

Concrete Pavement Repairs

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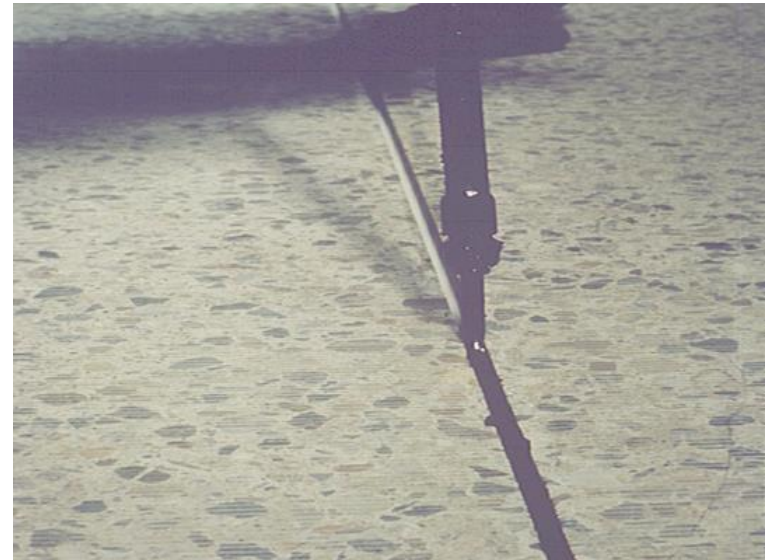
- Full-Depth Repairs
 - Removal & replacement of deteriorated concrete thru entire slab thickness
 - Joints & mid-panel cracks
- Partial-Depth Repairs
 - Removal & replacement of shallow areas of deteriorated concrete
 - Upper $\frac{1}{2}$ of slab thickness



Common Treatments Accompanying Repairs



Diamond
Grinding



Joint
Sealing

- Others: Dowel bar retrofit, slab stabilization, edge drains

Why Concrete Pavement Treatments?

- Maintain functionality
 - Smoothness
 - Safety
- Restore structural capacity
- Enhance performance
- Extend life



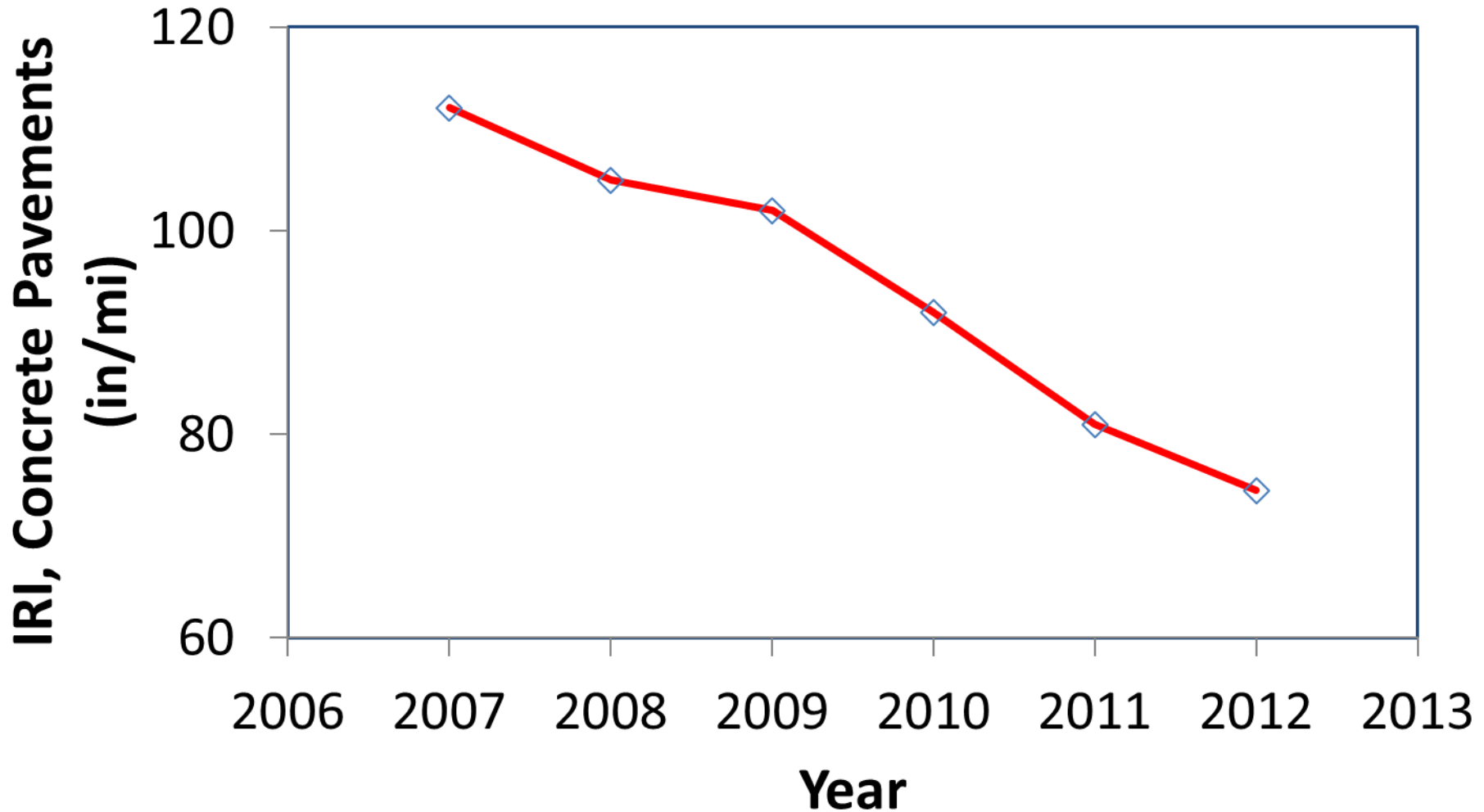
Managing Your Investment

Managing Your Investment Through Concrete Treatments

- Be practical: use appropriate treatments for specific distresses
- Be proactive: timing is everything
- Be particular: proper design and materials are important
- Be proficient: quality matters



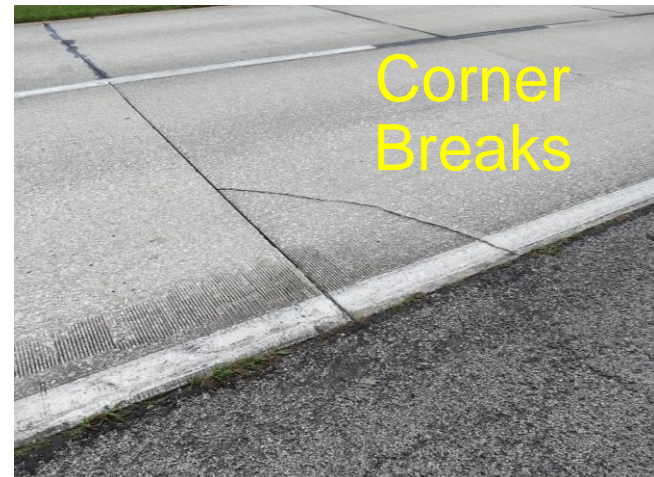
Managing Concrete Pavements in Kentucky



Full-Depth Repairs



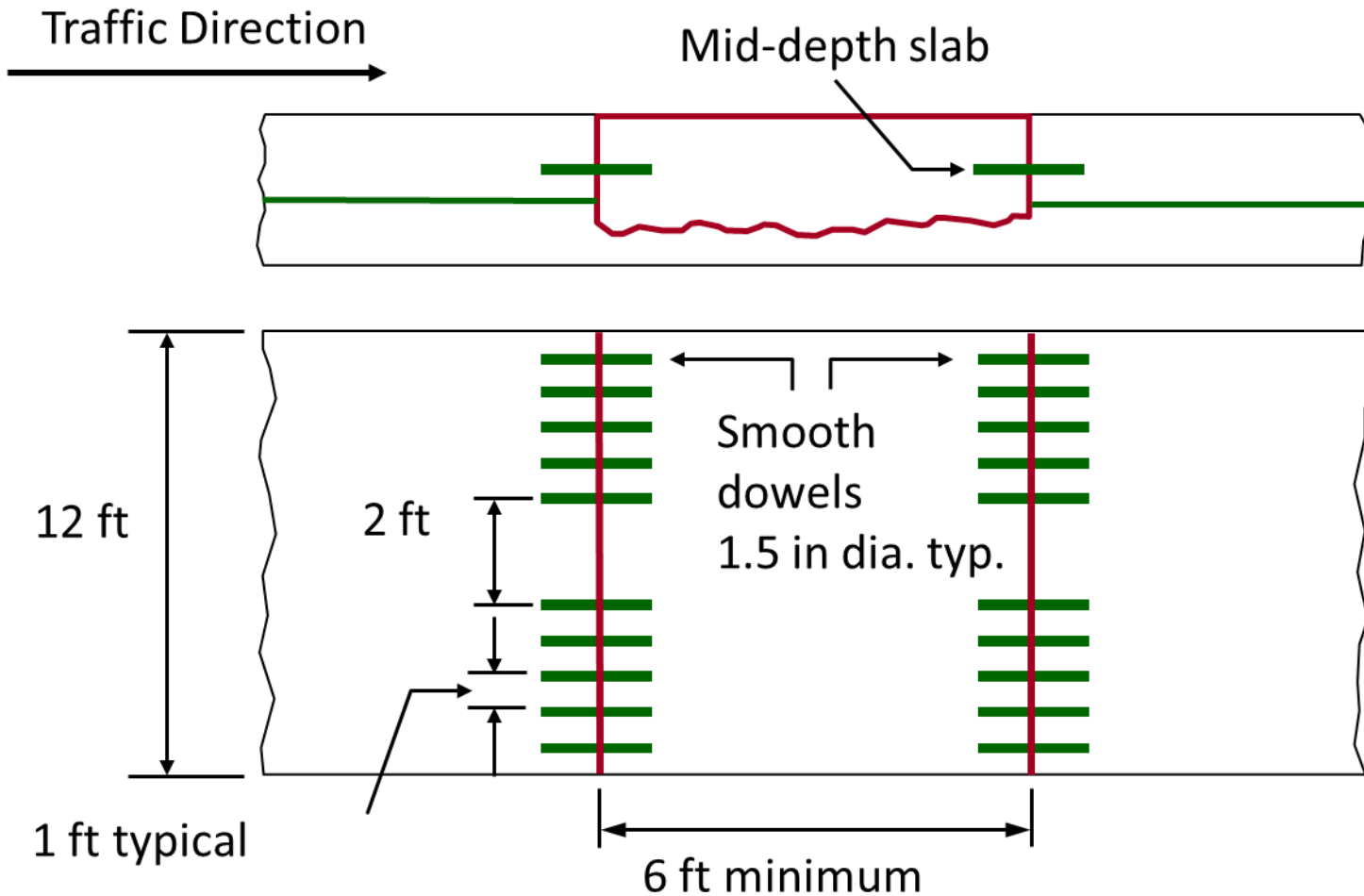
BE PRACTICAL: Select Appropriate Distresses



BE PROACTIVE: Proper Timing



BE PARTICULAR: Proper Design & Layout



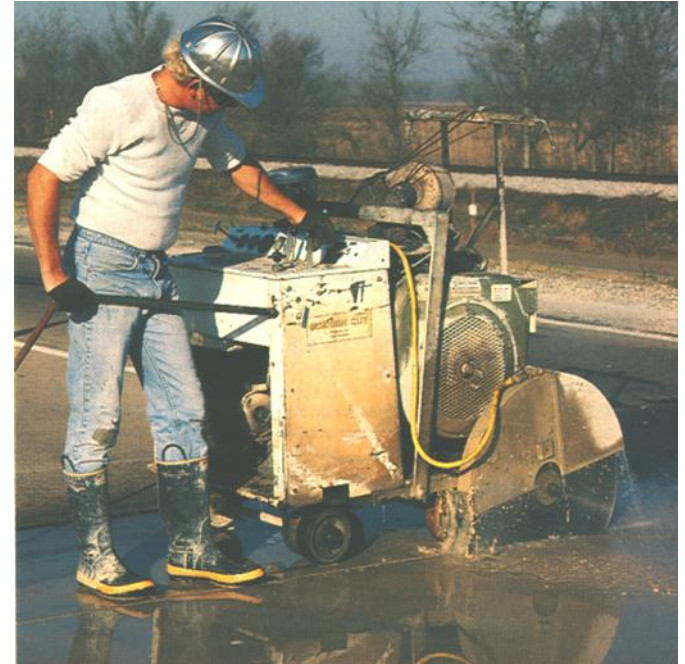
BE PARTICULAR: Durable Materials

- Cementitious materials most common
 - Type I, II, or III
 - Low w/c
 - Accelerators and water reducers
 - 4 to 24+ hour mixes
- Proprietary mixes
 - Opening times < 4 hours



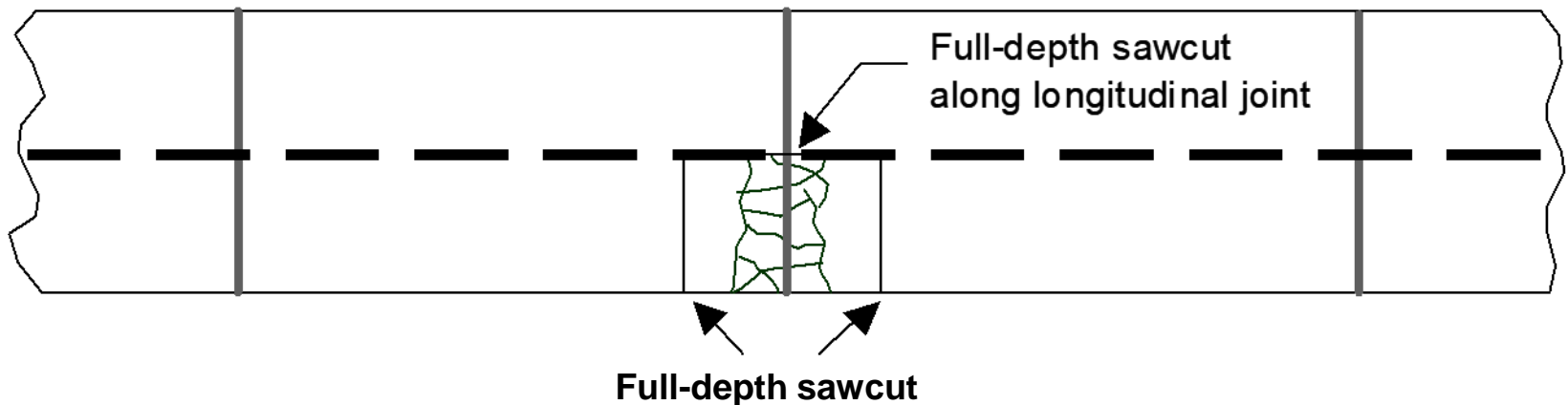
BE PROFICIENT: Proper Installation & Construction

- Layout repair locations
- Saw boundaries
- Remove concrete
- Prepare area
- Provide load transfer
- Place and finish concrete
- Curing
- Opening to traffic



Sawing

- Full-depth, diamond-bladed sawing
- Entire perimeter of repair area
- Limit traffic loading on sawed pavement



Removal

- Breakup and Cleanout
 - Pneumatic hammers
 - Drop hammers
 - Backhoe
- Lift-out (preferred)
 - Pin & chain/lifting equipment
 - Advantages:
 - Quick and easy
 - High levels of productivity
 - Minimizes damage to base



Load Transfer

- Critical to long-term performance
- Dowel characteristics:
 - Diameter: Typically D/8 or larger
 - Length: Typically 18 inches
 - Corrosion-resistant (epoxy common)
 - Bondbreaker on protruding ends

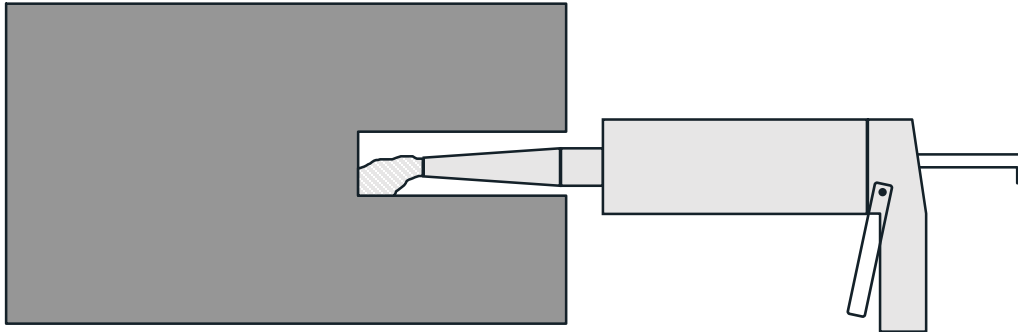


Drilling Holes for Dowels

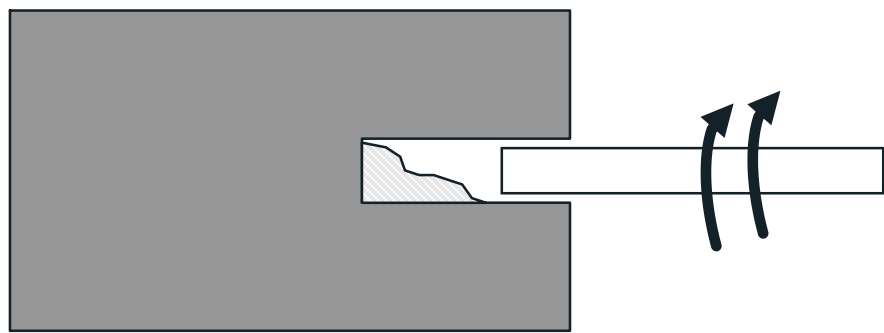


Dowel Placement

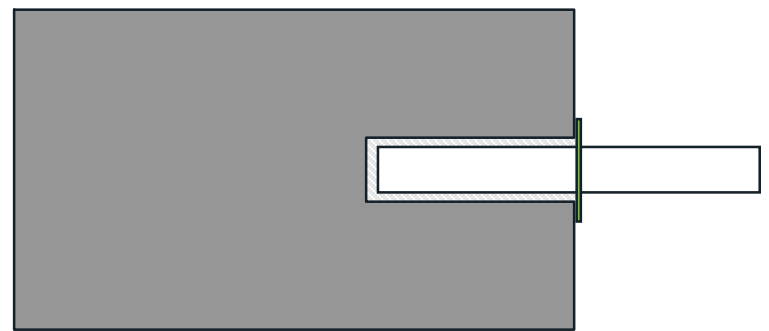
1



2



3



Repair Installation



Curing

- White pigmented curing compound
- Apply immediately after texturing
- Ensure uniform coverage



Opening to Traffic

- Compressive strength
 - 2000-3000 psi
- Flexural strength
 - 300-400 psi
- Thicker slabs can be opened at a lower strength



Performance of Full-Depth Repairs

- Performance generally good to excellent
- Requires proper design and construction:
 - Selection of proper candidate projects
 - Properly sized repairs
 - Good material removal practices
 - Effective load transfer
 - Proper material placement, finishing, and curing



A photograph showing construction workers in high-visibility vests performing partial-depth repairs on a road surface. A wheelbarrow is visible in the background, and a large concrete mixer truck is partially visible on the left. The scene is outdoors on a bright day.

Partial-Depth Repairs

BE PRACTICAL: Select Appropriate Distresses

- Joint spalling
- Surface deterioration
- Watch out for
 - Deep spalls
 - D-cracking, ASR



Joint Spalling

Deep Spall



D-Cracking

BE PARTICULAR: Durable Repair Materials

- Conventional cement-based materials
- Modified hydraulic cements (e.g., calcium aluminate)
- Polymer-based or polymer-modified (e.g., epoxy, polyester, polyurethane)
- Conventional bituminous



Proprietary Materials

- Fast setting
- Durable
- Constructability



Example Proprietary Products



Kwik Bond
PPC 1121



FibreCrete



GAP Patch 330



Delpatch



TechCrete

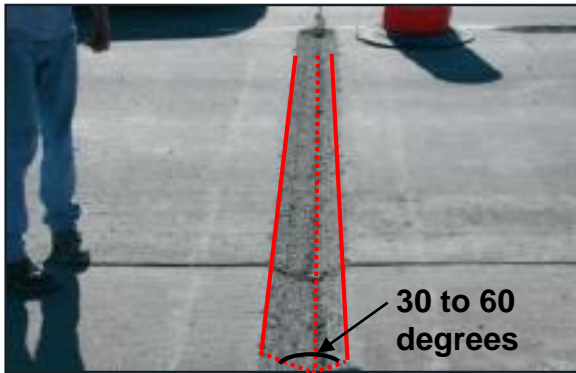
BE PROFICIENT: Effective Concrete Removal

- Methods:
 - Sawing/Chipping
 - Light jackhammer (no sawing)
 - Cold milling/wheel saws
 - Various head shapes & sizes
 - Various orientations



Milling Heads

“V” Shape Milling Head and Pattern



Wheel Saw and Rounded Pattern



Vertical Edge Mill Head and Pattern

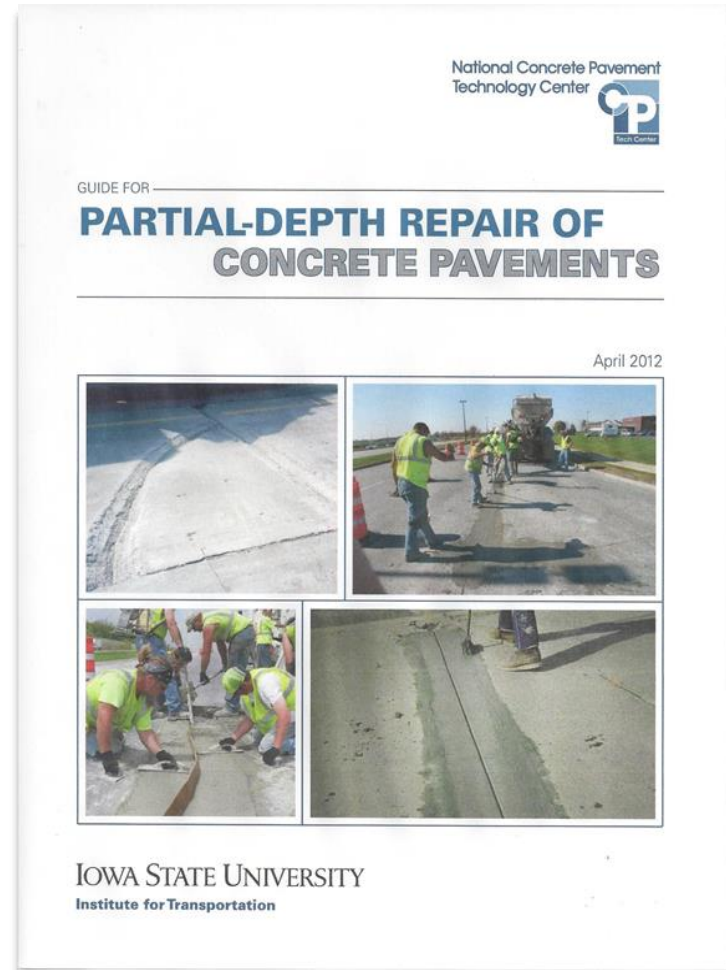


Performance of Partial-Depth Repairs

- 10-15+ years with appropriate use and proper installation
- < 2-3 years if:
 - Used on improper distresses
 - Incomplete removal of deteriorated concrete
 - Poor installation/workmanship



For Additional Info



<http://www.cptechcenter.org/>

Questions?



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