

Longitudinal Joints

BEST PRACTICES FOR HMA LONGITUDINAL JOINTS

AN AI AND FHWA CO-OPERATIVE EFFORT

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Ontario Activities

- OHMPA – MTO Task Group to look at longitudinal joints
- MTO produced a report outlining activities from design to award stage that allow for the construction of better longitudinal joints
- Available on the web
 - Construction of Longitudinal Joints In Flexible Pavements - Design Guidelines - MERO-033
- OHMPA waited for FHWA-AI research report to produce the Best Practice Guide - ABC

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US Activities

- FHWA in the US started a project 4 years ago to look at improving longitudinal joints
- Asphalt Institute worked with FHWA
 - Understand the issue
 - Develop a training program
 - Deliver it to the DoTs and local contractor in each state
- Program delivered through the FHWA initiative *Every Day Counts*
- Nearing completion

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Don't We Already Know How To Build a Longitudinal Joint?

I-81 in Pennsylvania



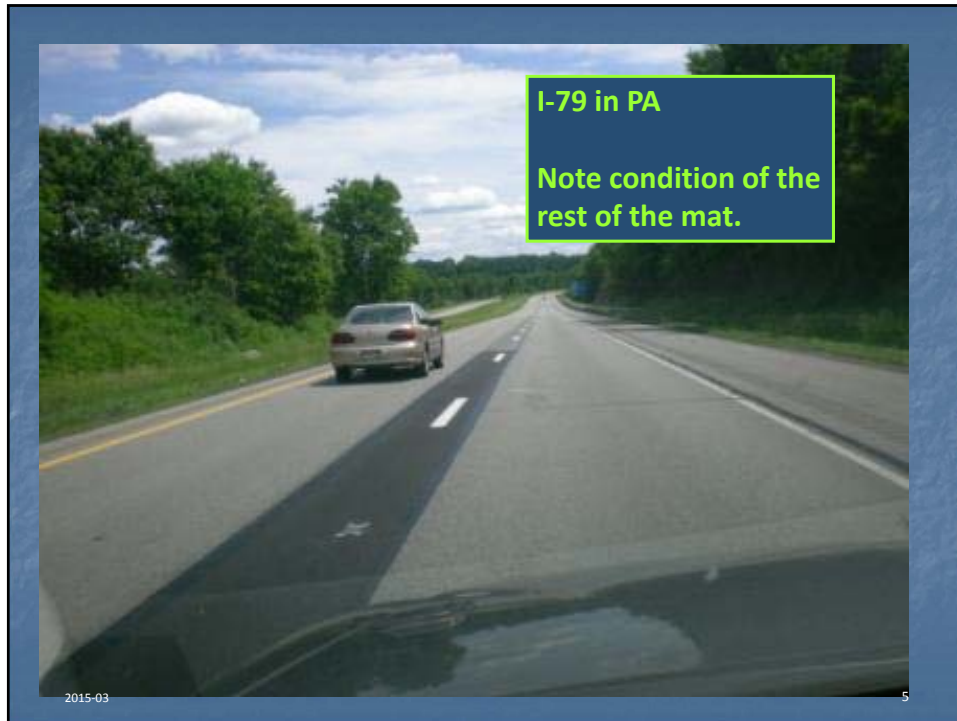
I-84 in New York



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Longitudinal Joints

Takeaways from FHWA Survey to 52 Division Offices

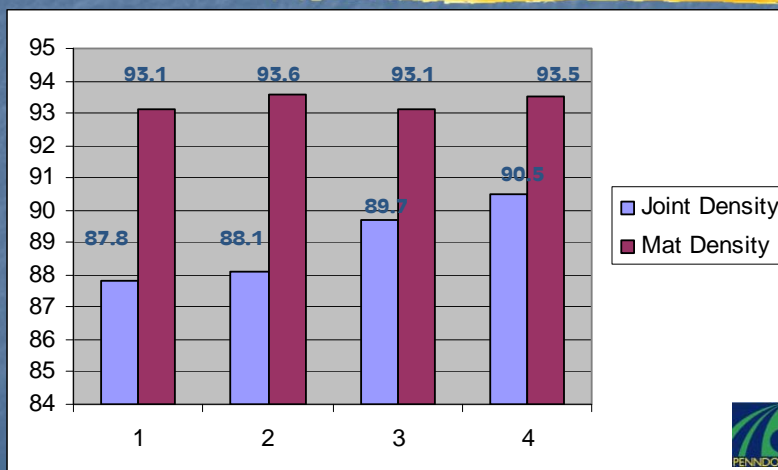
- 1/2 of states not satisfied with overall performance of L-Joints.
- Lots of best practices available
- 2/3rds of states have a L-Joint spec
 - Half of those (17) have a L-J density spec
 - Range from 89% - 92% min TMD
 - Other half were method specs
 - From Joint Adhesive to very prescriptive
- Great start to point us in the right direction, but no definitive answers

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Joint vs. Mat Density

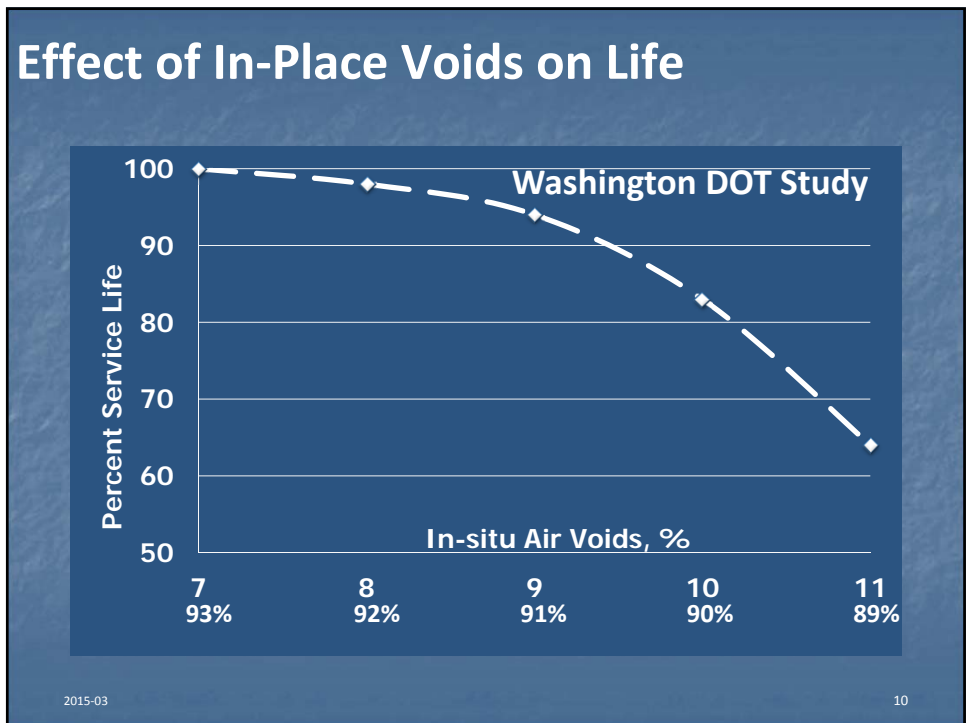
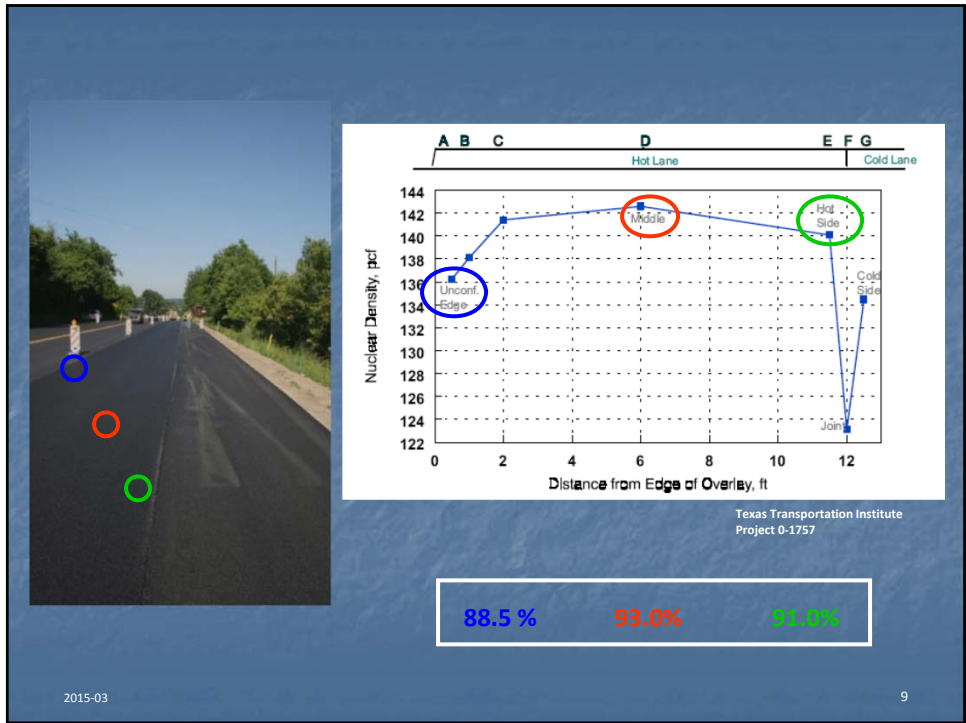
(Representative of Other Studies)



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Longitudinal Joints



Longitudinal Joints

and then there's permeability

Water running out of the interface between the HMA pavement and the bridge deck after a rain

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Maybe We Don't Already Know How to Build a Longitudinal Joint?

- What We Know
 - Certain Steps Everyone Agrees On

- What We Don't Know
 - Differing Opinions on Other Steps
 - Developed Questionnaire for Experts
 - Interview Consultants, Manufacturers and Contractors (Sheldon Hayes winners since 2000)
 - Compile and Analyze Findings

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Longitudinal Joints

19 Experts Interviewed

Consultants

- Jim Scherocman
- Chuck Deahl
- Jim Heddrich
- Ron Corun
- Larry Michael
- Steve Neal
- Brian Prowell
- Tom Skinner
- Frank Colella
- Wes McNett

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Sheldon Hayes Winners

- Lindy Paving (PA) ³
- P. Flanigan & Sons (MD)
- Duininck Bros (TX)
- Thompson-McCully (MI)
- DesMoines Asphalt & Paving (IA)
- K Barnett & Sons (NM)
- Norris Asphalt Paving (IA)

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Do the Experts Agree?

Not Always!

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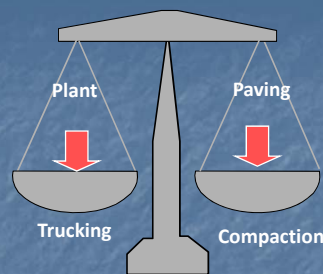
Better Longitudinal Joints

- Need proper thickness of the lift to allow for good compaction
 - Particularly important at the joint
 - 3 x NMPS for Marshall fine graded mixes
 - 4 x NMPS for Marshall course graded mixes
 - 4 x NMPS for Superpave D and E
- Need to allow enough space for compaction and laydown equipment – minimum of 1.5 m clearance between the edge of the mat and barriers

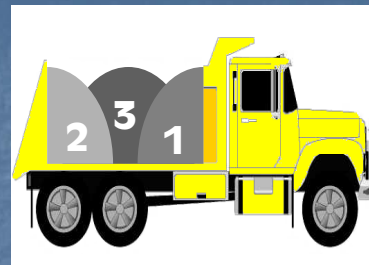
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GETTING STARTED OFF RIGHT



Compaction controls rate of construction



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Dump Person



MTV

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Longitudinal Joints

First Pass Must Be Straight

Unanimous that a string line should be used to assure first pass is straight



Stringline Skip Paint Reference¹⁷

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Detailed description: This slide features three photographs. The first, labeled 'Stringline', shows a yellow stringline stretched along the edge of a newly paved road. The second, labeled 'Skip Paint', shows a close-up of a road surface with a dashed white line and some orange paint markings. The third, labeled 'Reference', shows a yellow stringline stretched across a road surface, with a yellow truck's wheel visible in the background.

Tough to get proper overlap (1") with next pass



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Detailed description: This slide features two photographs. The first is a close-up of a longitudinal joint in a road surface, showing a significant gap and poor overlap between the two passes of asphalt. The second photograph shows a road with a longitudinal joint, a white dashed line, and a red diamond-shaped sign that reads 'UNEVEN PAVEMENT'. Several cars and a truck are visible on the road in the background.

Longitudinal Joints

Paver on Automatic w/ Joint Matcher



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End Gate

Always seated on the existing surface

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Longitudinal Joints

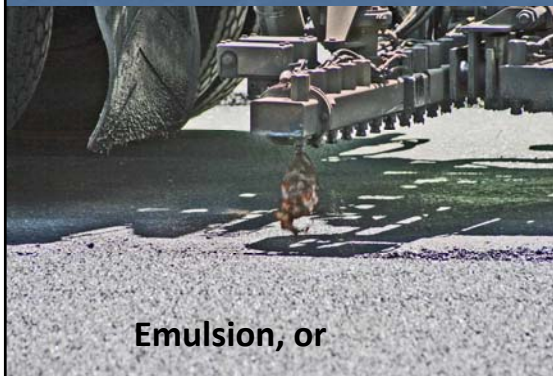
Vibratory Screed Should Always Be On



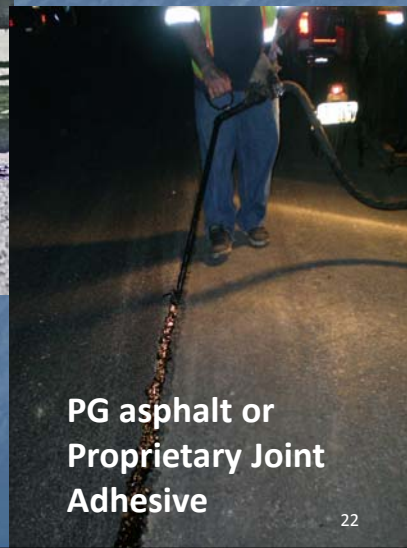
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Tack the Joint! (Butt or Wedge)



Emulsion, or



PG asphalt or
Proprietary Joint
Adhesive

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Longitudinal Joints

Auger

Uniform Head of Material
Across the Entire Screed

Extend auger tunnels

Carry material within
300 to 400 mm of
the end gate

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Maintain Correct Overlap and Proper Thickness for Roll Down

Proper Roll Down – Start With 25% of the Depth

1/2 - 1 1/2" (13-35mm) Overlap

1st Pass (Cold)

2nd Pass (Hot)

Minimum Overlap for Compaction is 1/2 Inch (13mm)


Always Check Joint Roll Down Behind the First Roller

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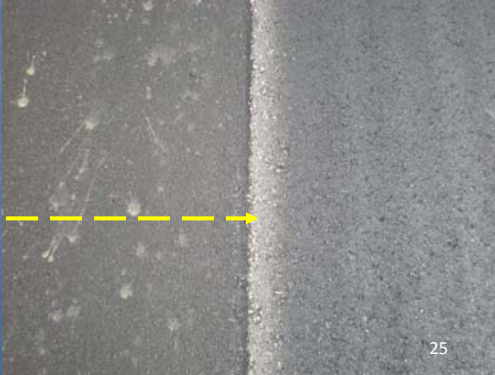
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Longitudinal Joints

Matching Joint



Proper Overlap: 1.0 ± 0.5 inches
(25 ± 10 mm)



Sufficient Depth of HMA to avoid "starving" joint and "bridging" with roller

Final overlap height: 0.1 in (2 mm)

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 **Lute the Longitudinal Joint**



This lute person is doing a great job

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Longitudinal Joints

Don't Starve the Joint
Don't broadcast material back over the mat



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Placing HMA
Don't broadcast material back over the mat



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Don't broadcast material back over the mat

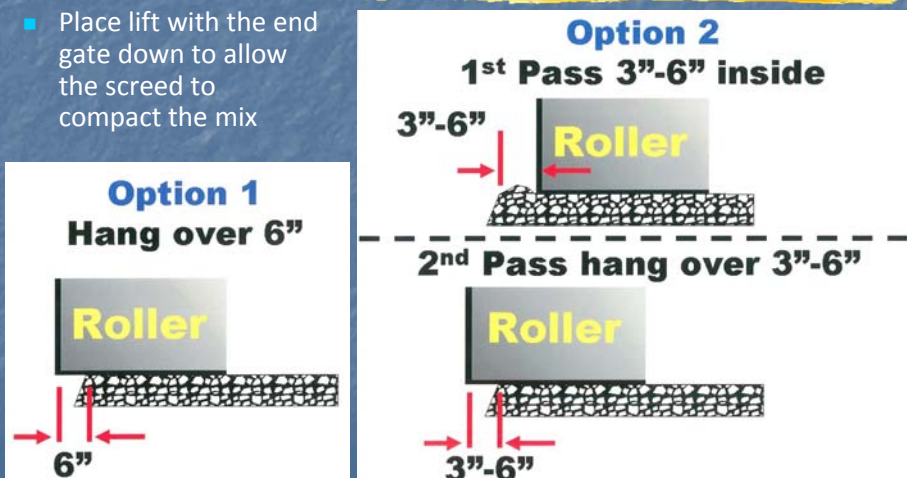


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Compact the Unsupported Edge

- Place lift with the end gate down to allow the screed to compact the mix



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Longitudinal Joints

Compact the Unsupported Edge

- Avoid the use of rubber tired roller to close to the unsupported edge of the mat
 - Might shove the mix and produce an uneven edge
 - May be difficult to get adequate density
 - Milling out the edge may be an option

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1st Roller Pass on Unsupported Edge 50/50: Overhang vs. Stay Back 4-6"



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Longitudinal Joints

7 Compacting Your Longitudinal Joints

First Pass **Second Pass**

Cold **Hot** **Cold** **Hot**

6 to 8 Inches

Creates a Confined Edge & Raised Area Second Pass Use, Vibratory to Build Density

NAPA National Asphalt Pavement Association

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Rolling the Supported Edge

1st pass off the joint about 150 to 200 mm

2nd pass overlaps on cold mat 75 to 150 mm

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Longitudinal Joints

Rolling the Supported Edge



Stay off the Joint by 6" with 1st Pass to Avoid Bridging,



but, watch for stress cracks along the edge of the drum. May be more of a concern with rolling unsupported edge

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Joint heaters



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Longitudinal Joints

Joint Heater



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Joint Heaters



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Longitudinal Joints

Sealing the longitudinal joint at the time of construction

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The Best Longitudinal Joint

Echelon Paving

I-295 in New Jersey

Rolled Hot

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Longitudinal Joints

Paving In Echelon Hwy 2 in Whitby



SP 103F48M (Oct 30, 2008) Version 3

- No longer required to bring all lanes up to the same point in specific conditions
 - Use of temporary longitudinal edge ramps are permitted
 - Ramping materials must be removed by milling
 - Ramping material is not included for payment
 - Refer to SP for conditions
 - Must use TC-24 “Uneven Lanes” signs
 - Refer to SP 543F01M (Oct 30 2008)
- Work of the Pavement Constructability Task Group

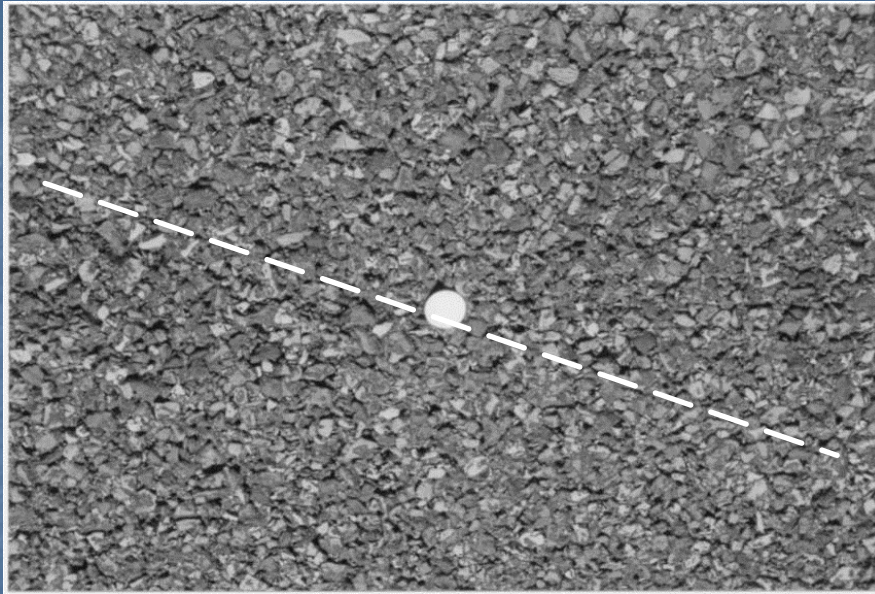
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Longitudinal Joints



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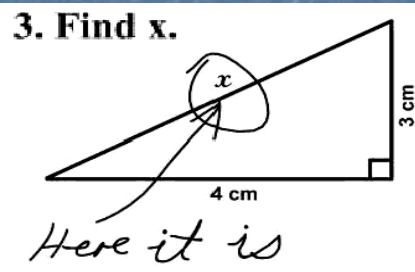


I-68 project approximately 5 years old
(same project, same location as previous slide)

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Thank You



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