

# PAPA REGIONAL TECHNICAL MEETINGS

RESEARCH PROJECT 2018-223 EVALUATION OF USING A  
LONGITUDINAL JOINT SEALANT DURING ASPHALT PAVING

MARCH 15, 16, & 17, 2022

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# PRESENTATION OUTLINE

This presentation will provide an overview of PennDOT's evaluation of J-Band as a Void Reducing Asphalt Membrane, also called a Longitudinal Joint Seal

- Longitudinal Joints
- Work Plan
- Construction
- Field Reviews
- Additional Field Sites
- Lessons Learned
- Moving Forward



# LONGITUDINAL JOINTS

## Issues

- Density
- Permeability
- Raveling
- Cracking

## Construction Practices

- Notched Wedge Joint
- Rolling the mat from the hot side to the cold side
- Joint Density  
incentive/disincentive



# WORK PLAN

- Work Plan
  - Researched what type of testing would be appropriate.
    - Reviewed Illinois's specifications and guidelines.
    - Determined what lab tests could be done by technicians.
    - Determined what field tests could be done by inspection staff.
  - Developed an appropriate testing plan during placement.
  - Found several suitable construction projects that could benefit from this product before the end of the 2018 construction season
    - Field Site 1, District 5, SR I-81, 13,644 ADT, 53.9% Trucks (10,560 LF)
    - Field Site 2, District 5, SR I-380, 15,246 ADT, 17% Trucks (5,280 LF)
  - Wrote the work plan so additional sites could easily be added.
    - Eleven field sites have been added to the work plan.



# CONSTRUCTION

- Material Placement
  - Observe and record the following:
    - Application rate
    - Material Spread
    - Time and Temperature until non-tracking
  - Collect liquid binder material samples for lab testing.
    - Dynamic Shear, AASHTO T315, > 1 min.
    - Creep Stiffness, AASHTO T313, between 0.3 & 300 MPa
    - Elastic Recovery, ASTM D6084 Method A, 70 min.
    - Polymer Separation, ASTM D7173, 3 max
  - Collect core samples for lab testing.
    - Bulk Specific Gravity  $G_{mb}$ , PTM 715/716,
    - Tensile Strength, AASHTO T283
    - Maximum Theoretical Specific Gravity  $G_{mm}$ , AASHTO T209
    - Percent Migration Depth of Modified Binder into Core, Visual Measurement
  - Check that the work was constructed according to the project special provision or manufacturers specifications.



# MATERIAL FIELD TEST

Measuring the liquid binder application rate.

Scale used to weigh the tar paper and material to determine application rate



Collecting material sprayed on tar paper



# MATERIAL FIELD TEST

Collecting material sprayed on a metal pan lined with tar paper to calculate application rate.



# MATERIAL FIELD TEST



Measuring  
18 inch  
width





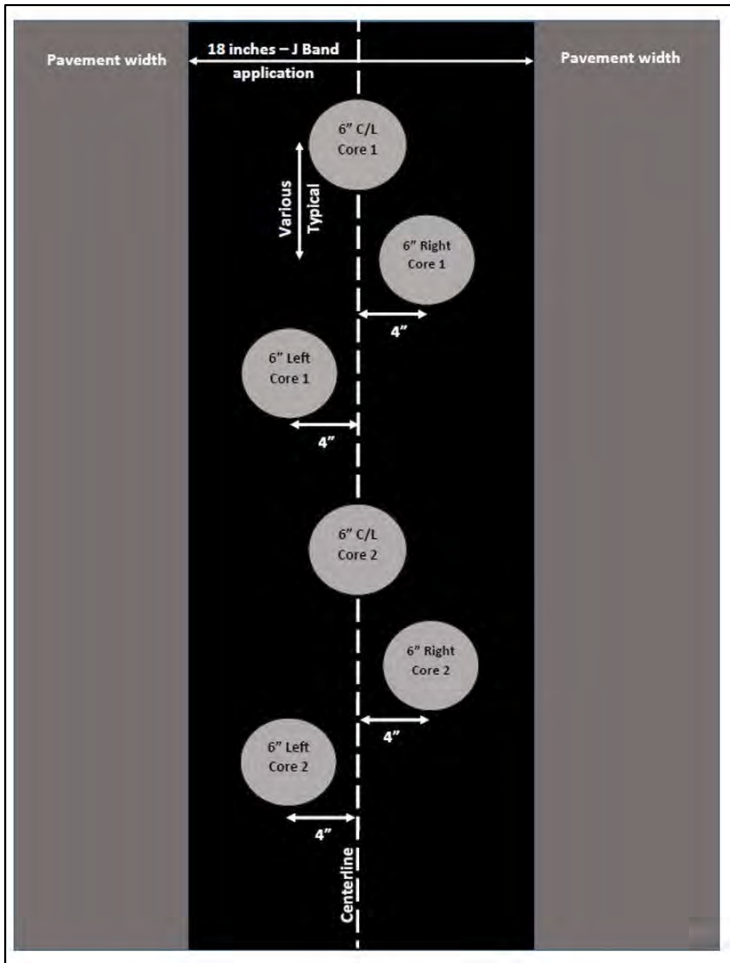
# LIQUID SAMPLE

Collecting liquid binder material for lab testing



# CORE SAMPLES

## Core Locations



## Visual Measurement



# FIELD REVIEWS

- The field reviews for each site are to visually survey the condition of the experimental longitudinal joint and the control joint for pavement distresses.
- Any cracking, raveling, bleeding or settlement along the joint areas will be documented.
- The percentage of pavement distresses per each area (control and experimental) will be determined for comparison.
- It is expected the experimental joint will have less distresses.
- Field Site 1 and Field Site 2 were placed in October 2018
- Field Review Schedule
  - 6-month review was in April 2019
  - 12-month review was in October 2019
  - 18-month review was cancelled in April 2020
  - 21-month review was in July 2020
  - 36+month review was in December 2022



# ADDITIONAL FIELD SITES

- Eleven additional field sites were added to the work plan.
- Locations ranging from the northeast to the southwest portions of the state.
- Types of roads two-digit to four-digit SR's
- Lengths vary from less than a mile to nine miles.
- Mix of traffic conditions and one-way versus two-way traffic.



# ADDITIONAL FIELD SITES

Research Project Location Information						Placement Information	
Field Site	District	ECMS	SR	Current ADT	Truck ADT	Date (Proposed)	Length (LF)
3	12	111658	906	3,228	7.30%	September 30, 2021 October 13, 2021	9,000
6	1	109821	80	27,208	56%	August 2, 2021 August 9, 2021	62,559



# ADDITIONAL FIELD SITES

Research Project Location Information						Placement Information	
Field Site	District	ECMS	SR	Current ADT	Truck ADT	Date (Proposed)	Length (LF)
9	9	22816	70	8,888 EB 8,511 WB	34%	(2022)	35,064
11	3	105530	180	---	---	(2022-2023)	---
12	3	99423	220	2,624	28%	(2022)	12,279
13	8	101156	22	18,839	20%	(2022)	24,324



# ADDITIONAL FIELD SITES

Research Project Location Information						Placement Information	
Field Site	District	ECMS	SR	Current ADT	Truck ADT	Date (Proposed)	Length (LF)
4	5	93710	924	5,923	7%	June 9, 2021 September 15, 2021 September 21, 2021	12,565
5	6	86923	309	21,343	10%	June 22, 2021 June 23, 2021 June 24, 2021	18,300
7	4	102563	2008	9,147	4%	September 17, 2021	11,924
			2035	5,779	6-13%	July 6, 2021	12,557
8	4	112495	247	8,128	4%	(2022)	8,051
			6011	12,189	4%	(2022)	6,611
			2006	6,515	3%	(2022)	4,584
10	5	96385	22	34,605 EB 32,647 WB	21% EB 16% WB	October 6, 2021 October 7, 2021 October 8, 2021	47,650



# NIGHT PLACEMENT



Field Site 10 District 5 SR 22



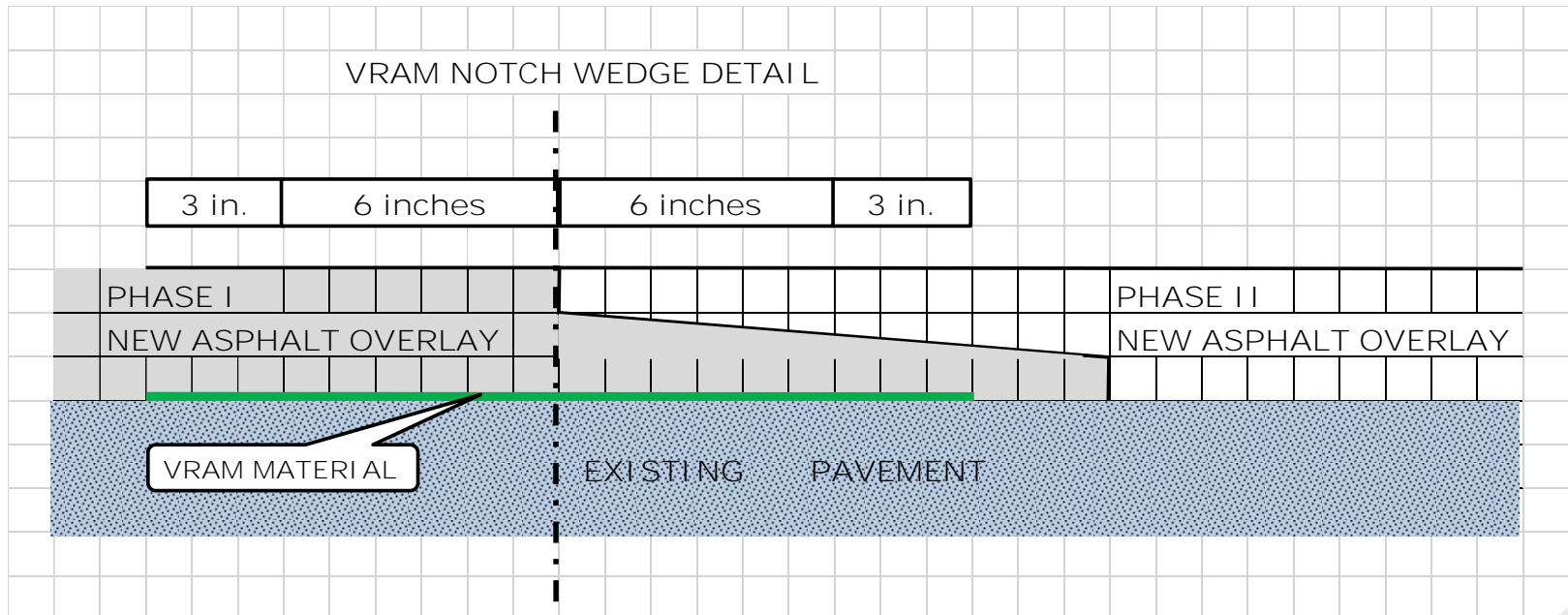


# DAY PLACEMENT



# LESSONS LEARNED PLACEMENT

- Vertical Joints
  - Have preformed better so far.
- Notched Wedge Joints
  - Recommend rolling the notched wedge.
  - Tack Coat vs PG 64S-22 asphalt binder on wedge surface.



# PAVING OVER THE MATERIAL



Field Site 6 District 1 SR 80



# LESSONS LEARNED LAB TESTS

- Liquid Samples
  - Material ranges
- Core Samples
  - Core Collection
  - Maximum Specific Gravity



# MOVING FORWARD

- Working on a Standard Special Provision. (SSP)
- The first revision of the work plan special provision was added to Field Site 6, Field Site 9, Field Site 11, and Field Site 13 contracts, based on where these projects were in the letting schedule.
- Based on observations during 2021 construction PennDOT usage guidelines need to be developed.
- Both the SSP and guidelines need to proceed through PennDOT's clearance transmittal process to become approved standards.
- NPI and the Districts will continue to monitor the field sites for additional information for this evaluation.



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