Paving Best Practices: Transverse & Longitudinal Joint Construction

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PAPA Regional Technical Meetings

Transverse Construction Joints

- Critical steps for avoiding a bump

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Taking off from the joint

- Cut joint back to level
- Clean & dry
- Apply tack coat to vertical surfaces
- Set screed on starter boards
- Maintain consistent head of material
- Don’t use the first load – use 3rd and 4th truck loads

Taking off from the joint

Image Source: PennDOT, “The Good, the Bad, and the Ugly,” presented at the 2025 PAPA Regional Technical Meetings

- Cut joint back
- Clean & dry
- Apply tack coat to vertical surfaces

Taking off from the joint

- Set screed on starter boards
  - Starter boards = desired mat thickness, uncompacted
    - ¼” of compaction per 1” loose mix
  - Lower screed onto start boards in “float” position
  - Boards or pad should be 3-4’ long to fully support screed and extensions

Image Source: Todd Mansell, “Best Practices for Smoothness & Density,” presented at the Maryland Asphalt Association’s 55th Annual Paving Conference

Compaction at the Transverse Joint

Less preferred = “Head-on” rolling:

- Slowly to avoid shoving
- Static mode
- Always turning at an angle

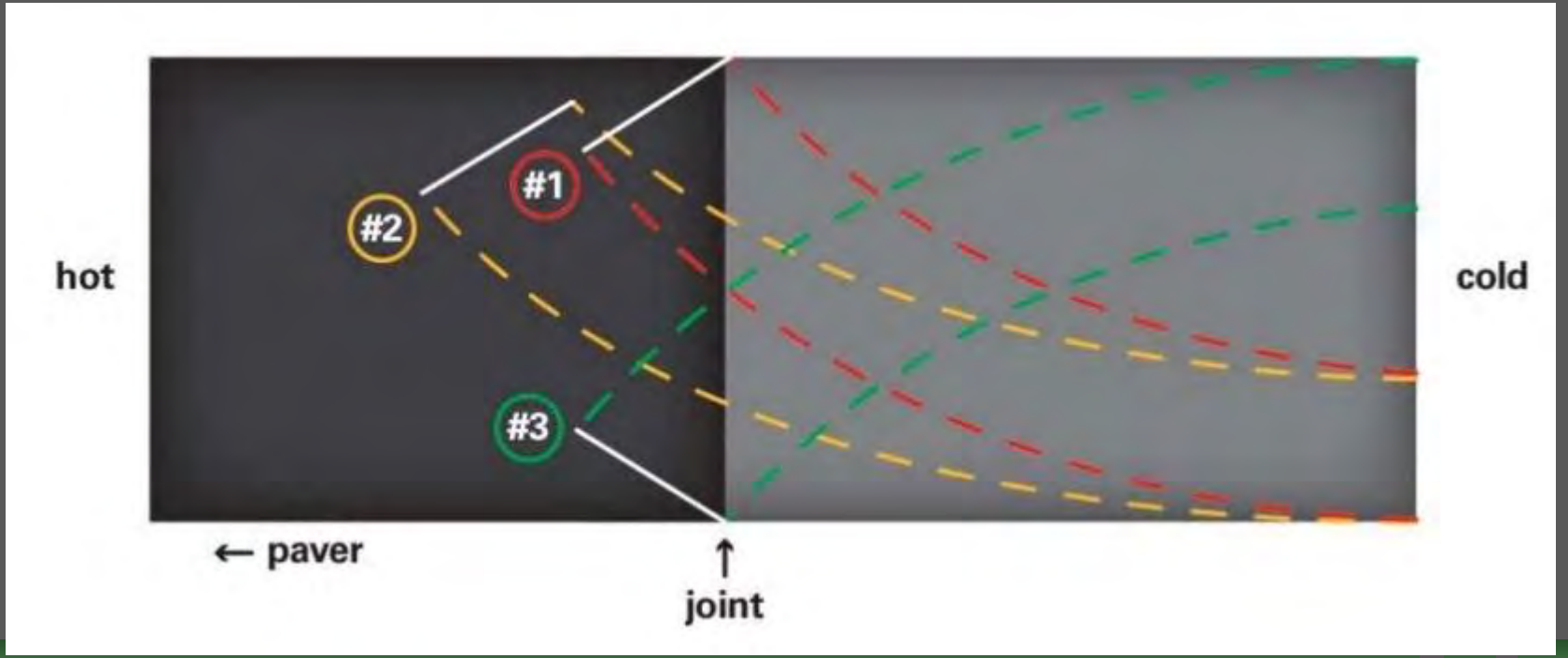

Image Source: Todd Mansell, “Best Practices for Smoothness & Density,” presented at the Maryland Asphalt Association’s 55th Annual Paving Conference

Compaction at the Transverse Joint

- First pass:
  - Most of drum on cold side
  - Check flatness
- Second pass:
  - Move farther onto hot side
- Static mode on all passes

Images Source: Todd Mansell, “Best Practices for Smoothness & Density,” presented at the Maryland Asphalt Association’s 55th Annual Paving Conference

Use the Straightedge!

Image Source: Todd Mansell, “Best Practices for Smoothness & Density,” presented at the Maryland Asphalt Association’s 55th Annual Paving Conference

Taking off from the joint

- Maintain consistent head of material

Image Source: Todd Mansell, “Best Practices for Smoothness & Density,” presented at the Maryland Asphalt Association’s 55th Annual Paving Conference

- Longitudinal Joint Construction

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LONGITUDINAL JOINT IMPROVEMENT

PUB 408 SECTION 405 — EVALUATION OF ASPHALT PAVEMENT LONGITUDINAL JOINT DENSITY AND PAYMENT OF INCENTIVE/DISINCENTIVE

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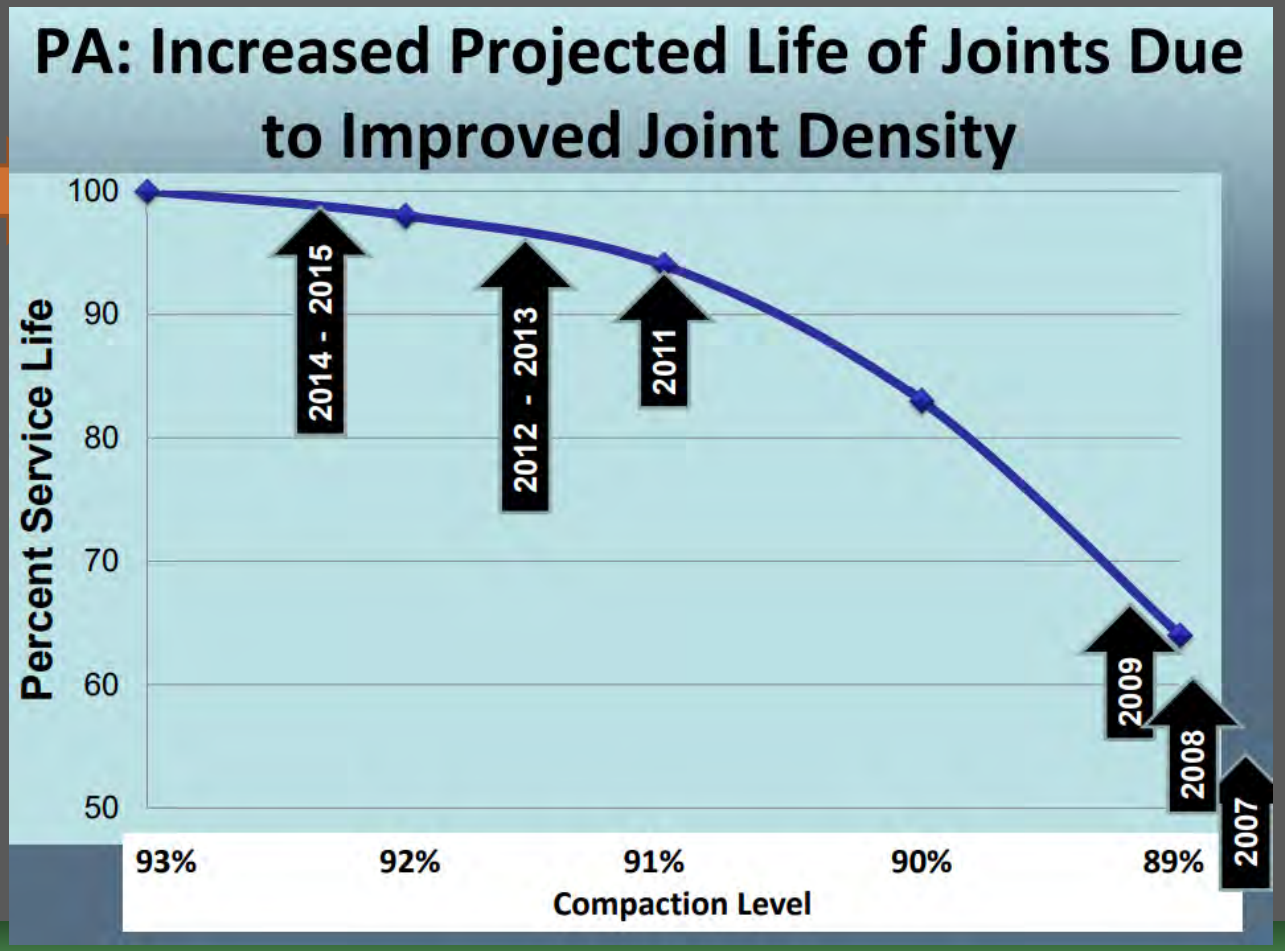
LONGITUDINAL JOINT IMPROVEMENT

PUB 408 SECTION 405 — EVALUATION OF ASPHALT PAVEMENT LONGITUDINAL JOINT DENSITY AND PAYMENT OF INCENTIVE/DISINCENTIVE

2020



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LONGITUDINAL JOINT IMPROVEMENT

Longitudinal Joint Density and Payment of Incentive/Disincentive 2024

PennDOT Joint Density by Year		
Year	Average Density	Lots
2007	87.8	n/a
2008	88.9	n/a
2009	89.2	n/a
2010	***	n/a
2011	91.0	137
2012	91.6	162
2013	91.4	168
2014	92.3	479
2015	92.6	493
2016	92.4	358
2017	92.8	394
2018	92.6	386
2019	92.8	347
2020	**93.1**	286
2021	93.3	294
2022	93.0	216
2023	93.2	241
2024	**93.5**	201

2020

*** no data collected that year, transition to Section 405 joint density spec.

2007 data was the baseline before we did anything. The 2008 and 2009 numbers were based on a method spec and some education on joint construction practices. The 2011 data and on was after we implemented the incentive/disincentive spec. The original lower spec limit was 89.0%, then upped to 90.0% and now sits at 91.0%.

LONGITUDINAL JOINT IMPROVEMENT

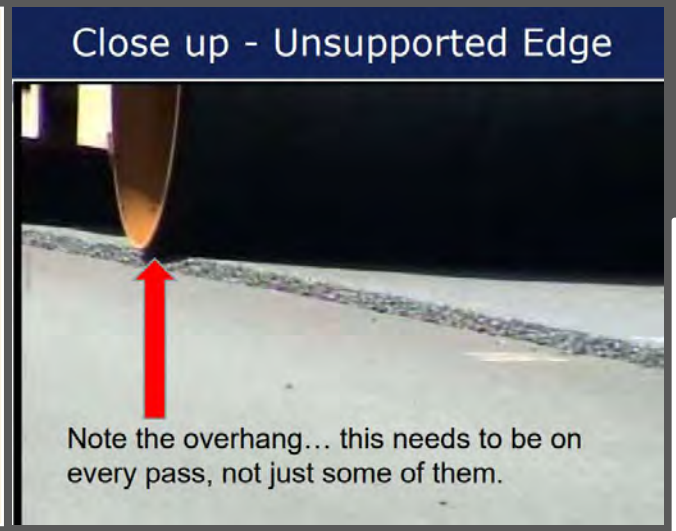
What else has contributed to getting better performing Longitudinal Joints?

TRAINING - HAS ALSO ASSISTED WITH IMPROVING DENSITY

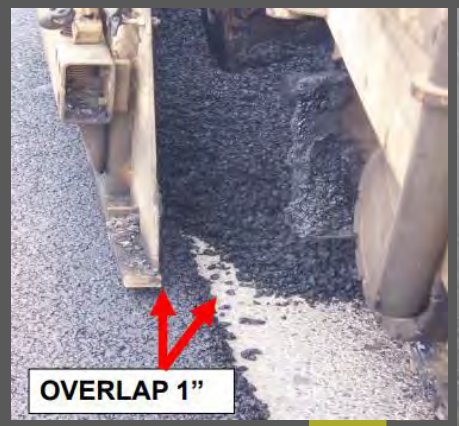
PENNDOT VIDEO

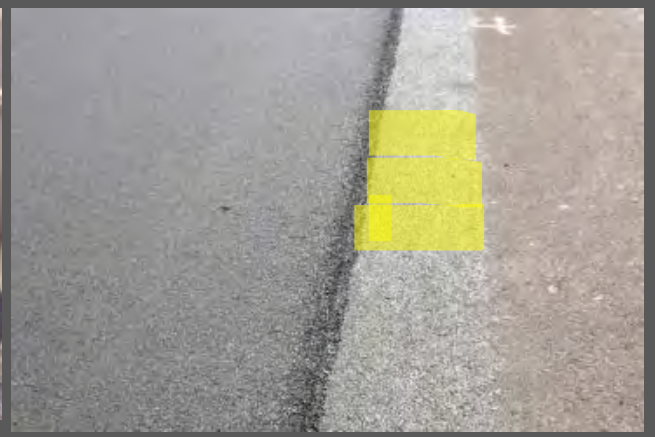
WEBINARS

FIELD DEMOS



PWL HAS ALSO ASSISTED WITH IMPROVING DENSITY





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PENNDOT LONGITUDINAL JOINT VIDEO

https://www.youtube.com/watch?v=QIm6Qlfdz8g

LONGITUDINAL JOINT IMPROVEMENT

- VARIOUS JOINT TYPES
  - VERTICAL (BUTT) JOINT
  - NOTCHED WEDGE JOINT
  - CUT VERTICAL JOINT (WHICH CREATES A VERTICAL BUTT JOINT)

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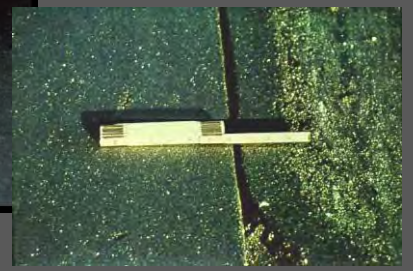
LONGITUDINAL JOINT IMPROVEMENT

Hot Lane

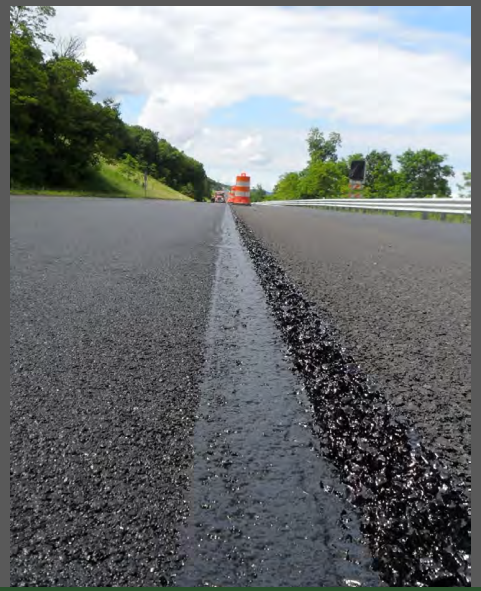
Cold Lane

CUT VERTICAL (BUTT) JOINT



VERTICAL (BUTT) JOINT

USE ON WEARING, BINDER or BASE LAYER



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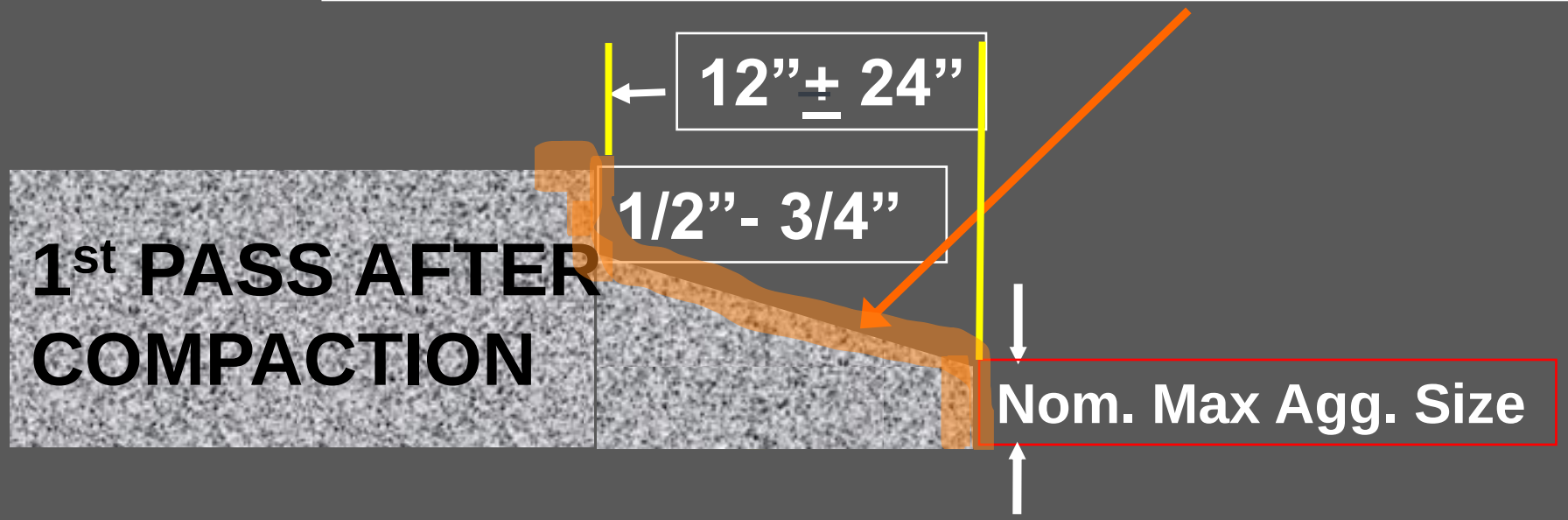
LONGITUDINAL JOINT IMPROVEMENT

PA NOTCH WEDGE JOINT

FOR ASPHALT MIXES WITH NOMINAL MAX AGGREGATE SIZE OF 19.0 MM OR LESS

PUB 72M, STANDARD RC-28

Paint total joint face with PG 64S -22



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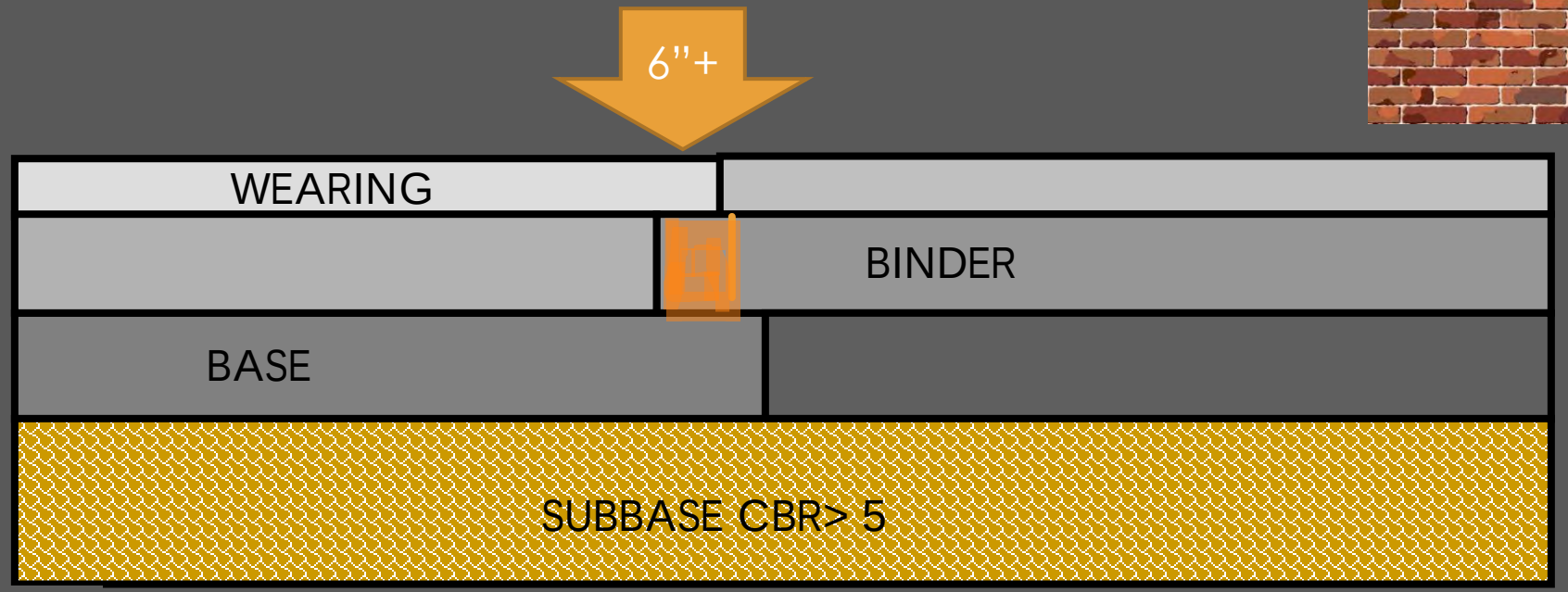
LONGITUDINAL JOINT IMPROVEMENT

PA NOTCH WEDGE JOINT

Device for NWJ Compaction is both heated and vibratory

LONGITUDINAL JOINT IMPROVEMENT

Offset Longitudinal Wearing layer joint at least 6 inches from binder layer!



Avoids plane of weakness

LONGITUDINAL JOINT IMPROVEMENT

TACK COAT

TABLE B
Uniform Asphalt Residual Rates by Surface Type

Surface Type	Uniform Asphalt Residual Rates (RR) (gallons per square yard)
New Asphalt Paving	0.03 to 0.05
Existing Asphalt Paving	0.04 to 0.07
Milled Surface (Asphalt & Portland Cement Concrete)	0.04 to 0.08
Portland Cement Concrete	0.04 to 0.07

TACK CSS-1H, NTT, or ???

PUB 408 SECTION 460—ASPHALT TACK COAT, TACK EVERY PAVEMENT LAYER

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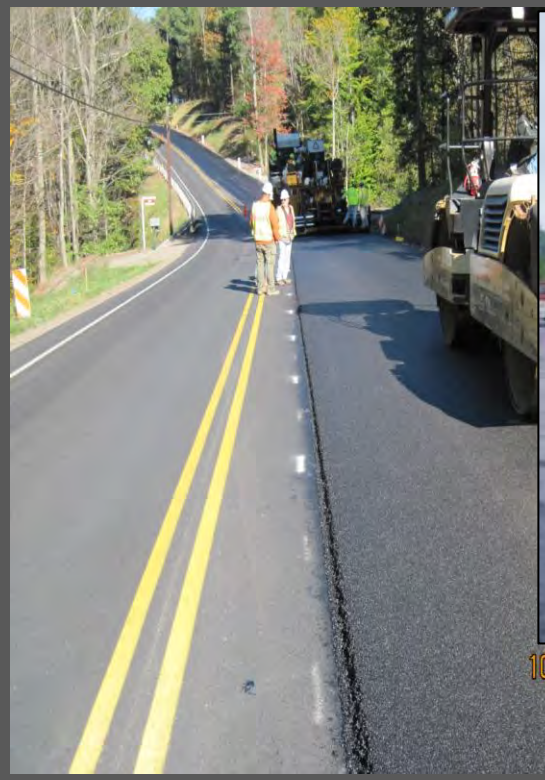
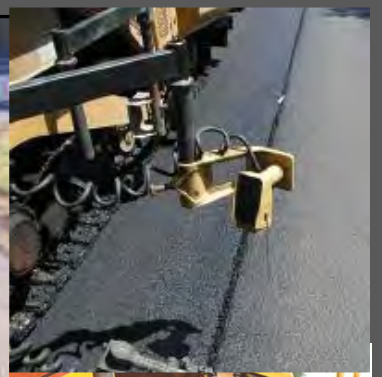
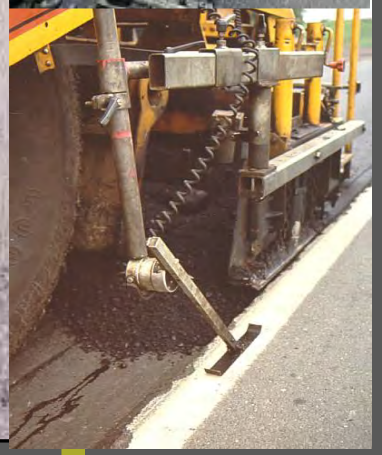
LONGITUDINAL JOINT IMPROVEMENT

NEED A STRAIGHT & CONSISTANT EDGE !







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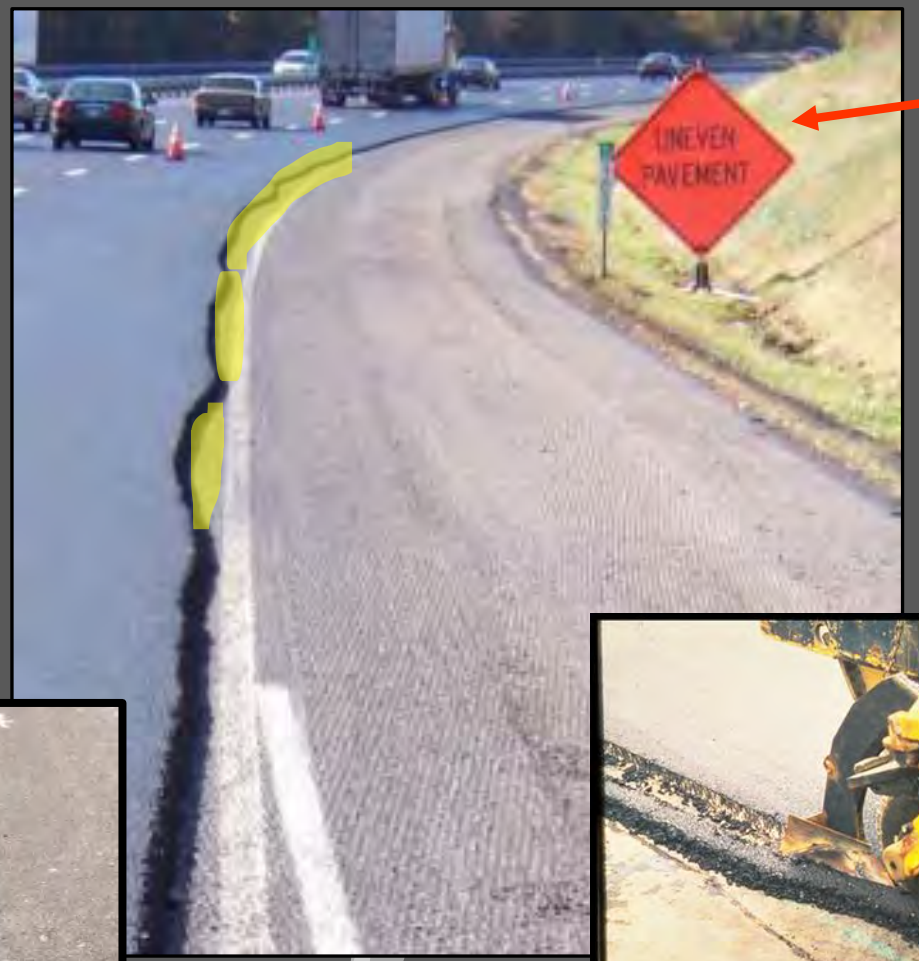
LONGITUDINAL JOINT IMPROVEMENT



SIGN IS REALLY APPROPRIATE

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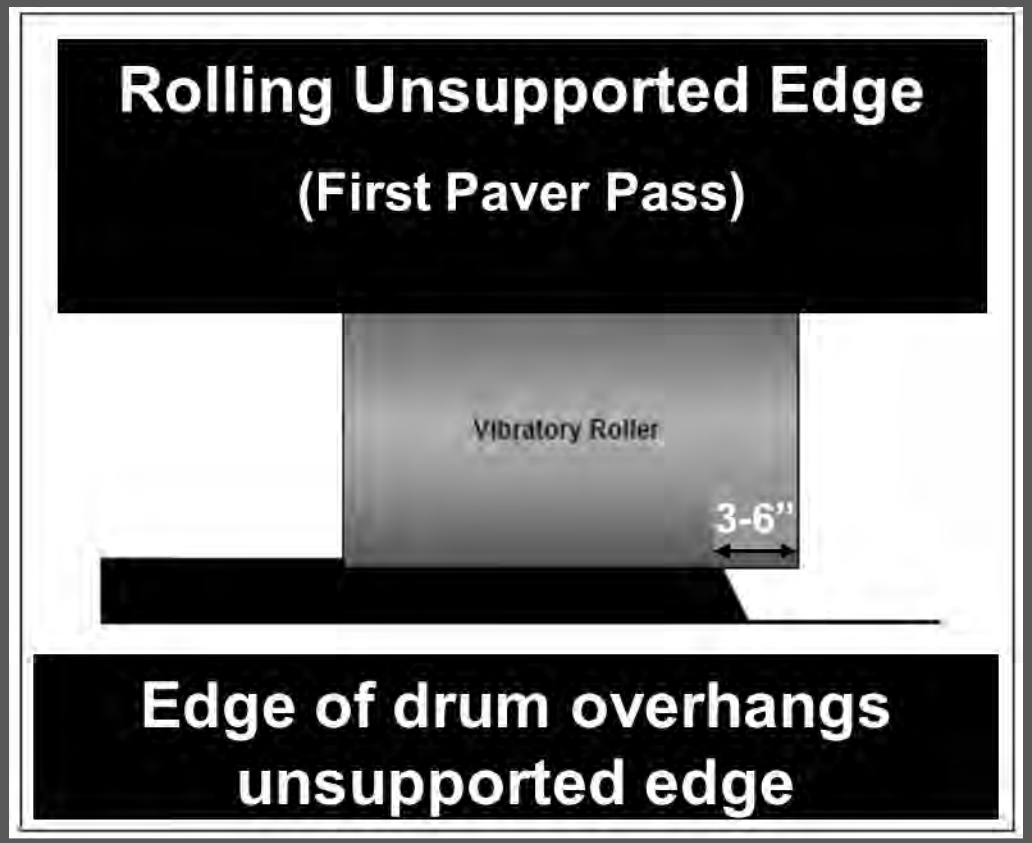
LONGITUDINAL JOINT IMPROVEMENT

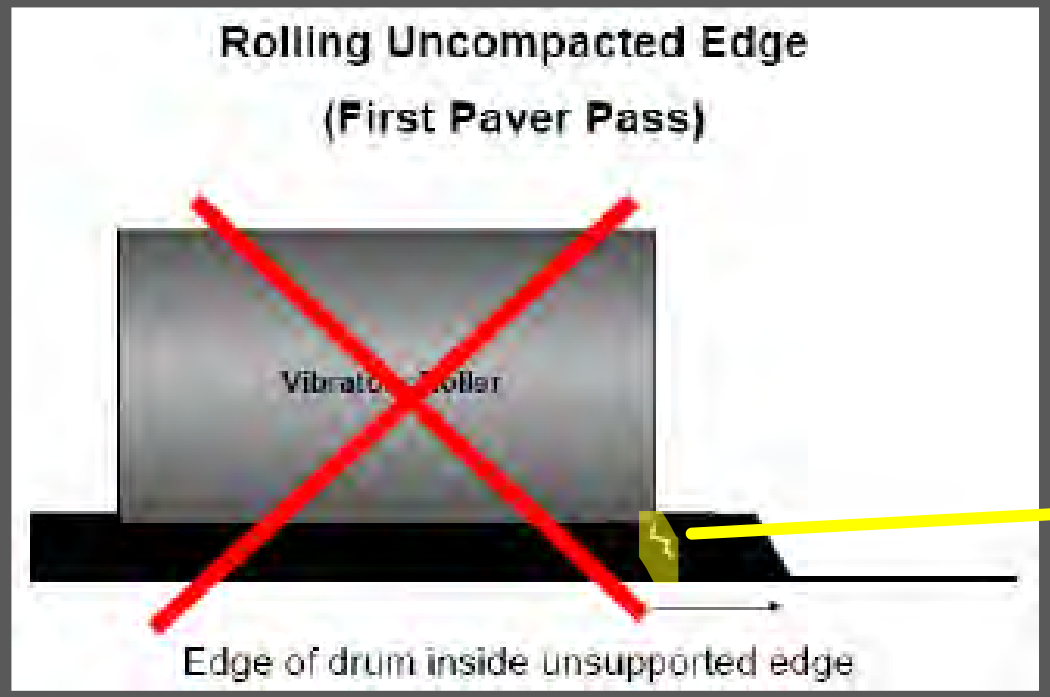
COMPACTION

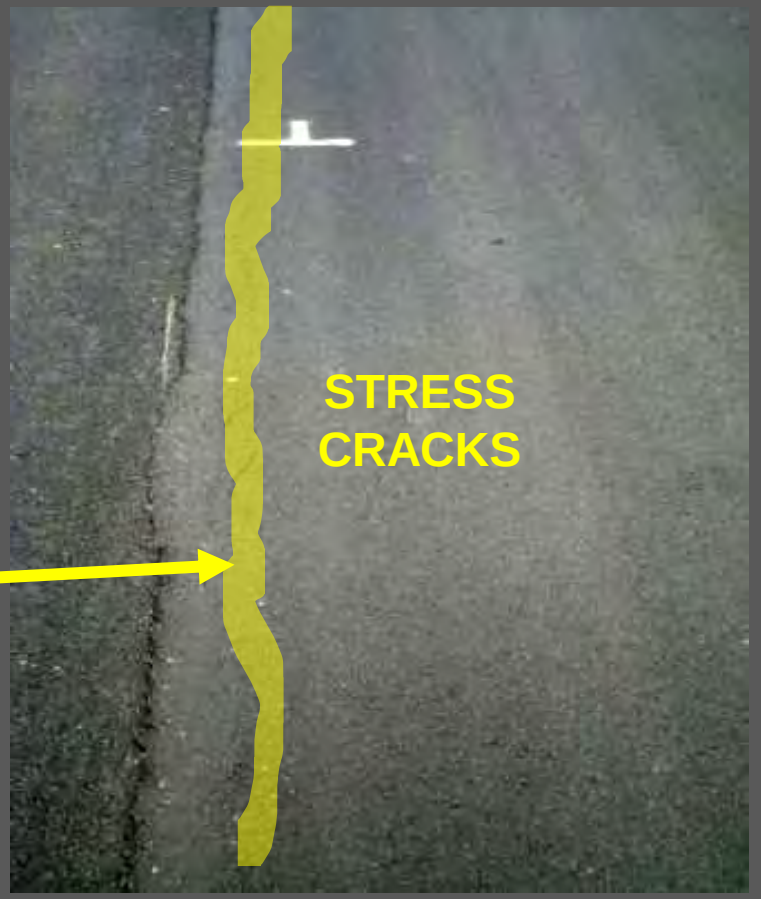


OVERHANG 3” - 6” FIRST ROLLER PASS

LONGITUDINAL JOINT IMPROVEMENT

COMPACTION





Proper rolling sequence of joint critical!

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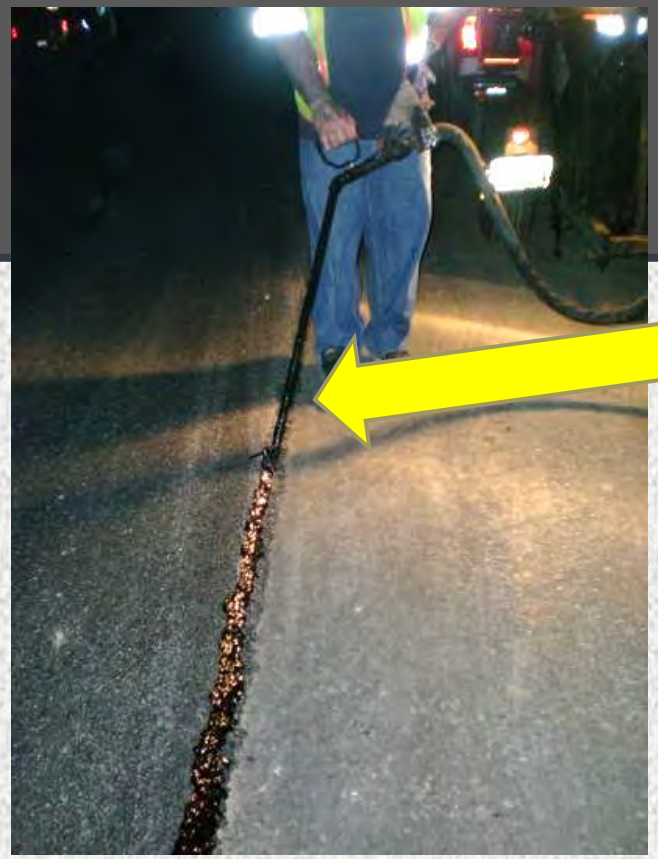
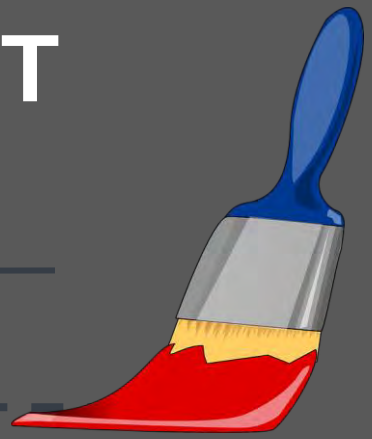
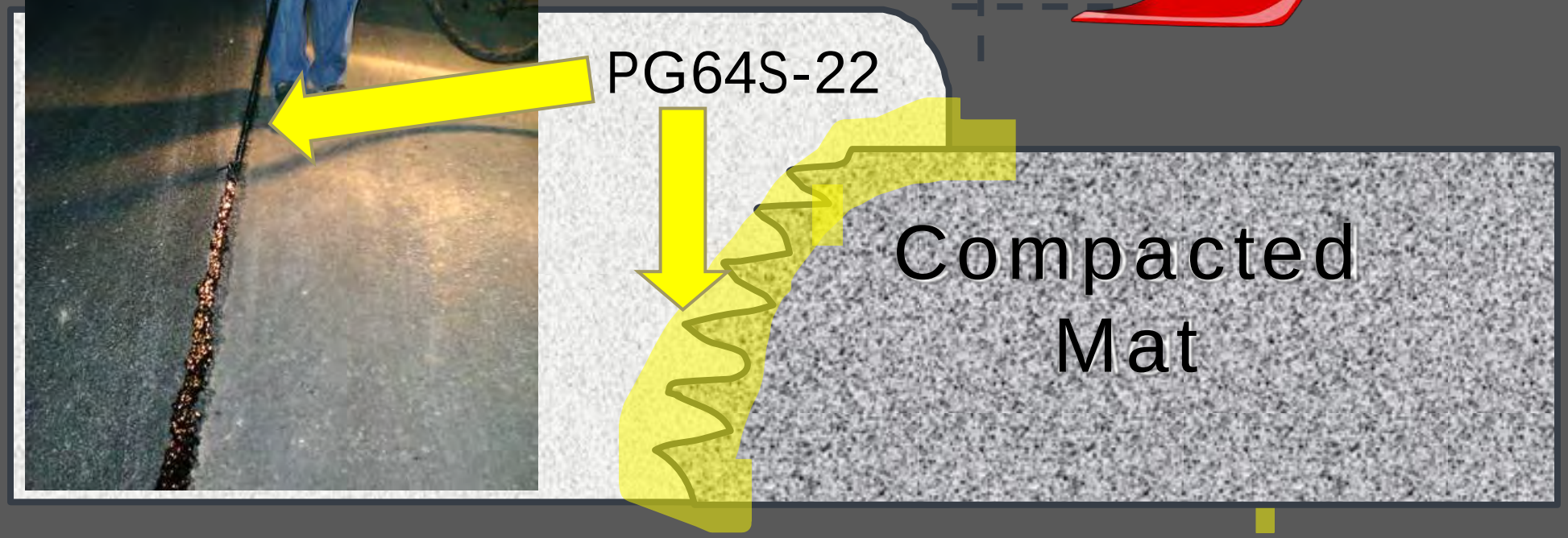
LONGITUDINAL JOINT IMPROVEMENT

PAINT THE JOINT







BUTT OR NOTCH WEDGE

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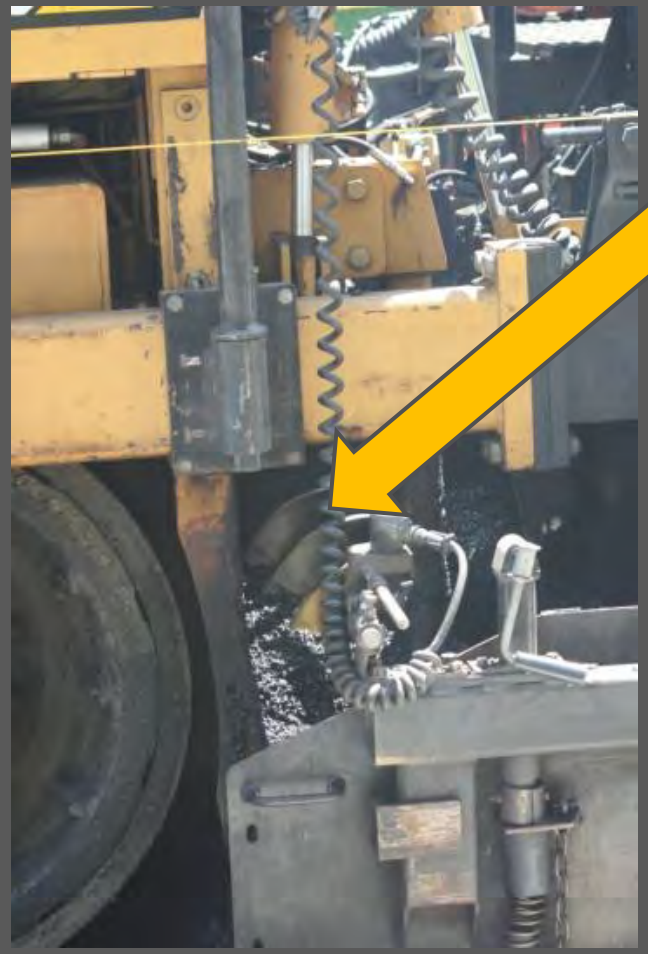
LONGITUDINAL JOINT IMPROVEMENT

PAVING THE JOINT



Uniform Head of Material Across the Entire Screed

Carry Material Within 12–18 inches of the End Gate

DO NOT STARVE THE JOINT!

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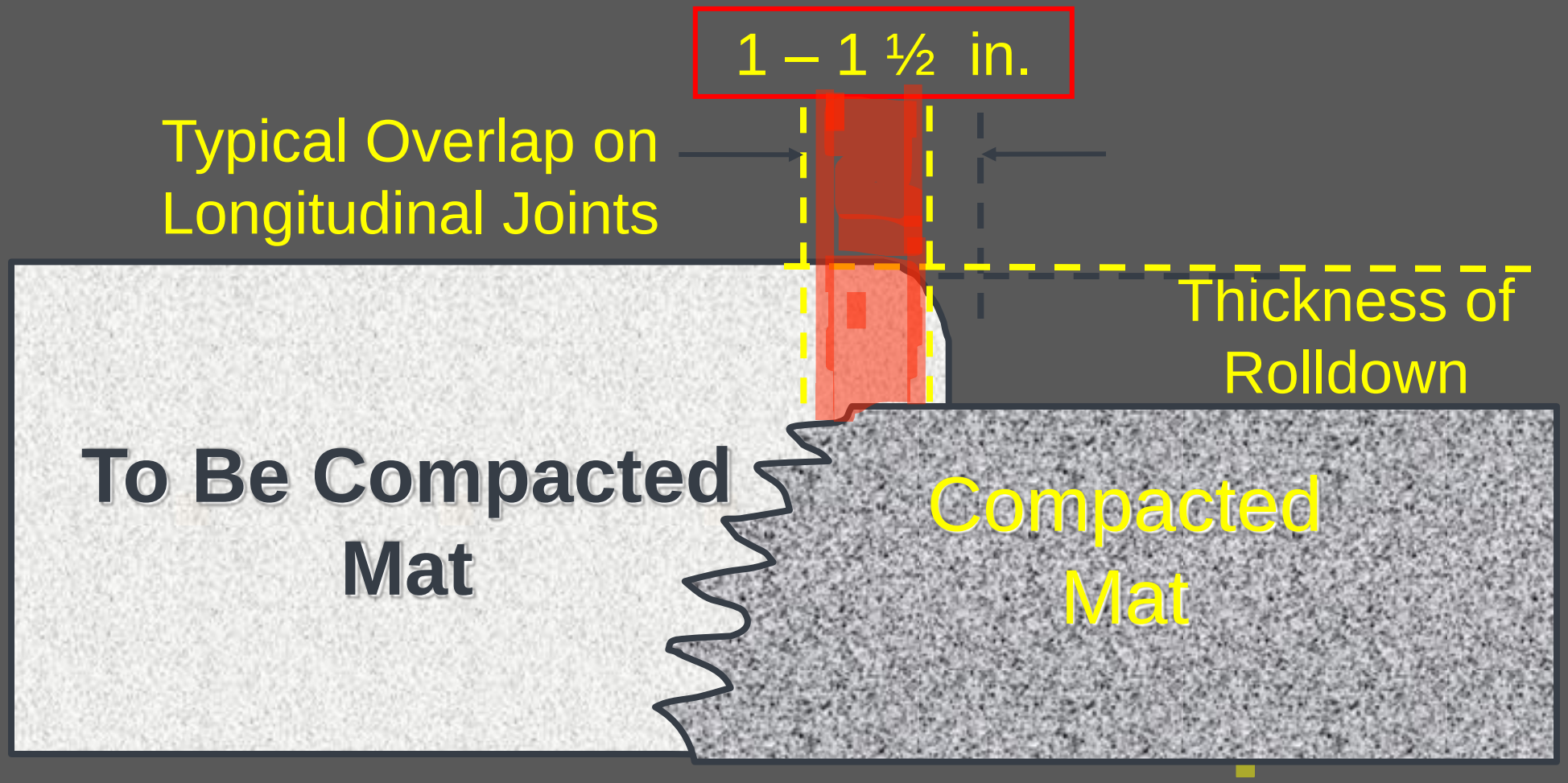
LONGITUDINAL JOINT IMPROVEMENT

PAVER OVERLAP



BUTT OR NOTCH WEDGE

LONGITUDINAL JOINT IMPROVEMENT

PAVING THE JOINT

DO NOT LUTE THE JOINT

OVERLAPPING JOINT - Critical to proper joint performance!

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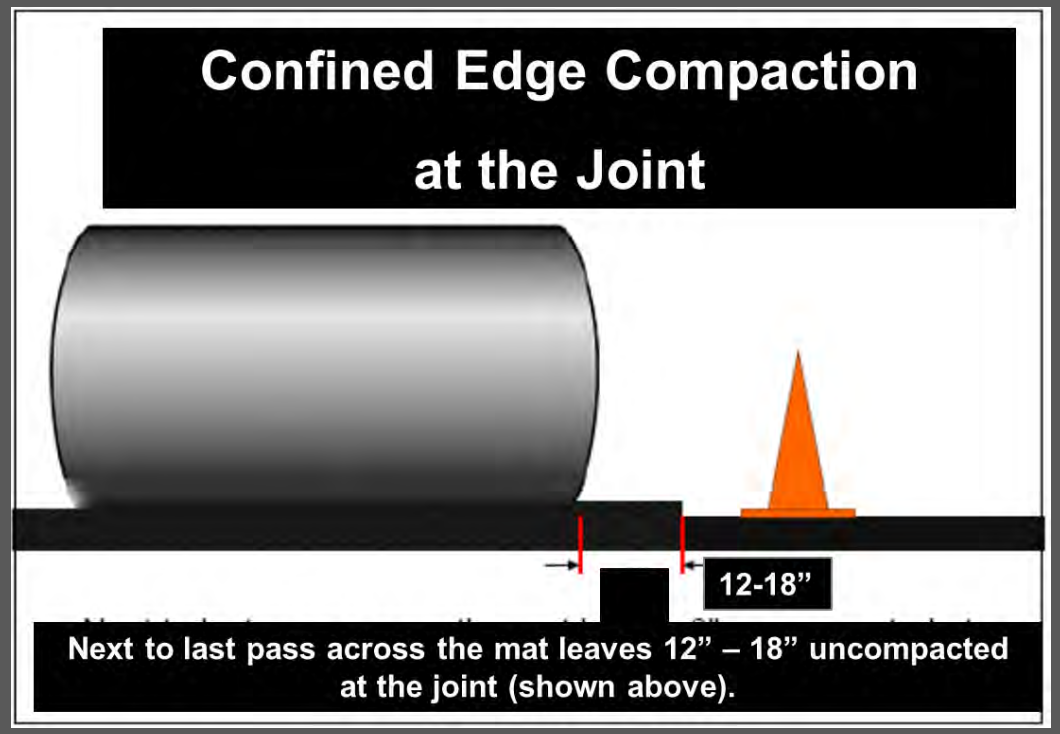
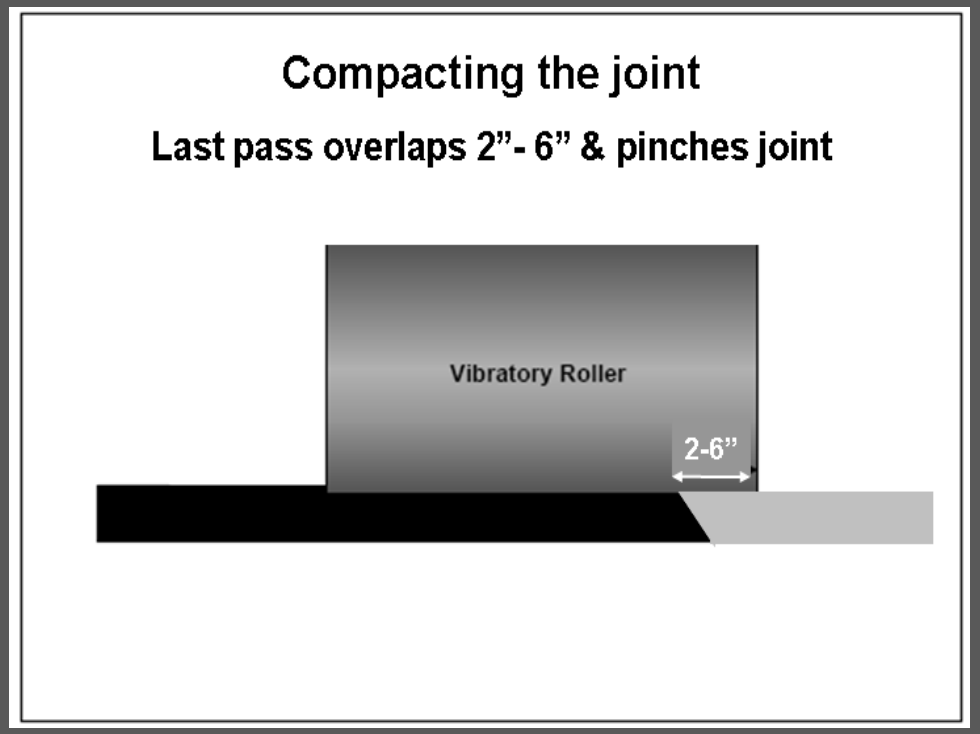
LONGITUDINAL JOINT IMPROVEMENT

COMPACTION

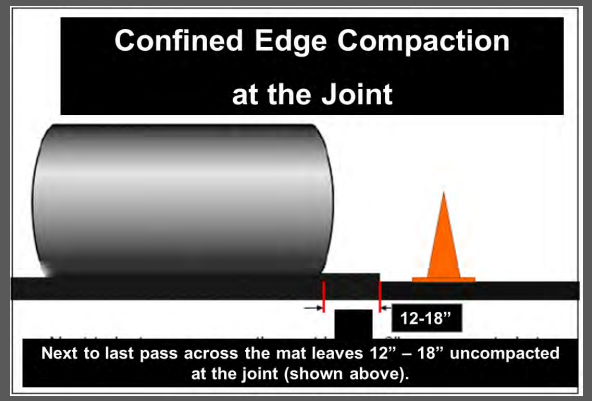


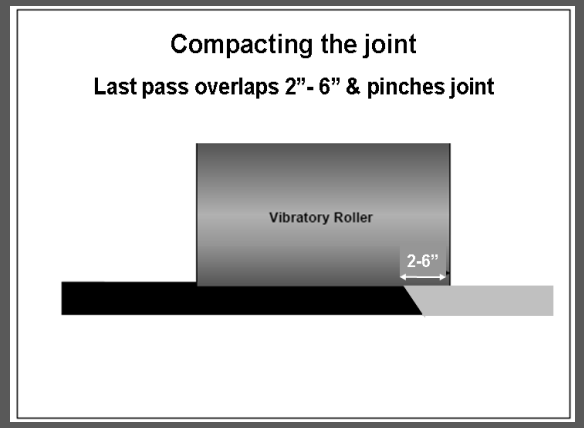


Proper rolling sequence of joint critical!

LONGITUDINAL JOINT IMPROVEMENT

COMPACTION





Proper rolling sequence of joint critical!

LONGITUDINAL JOINT IMPROVEMENT

COMPACTION

This method results in a crushed stone line that is mostly cosmetic and will wear off in time

LONGITUDINAL JOINT IMPROVEMENT

OVERBANDING JOINT

LONGITUDINAL JOINT IMPROVEMENT

What else has contributed to getting better performing Longitudinal Joints?

NOTCH WEDGE SYSTEM/PNEUMATIC ROLLER

TACKING THE JOINT & SEALING THE JOINT PG 64S-22

COMPACTS WEDGE & VERTICAL EDGE

OFFSET PAINT LINES & RPM FROM JOINT

LONGITUDINAL JOINT IMPROVEMENT

What else has contributed to getting better performing L Joints?

LONGITUDINAL JOINT REPAIR

HOW DO YOU REPAIR THIS DISTRESS?

LONGITUDINAL JOINT REPAIR

3 OPTIONS

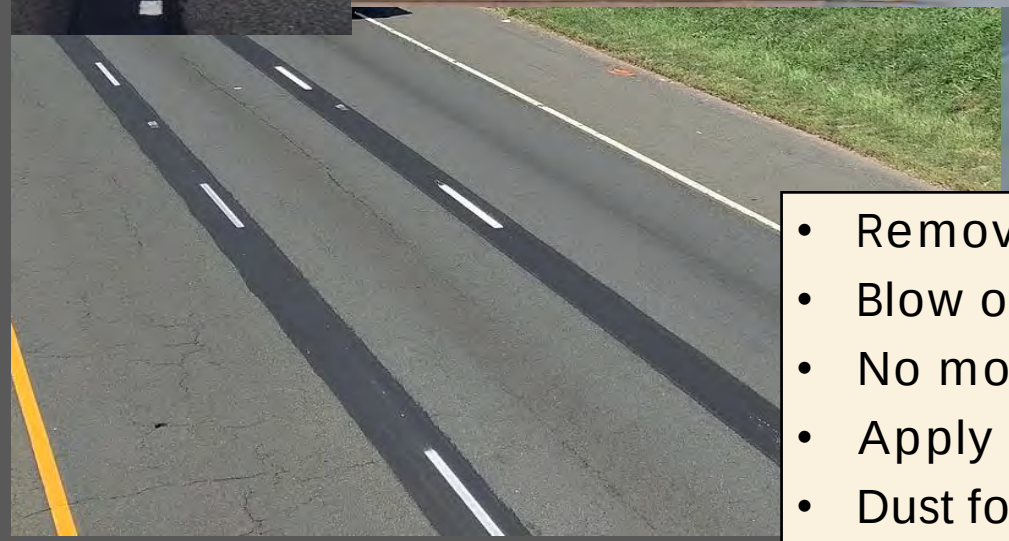
- Short term MICROSURFACE
- Medium term - MASTIC
- Longer Term - MILL-FILL

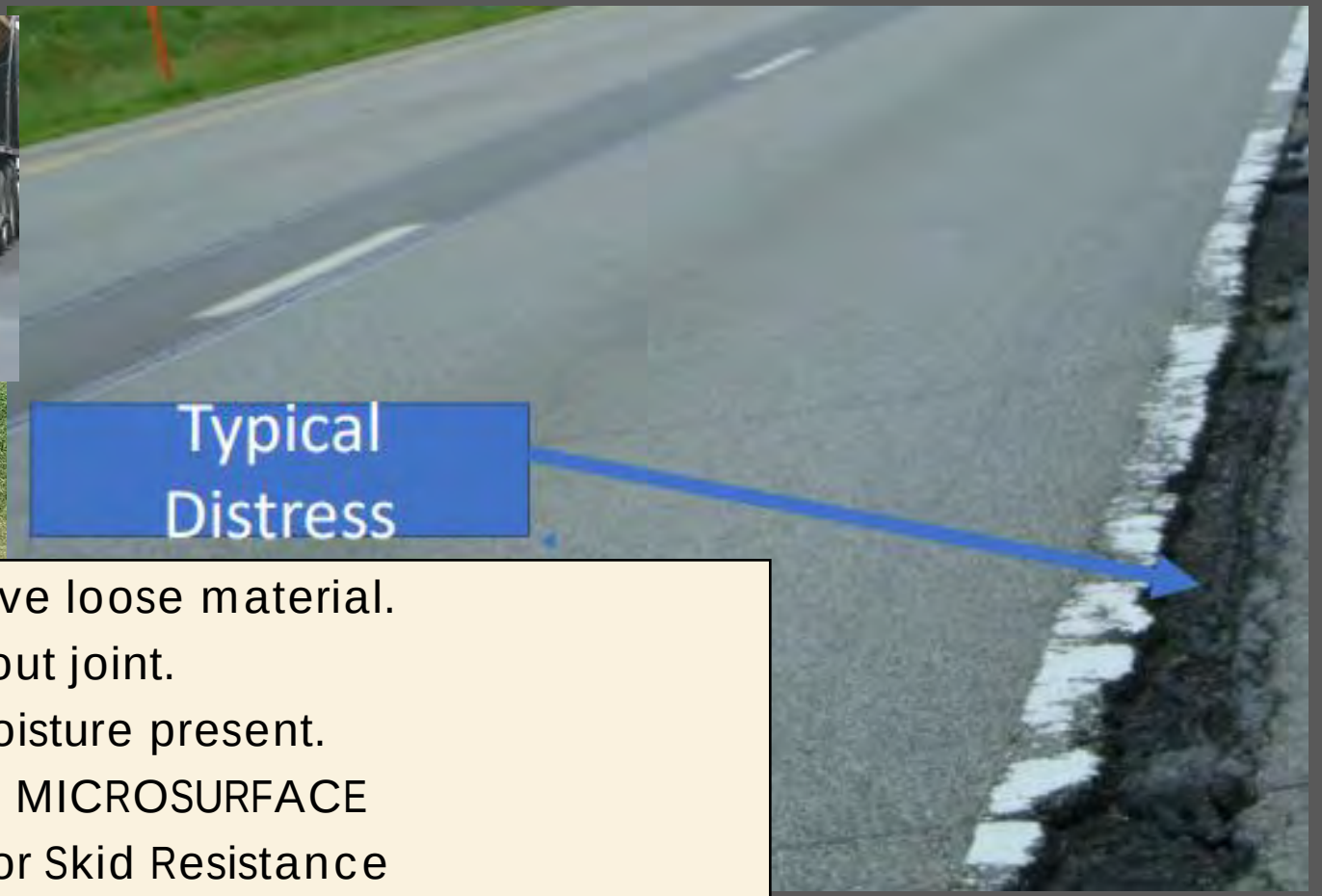
LONGITUDINAL JOINT REPAIR

OPTION 1

Short term MICROSURFACE

MICROSURFACE is a design mixture of polymer-modified emulsified asphalt, mineral aggregate, mineral filler, water, and other additives proportioned, mixed, and uniformly spread over a properly prepared surface.





- Remove loose material.
- Blow out joint.
- No moisture present.
- Apply MICROSURFACE
- Dust for Skid Resistance
- Durability – 5 years.

OPTION 2

Medium term - MASTIC

The term **"mastic"** refers to polymer-modified asphalt binder mixed with prepackaged engineered aggregates used in pavement preservation repairs. These binders provide improved bonding and adhesion to existing pavements, elasticity, and elongation for flexibility. The aggregates provide structural strength and a load-bearing capacity to the repair.

- Remove loose material.
- Blow out joint.
- No moisture present.
- Apply Mastic.
- Dust for Skid Resistance
- Durability – 5 years.

LONGITUDINAL JOINT REPAIR

OPTION 3

- Longer Term - MILL-FILL
- With Aramid Fibers
- With JBAND
- Seal Edges
- Fog Seal

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THANK YOU

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