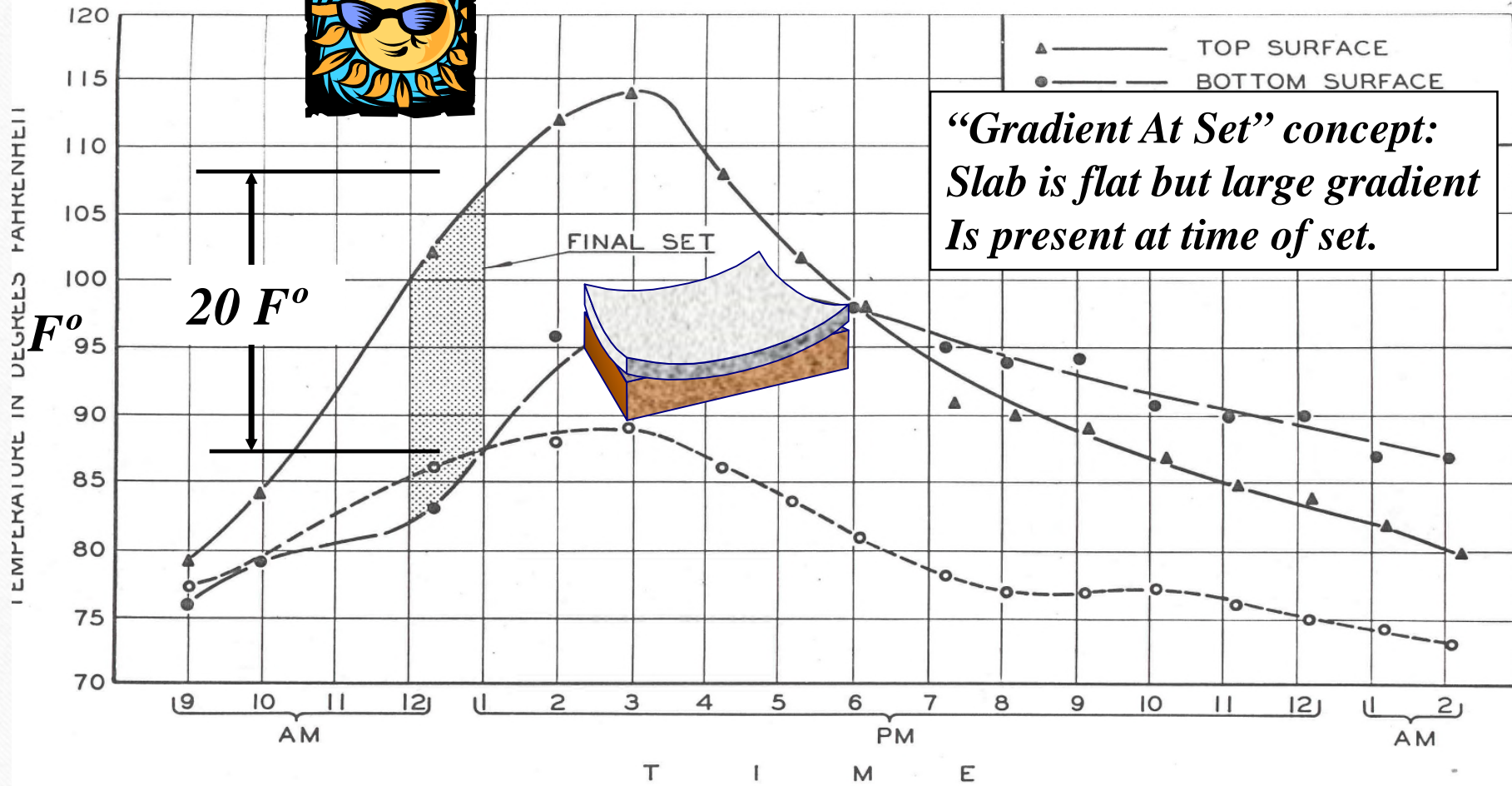
## Curling and Warping

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JPCP, 7 Years after construction: extensive mid-slab cracking and dowel bar looseness due to moisture warping







TEMPERATURES of PAVEMENT SLAB Poured *at* 7:30 A.M.

*C.C. Rhodes, MDOT, 1950*



# LONGITUDINAL CRACKING

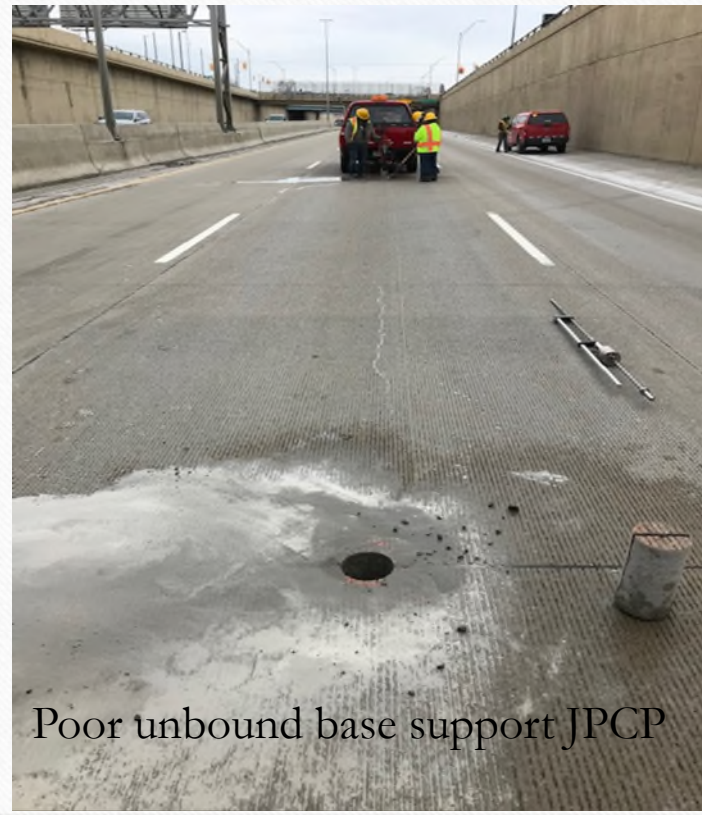
*Full Depth Repair* for loss of base support.

*Crack Sealing* for stable base support.

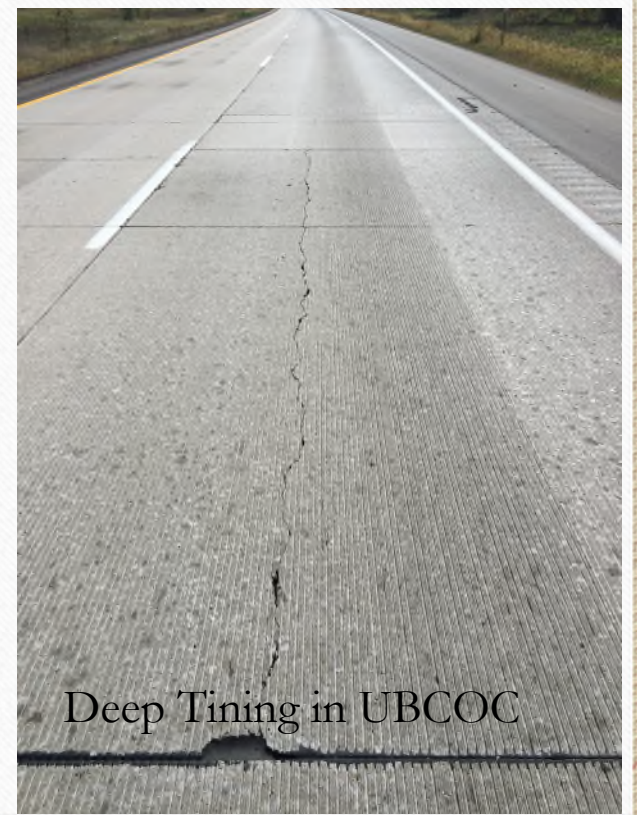
*Core ends of crack at transverse joint* to arrest continued development.



Erosion of HMA interlayer along edge of UBCOC



Poor unbound base support JPCP



Deep Tining in UBCOC





## **JOINT and MID-PANEL SPALLING**

*Partial Depth Repair* with Non-Cementitious or Mastic material.

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## **CORNER BREAKS**

*Full Depth Repair* for large corner breaks with working cracks.



## FAULTING

Consider *Diamond Grinding* when IRI is 95 to 120, *Diamond Grooving* when aggregate AWI is less than 260





## POLISHED AGGREGATE

Older pavements where surface texture has been removed by traffic over time.

Newer pavements that have been diamond ground for initial ride quality requirements that have been worn smooth by traffic.

Check friction numbers, traffic speed, and wet weather accident information for project selection.

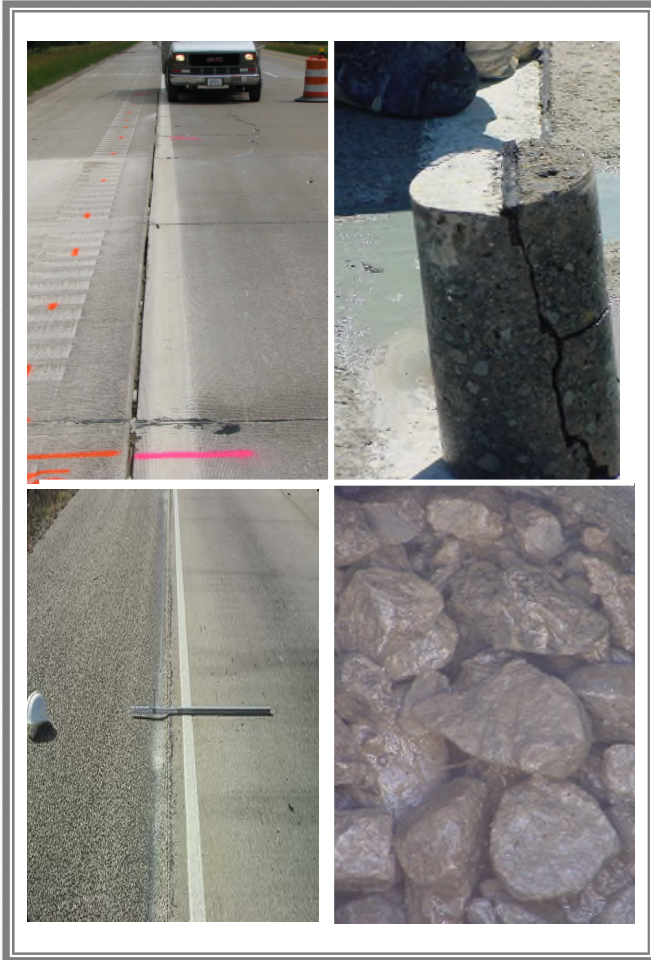
*Diamond Grooving* is a selection option to increase macro-texture, channel water, and improve lateral tire stability.

*High Friction Surface Treatment* is another selection option that will greatly improve friction numbers.





# EDGE DROP



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- Poor Load Transfer across the shoulder.
  - Increased surface water entering the shoulder joint.
  - Reduces resilient modulus of base at the edge of pavement leading to non-uniform support.
  - JRCP and JPCP constructed from on open-graded unbound base.
  - Movement of fines from the unbound base.
  - UBCOC from pumping erosion of the asphalt interlayer.





## PUMPING

Investigate the problem before selecting a repair option.

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# SHATTERED SLAB

*Full Depth Repair*

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## PUNCHOUTS

CRCP constructed on unbound base (all sections remaining are composite pavements).

JRCP constructed from 1983 to 1990 with very open-graded base with no geotextile separator.

*Full Depth Repair* is recommended.







## **BLOWUPS**

*Full Depth Repair with added Expansion* across the entire pavement and shoulder.

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## Deterioration of previous full depth repairs

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Treatment option is a new *Full Depth Repair*

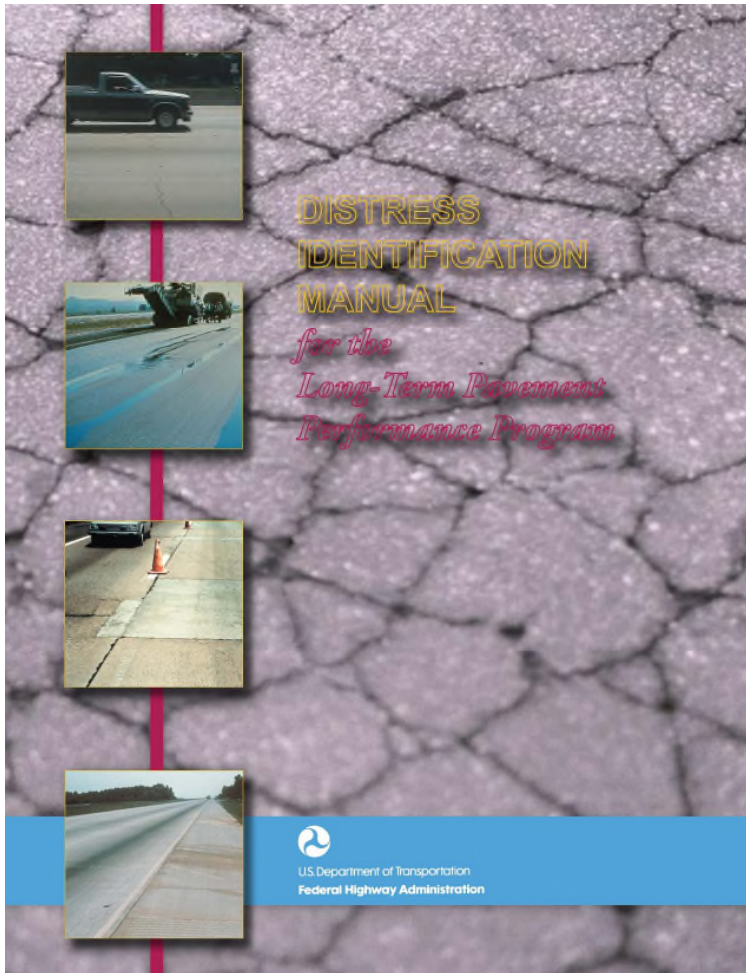


# CFS Equipment used for investigating pavement distress

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DISTRESS  
IDENTIFICATION  
MANUAL

*for the  
Long-Term Pavement  
Performance Program*



U.S. Department of Transportation  
Federal Highway Administration



# •Concrete Pavement Distress Assessments and Solutions

•IDENTIFICATION, CAUSES, PREVENTION & REPAIR



IOWA STATE UNIVERSITY  
Institute for Transportation

National Concrete Pavement  
Technology Center 