

# INDOT's Recap of Thin Concrete Overlay Test Program Lessons Learned To Date

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2019 Purdue Road School

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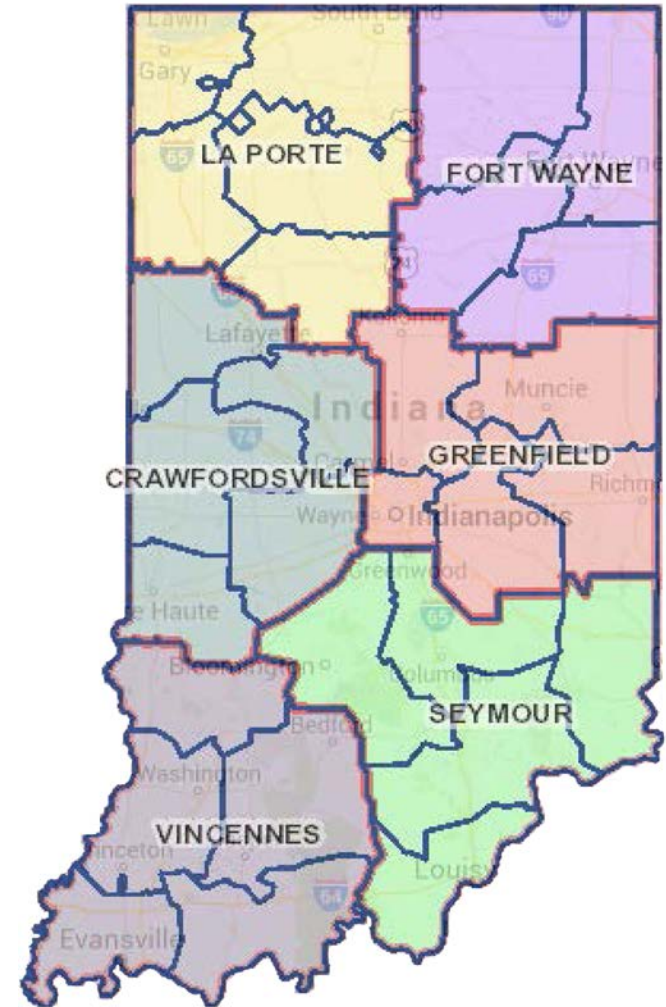
# SR 55

- Construction damage
- People do what people do



# INDOT Profile

- Six district offices
- 3,500 employees
- \$1 billion/annual capital expenditures
- 28,000(+) lane-miles
- Nearly 6,000 INDOT-owned bridges
- Assists 42 railroads in planning & development of more than 3,880 miles of active rail lines
- Supports 69 Indiana State Aviation System Plan airports



# Engineering Philosophy

In 1818 the Institution of Civil Engineers was founded in London, and in 1820 the eminent engineer Thomas Telford became its first president. The institution received a Royal Charter in 1828, formally recognizing civil engineering as a profession. Its charter defined civil engineering as:

**The art of directing** the great sources of power in nature for the use and convenience of man, as the means of production and of traffic in states, both for external and internal trade, as applied in the construction of roads, bridges, aqueducts, canals, river navigation and docks for internal intercourse and exchange, and in the construction of ports, harbors, moles, breakwaters and lighthouses, and in the art of navigation by artificial power for the purposes of commerce, and in the construction and application of machinery, and in the drainage of cities and towns.

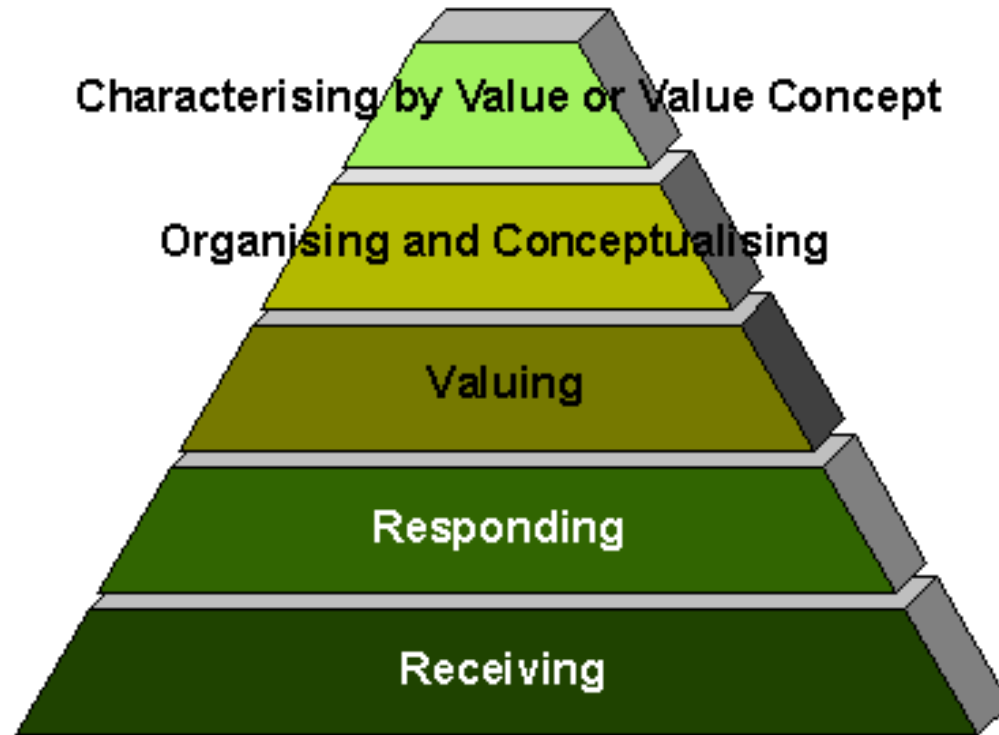


Institution of Civil Engineers, 1 Great George Str, Westminster, London



# The Stage

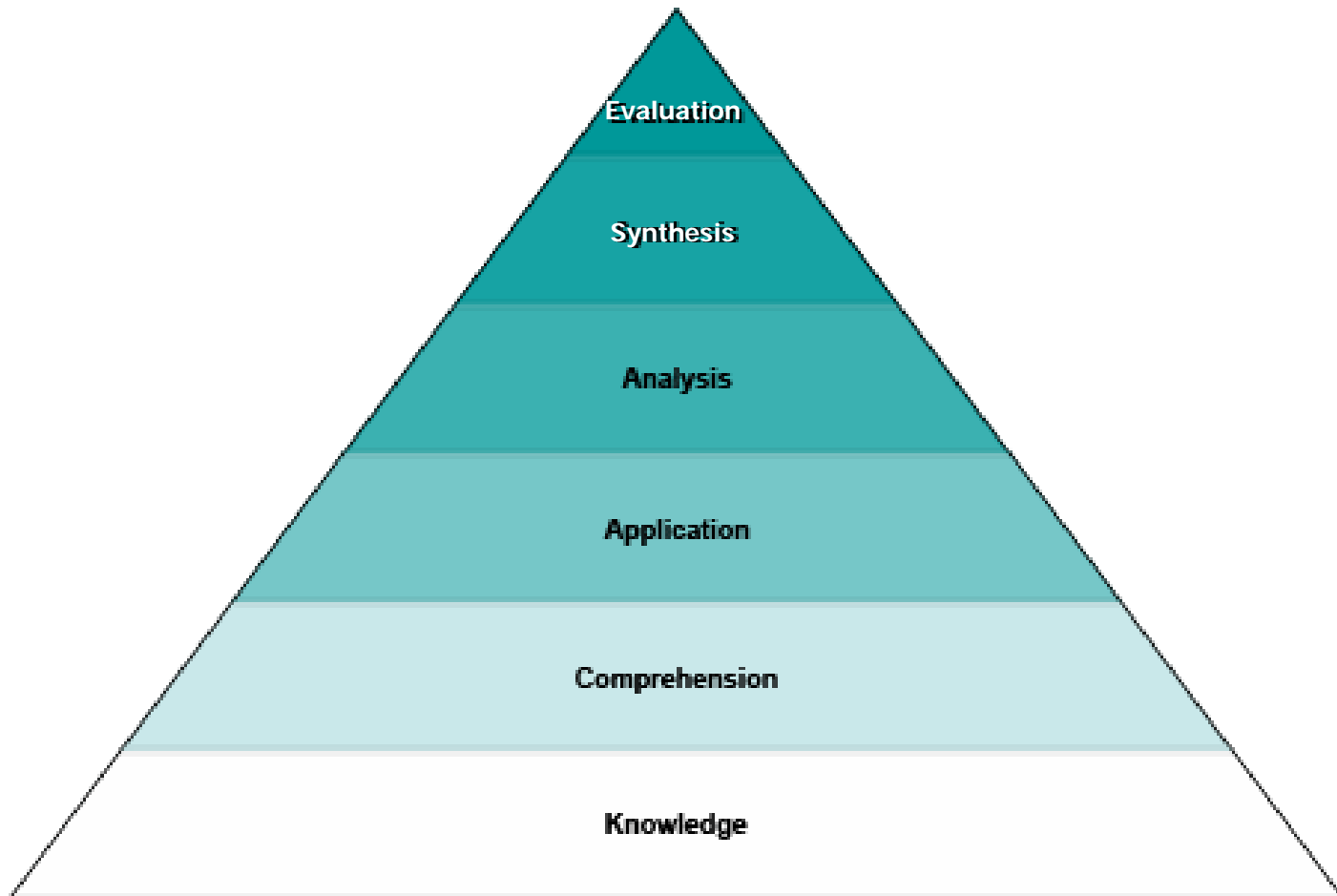
Affective domain



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Atherton J S (2011) *Learning and Teaching; Bloom's taxonomy* [On-line: UK] retrieved 27 February 2013 from <http://www.learningandteaching.info/learning/bloomtax.htm>

# The Stage



Bloom's Taxonomy of learning. Adapted from: Bloom, B.S. (Ed.) (1956) Taxonomy of educational objectives: The classification of educational goals. Handbook I, cognitive domain. New York ; Toronto: Longmans, Green.

# Universal Intellectual Standards

Testing  
the quality  
of your  
thinking. .

- Clarity
- Accuracy
- Precision
- Relevance
- Depth
- Breadth
- Logic
- Significance
- Fairness

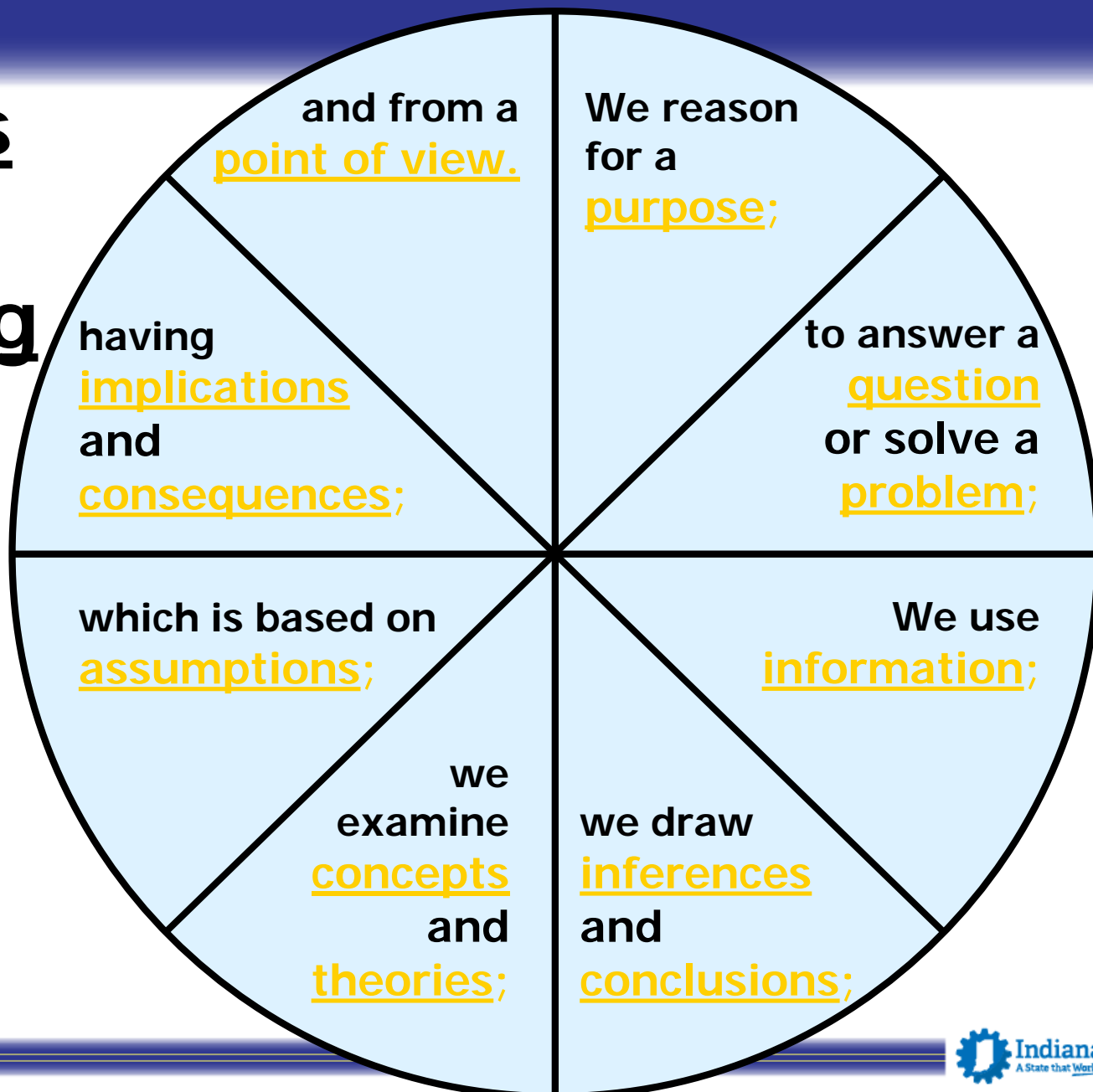
A good  
start...

What  
standards  
might you  
add for your  
discipline?



# Elements of Reasoning

Taking  
thinking  
apart . . .





# Thin PCCP Overlays – Current Status

- **Test projects currently completed, under construction, or being let**
- **Project pavement condition data collection scheduled for summer CY2018/19**
  - 'Initial' data collection to be upon project completion
  - Projects' on-going data collection to be annual
- **Project cost data being analyzed at this time**
  - Final cost data for test immediately follow
- **Program decisions to be made when appropriate**
- **Initial assessment:**
  - Costs higher than planning level estimates
  - Construction quality appears mostly higher than expected



# Thin PCCP Overlays – Concept Timeline

- **2010 - 1<sup>st</sup> INDOT TCO constructed on SR 161**
- **2012 - INDOT's current pavement organization generated**
- **2015 - 2<sup>nd</sup> INDOT TCO constructed: SR 55**
- **June 2015 - TCO programmatic interest initiated**
- **Summer 2015 - TCO performance investigations**
  - Multiple design methods w/multiple performance expectations
- **Fall 2015**
  - Existing TCO pavement condition data collection plan executed
  - Design method resolved later in CY2015



# Thin PCCP Overlays – Concept Timeline

## ■ **CY2016**

- INDOT guidance to investigate conducting multiple test projects
- Candidate project criteria developed
- Project pavement design criteria developed
- Construction considerations determined
- Unique special provision developed
- 10 projects designed

## ■ **CY2017 - Most test projects let**



# Thin PCCP Overlays – Concept Timeline

- **CY2018**
  - Construction on multiple projects
- **CY2019**
  - Multiple projects completed and being assessed.

**And Here We Are Today!**



# Thin PCCP Overlays - Candidate projects

- **SEYMOUR**: SR 46, Columbus to Nashville
- US 50, Aurora to end of 4-Ln Section
- SR 37, I-69 to Dillman Rd.
- US 50, City of Seymour
- **CRAWFORDSVILLE**: US 52, Teal Rd. to CR 800S
- SR 63, Vermillion Co.
- US 421, Kirklin to SR 29
- US 36, Wabash River to US 41
- **VINCENNES**: SR 66, Rockport to SR 70
- SR 65, SR 165 to SR 65 41
- SR 161, SR 68 to Holland



# Thin PCCP Overlays - Candidate projects

- **LAPORTE:** SR 14, US 35 to SR 17
- SR 18, Brookston to US 421
- SR 55, SR 14 to SR 10
- **GREENFIELD:** SR 234, ST 109 to SR 38
- SR 3, CR 300 North to SR 67
- US 31, SR 38 to SR 28
- US 31, 3 mi. S of US 24 to 0.5 mi S of US 24
- **FORT WAYNE:** SR 101, US 24 to Allen/Decatur Co Ln
- SR 9, SR 26 to SR 37
- US 20, 1 mi. E of US 27 to IN-OH St Ln



# Candidate Criteria

- **MOT & CN trafficability**
  - 1 Ln?
  - Echeloned closure?
- **NLT 4 inch HMAP needed under TCO**
  - Sound HMAP necessary, NLT 4"
  - or thinner if on composite pavement
    - NLT 3 inch sound HMAP necessary
- **Full-depth patching accomplished if necessary**



# SR 9

- Full closure





# SR 55

- Early test
- Looks good in most places
- Some issues
- Construction issues will be monitored



# Design Considerations

- **Expansion joints & gap pours**
  - Isolation & CN Joints
  - Drives
- **Drainage**
  - Bound Open-Graded Shoulder Drains?
- **Milling**
- **Upper half of criteria (screening criteria)**
- **May replace 1 or 2-lift HMAP overlay or inlay**



# SR 55

- Gap pours at drives and intersections



# SR 9

- Texture of underlying pavement important consideration

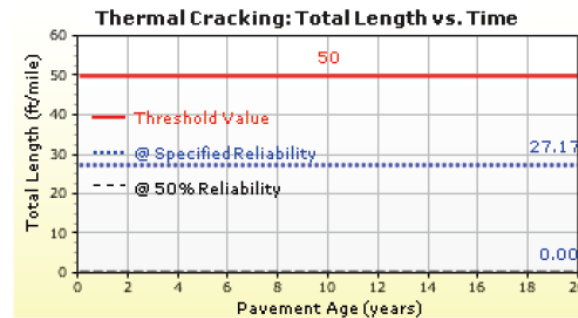
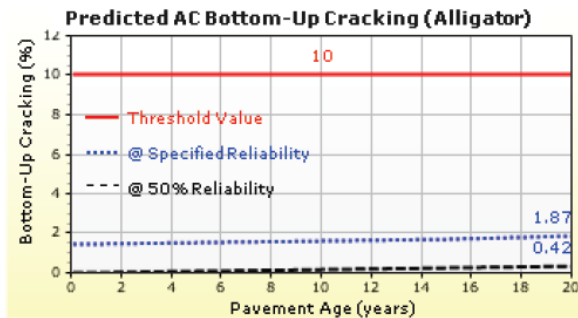
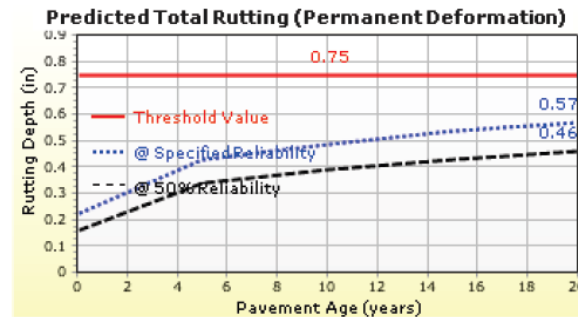
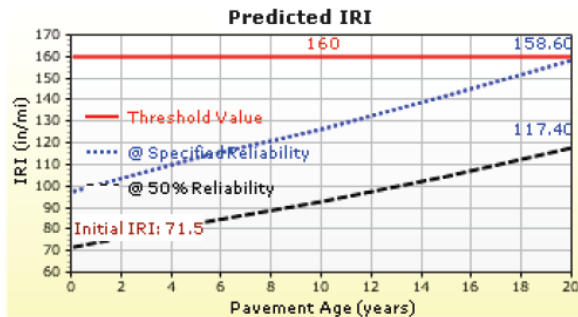


# Current Pavement Asset

- Mechanistic-Empirical Pavement Design Guide (M-EPDG) philosophy

Permanent deformation - AC only (in.)      0.40      0.18      90.00      100.00      Pass

## Distress Charts



# Design Considerations

- **Profile Re-establishment**
- **Crown Re-establishment**
- **Centerline or Edge Rumble Stipes**
- **Safety Edge**
- **Method of Payment**
  - Neat lines plus variable "Filet" vs. SYDs



# SR 9

- Edge support
- Appearances can be deceiving



# SR 3

- Underlying pavement surface texture
- Construction joint





# Construction Considerations

- **Weather**
- **Maintenance of traffic**
- **Paver width, construction operations**
- **Real time smoothness**
- **Centerline profile**
  - Low and high speed
- **Safety Edge support & constructability**
- **Sawing, sealing & curing**



# SR 3

- Maintenance of traffic
- Flexibility due to panel size



# SR 9

- Moisture management considerations critical



# SR 9

- Due to composite nature, surface preparation is critical



# SR 161

- Note inlay method



# SR 9

- Edge support condition is critical design consideration



# SR 9

- Material properties and ramifications



# SR 55

- Importance of contractor's QC plan review
- AND ADHERENCE!
- This was later in project





# SR 3

- Curing method



# SR 3

- Curing method



# SR 3

- Finished surface
- Note fibers
- Note curing compound



# Specification Considerations

- **“Filet” payment**
  - Thickness bonus
  - Fibers
  - Dip stick thickness measurement?
- **Pavement profile**
- **QC / QA**
- **Milling & existing surface cleaning**
- **Pre-overlay repairs**
- **Concrete placement, curing & sawing**



# SR 3

- Use of fibers



# SR 9

- Sawing operations are critical!
- Contractor's experience and QC plan must be discussed prior to construction



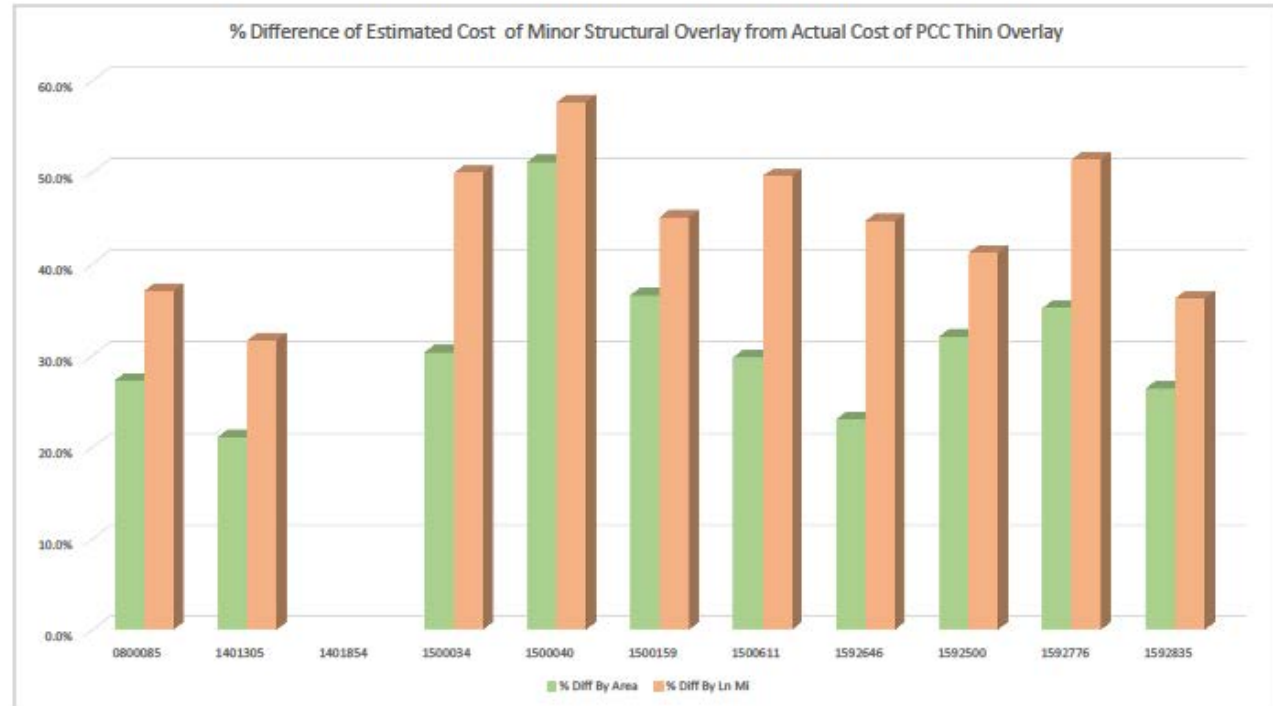
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- **Final Project cost data to be analyzed**
  - Final cost data for test immediately follow
- **Final assessment: TBD**
- **Program decisions to be made when appropriate**
  - INDOT will continue to examine TCO as another pavement preservation tool in our tool box
  - Strong executive interest in challenging SR 3 project



# Cost comparison

½ of cost comparison considerations



Other half will be in-service field life of treatment



# Final

# Questions?

