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# Background

# Partial Depth Joint Repair

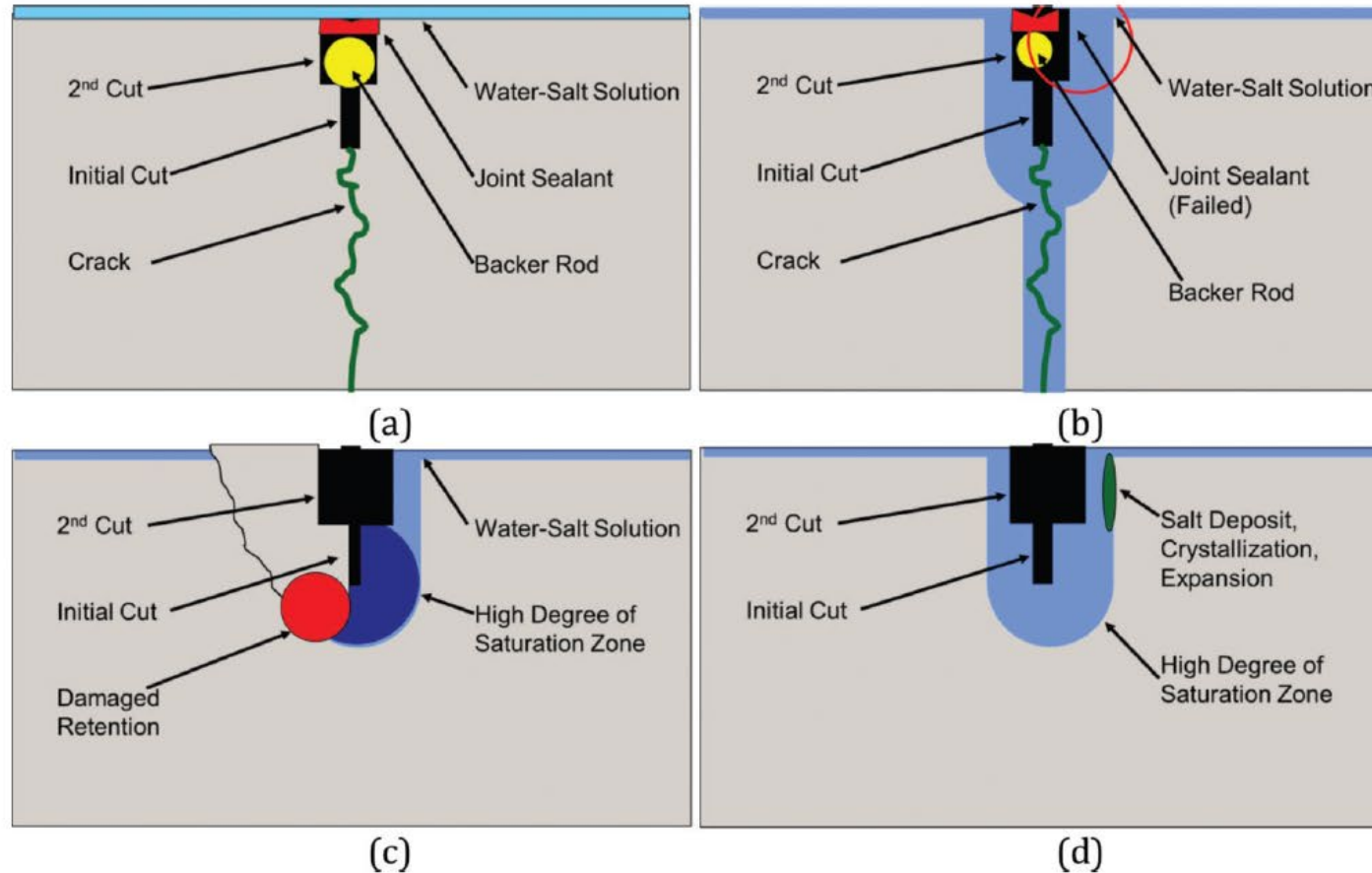
- Started at MnDOT
- Shallow repair (top of slab)
- Longitudinal joints
- Transverse joints
- Corner breaks
- Minimalistic approach
- Labor intensive
- Details matter!!



# Partial Depth Joint Repair



# Typical Joint Deterioration



**Figure 1.3** Potential degradation hypothesis: (a) an ideal joint, (b) a joint with damaged joint sealant that is cracked, (c) a joint with damaged joint sealant that is uncracked, and (d) a joint illustrating potential salt crystallization locations.

Weiss & Nantung, 2007

# INDOT Contracts

Total contracts - 48\*

Crawfordsville - 5

Ft. Wayne - 6

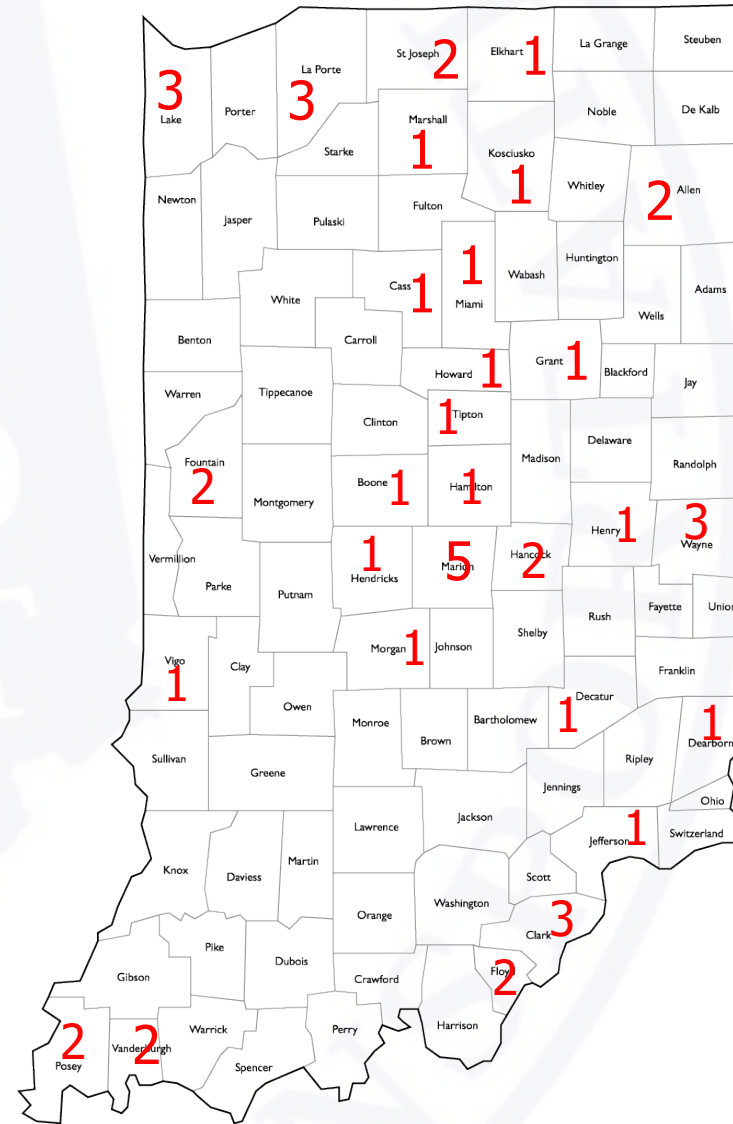
Greenfield - 12

LaPorte - 10

Seymour - 9

Vincennes - 4

\*Lettings 2017 thru March 2020



# Partial Depth Joint Repair



October 2016

I-465 Placed October 2016  
Custom mix design (OPCC)



July 2019



September 2018

# Partial Depth Joint Repair

SR62 Placed 2017 (3U18 Prepackaged)



June 2019



# Partial Depth Joint Repair

I-80 Placed June 2017 (3U18 Prepackaged)



June 2019



October 2019

# Scoping

# Select Good Candidates



Yes



Yes

Maybe



# Select Good Candidates (use pozzolans in new PCCP)



PCCP w/  
Fly ash



Plain  
PCCP



Yes



Yes

Maybe



# Avoid Bad Candidates

Take cores if not sure



Picture by: G. Bruhn – MnDOT

Picture by: G. Bruhn – MnDOT

# Lessons Learned

(so far)

# Unique Special Provision - Mix Options

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- 1) Prepackaged Concrete Patch Material, MnDOT 3U18 (**3U18**)
- 2) Ordinary Portland cement based concrete (OPCC)
- 3) Rapid hardening cement based concrete (RHCC)
- 4) Latex Modified Concrete (LMC)
- 5) Very Early Strength Latex Modified Concrete (VESLMC)
- 6) Prepackaged Rapid Set Patching concrete (RSP)

# Unique Special Provision - Mix Options

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Fast Setting Options



# Unique Special Provision - Mix Options

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Options being used on INDOT contracts

- All methods work
- All are susceptible to problems if not properly installed

# Unique Special Provision - Mix Options

## Prepackaged Concrete Patch material, MnDOT 3U18 (option #1)

- ProSpec 3U18  
by TCC Materials



(old packaging)

- ProSpec 3U58 (previously 3U18M)
  - Same gradation
  - Air entrained with superplasticizer
  - Higher slump (4"-6" vs 1" for 3U18)
  - Will be added to new spec



# Unique Special Provision - Mix Options

## Rapid setting patch materials (option #6)

- Follow manufacturer's recommendations

FasTrac 246 tech data sheet (Western Materials)

“Protect finished concrete from rapid moisture loss by covering with plastic or curing blankets, or cover with wet burlap. Do not use wax-based curing compounds.”

- Use PAMS curing compound
  - PAMS = Poly Alpha-methylstyrene
  - INDOT is drafting a standard specification
  - Apply as soon as possible!



# Achieve a Good Bond

- Prepared surface must be clean!!!
- Mist ahead of placement
- Scrub coat – use stiff bristle brush
- **No** water blasting in lieu of sand blasting
- Don't allow bond coat to dry
  - Must reclean and sand blast



# Achieve a Good Bond

## Bonding problems



# Compression Relief

Transverse joint



# Compression Relief

Sawing vs. compression material (Depth?)



# Compression Relief

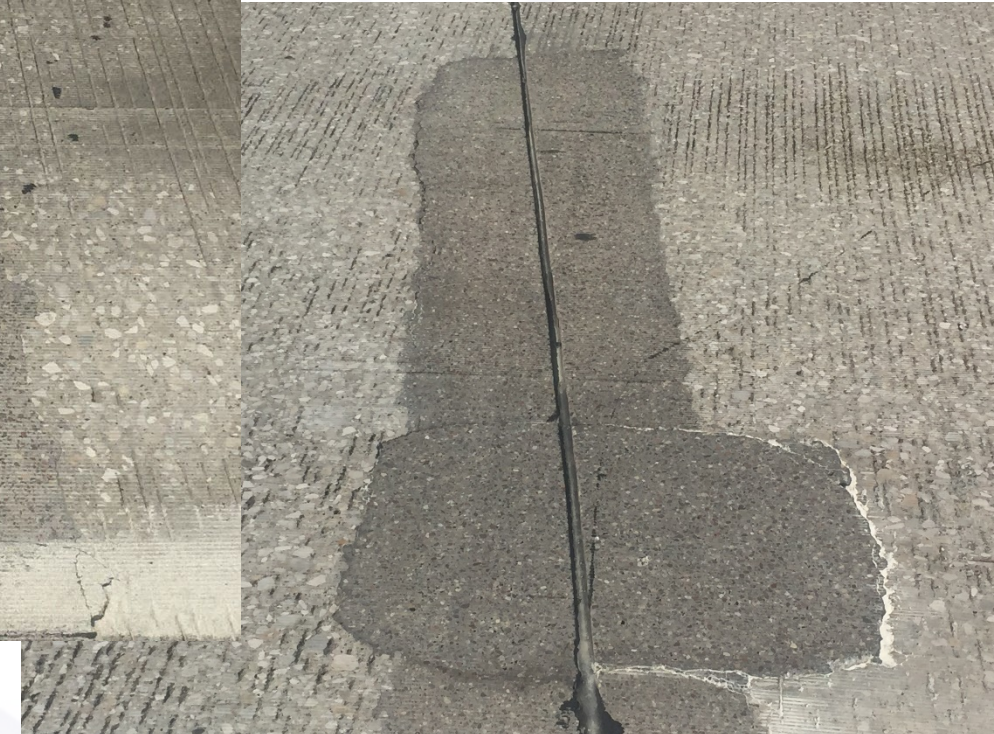
What's missing??



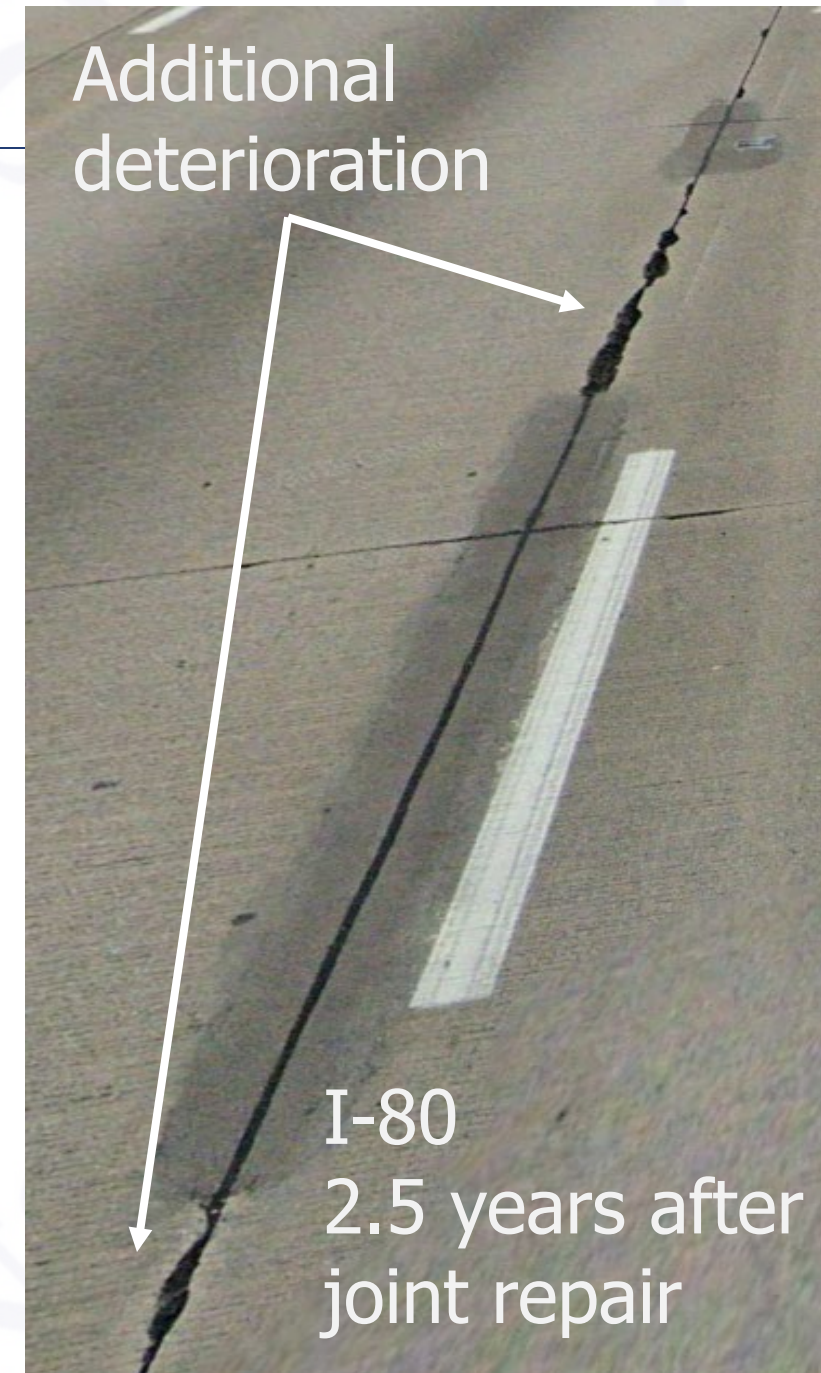


# Compression / Bonding ?

Placed 2017 –  
pictures June 2019



# Careful Stretching the Budget



Additional deterioration

I-80  
2.5 years after joint repair

# Cold Weather

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- Pavement & ambient temps above 50 degrees
- Placement prior to October 24<sup>th</sup>
- Fall may be more forgiving due to warmer pavement temps
- Don't even try in winter/spring until pavement warms
  - Blankets won't be enough to help
  - Rapid set mixes won't work

VES-LMC did not set

Placed 12-7-19

Pics 12-8-19

Placement temp: 35-42 degrees

Overnight low: 33 degrees



# Closing Thoughts

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- Good repair methodology INDOT
- Good work for industry
- Need feedback (good, bad and ugly)
- It can only be successful with attention to detail

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# Thank You !

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