# District 1-0
# Pavement Quality Task Force (PQTF)

**Where We are Today**

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# Route 62

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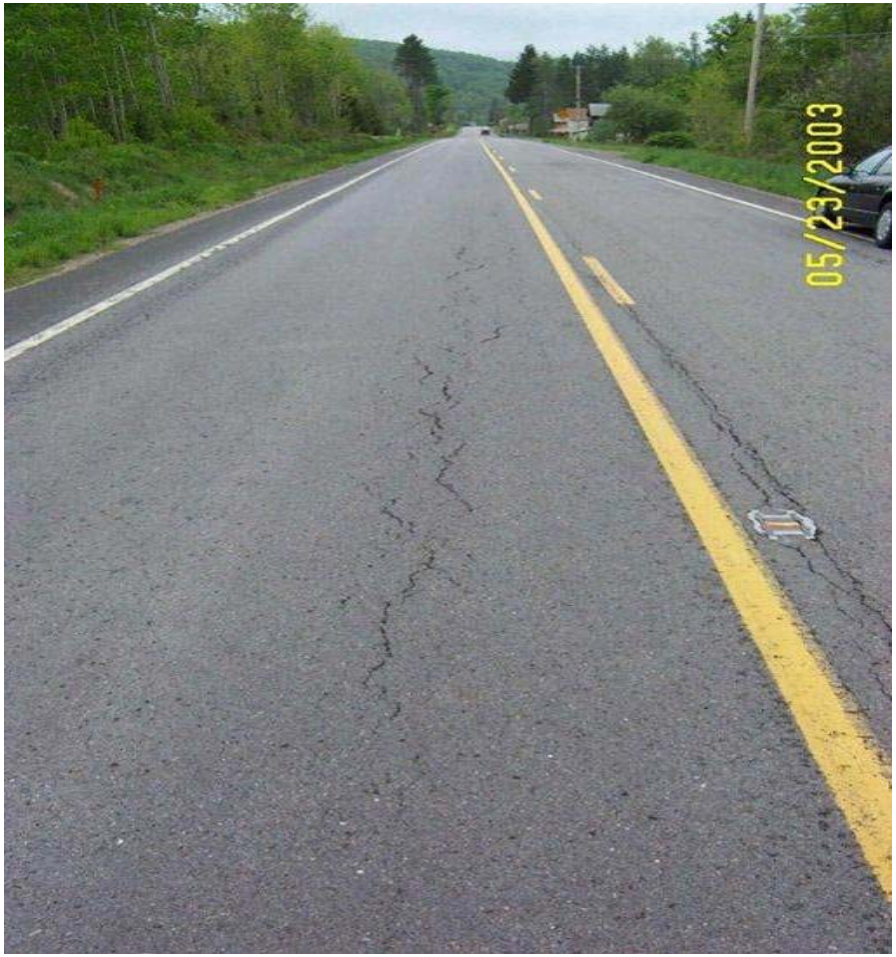
DEPARTMENT OF TRANSPORTATION

# Route 6


pennsylvania
DEPARTMENT OF TRANSPORTATION

# Route 948

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# I - 79

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# Route 6


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# I - 90

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# Team Members

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# Partnerships

- BOCM/BOPD
- BOMO
- PAPA
- FHWA
- Industry ( Bituminous Producers & Contractors )

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# Top Ten Accomplishments

- Development of a District Longitudinal Joint Special Provision in 2008 that included Piloting projects and Data Collection. Ultimately led to the implementation of a Statewide Longitudinal Joint Density Specification in 2011.

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# Top Ten Accomplishments

- Piloting of multiple projects in 2008/2009 that reduced gyration levels and lowered design air voids. Ultimately lead to a District Special Provision specifying 65 gyration mixes for all 9.5mm mixes.

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# Top Ten Accomplishments

- Development of a District verification process for theoretical Specific Gravities which was later replaced by the implementation of a Statewide verification process 3 years later.


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# Top Ten Accomplishments

- Set-up and operation of a District Lab to verify producer results and assist maintenance operations with various programs.


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# Top Ten Accomplishments

- Proactive implantation of 100% usage of SMA on all interstate projects.

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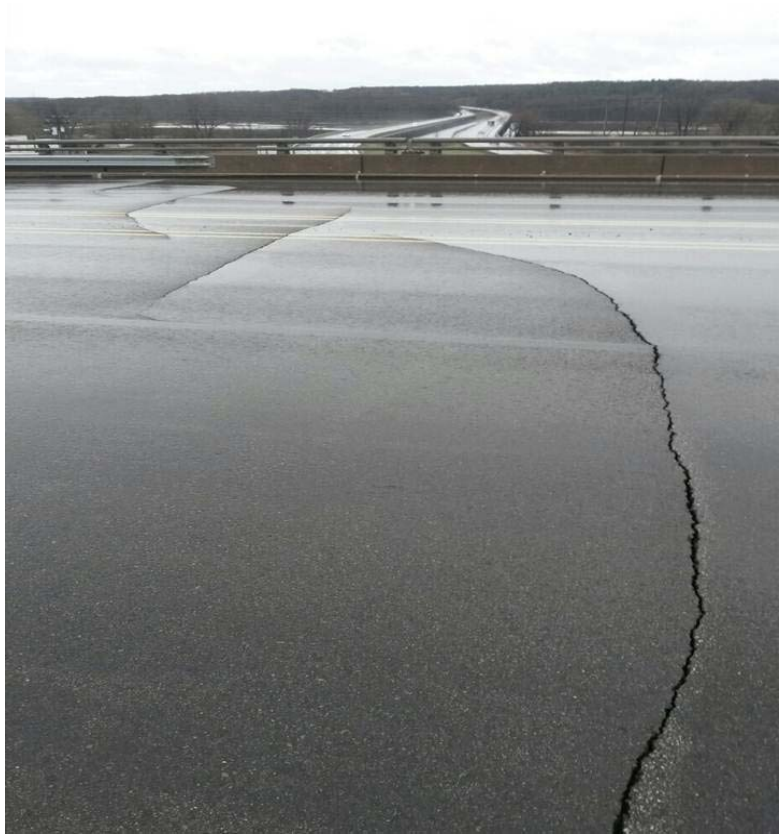
# Top Ten Accomplishments
# Pavement Database

**Spring Pavement Reviews**



**Continued Monitoring**

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# Top Ten Accomplishments

- Piloting the first WMA SMA in the State leading the way for State-wide usage of SMA WMA technology.


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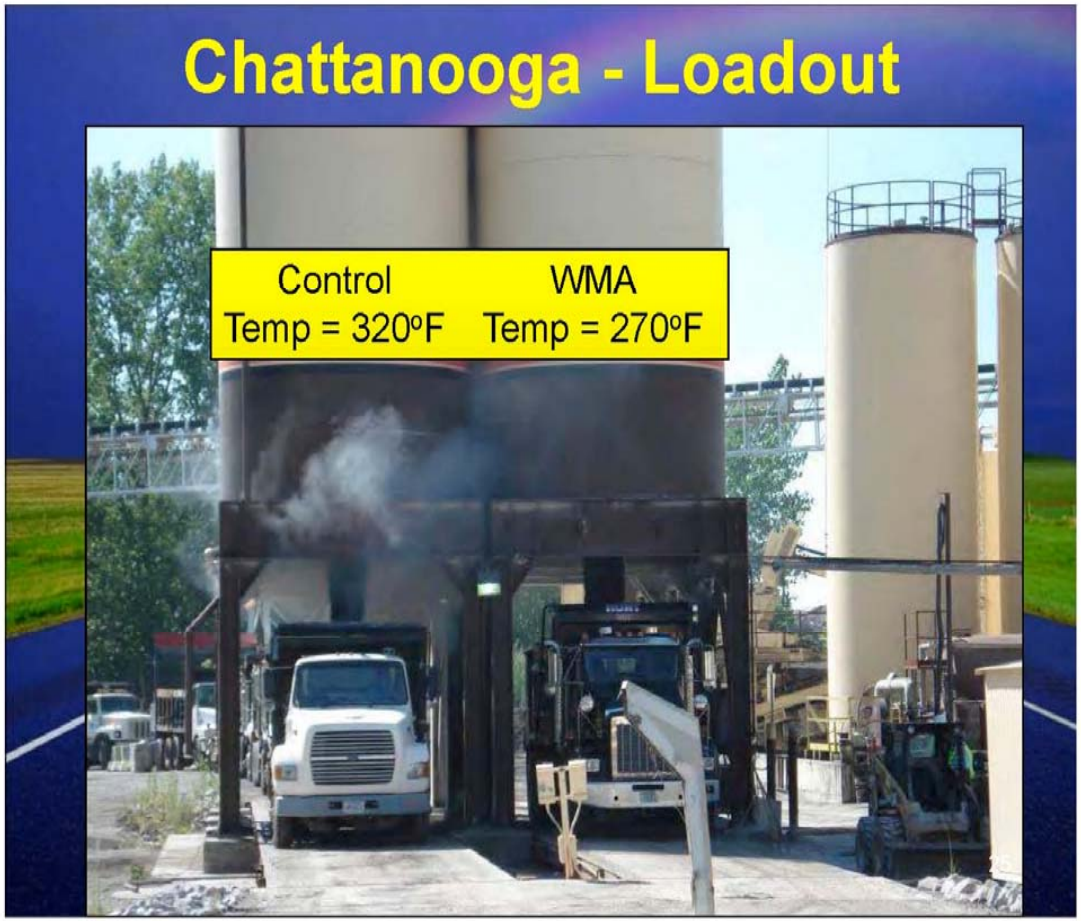
# Top Ten Accomplishments

- Leading the state with 100% WMA usage within the District providing more uniform AC coating of aggregates, thicker film thickness and less aging of the AC binder.

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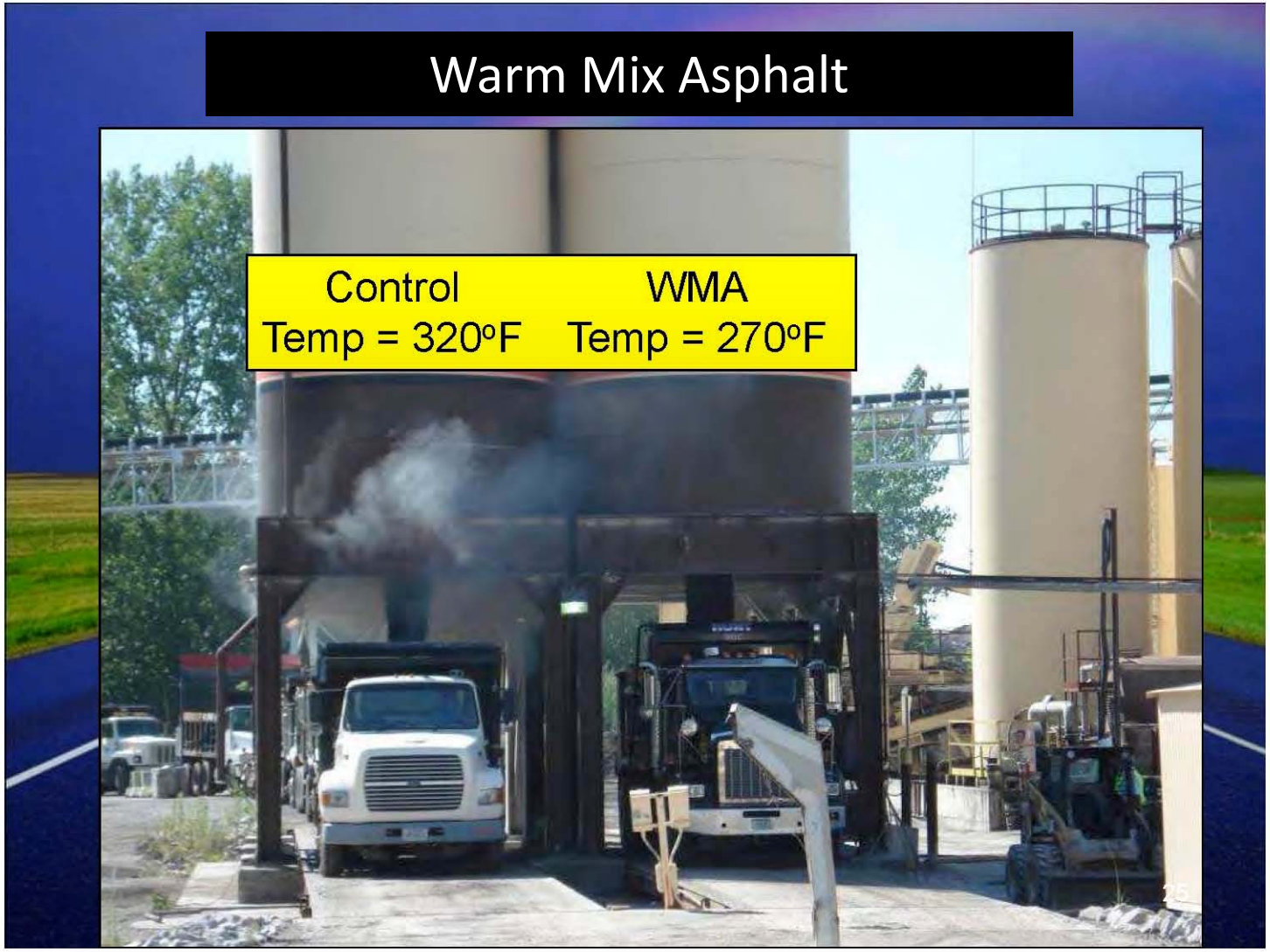
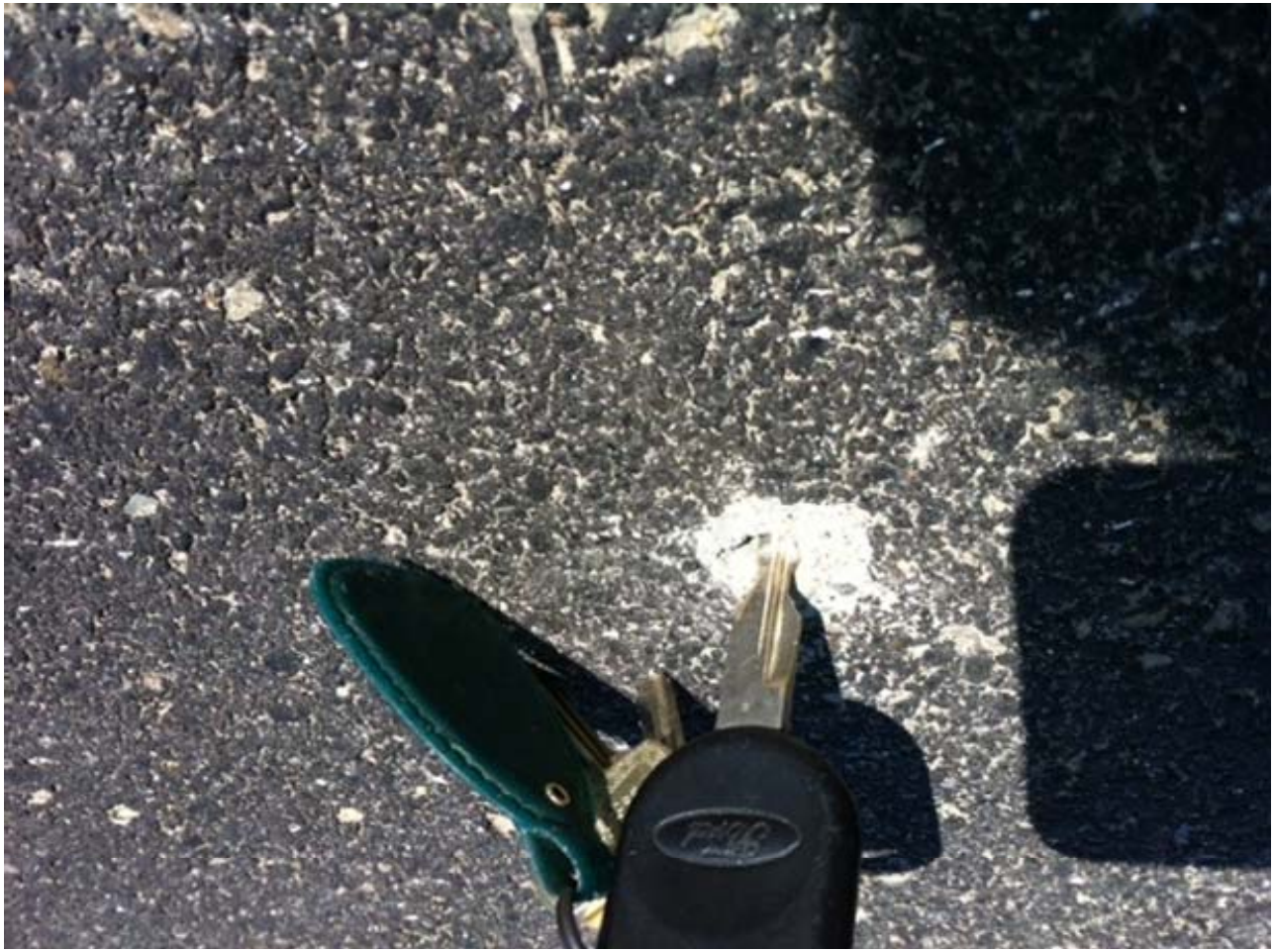
# Warm Mix Asphalt



# District 1-0 first Warm Mix Project

**20**

**2011**



The Glenn O. Hawbaker Grove City, Pa., plant provided the asphalt mixes for State Route 8


PAPA

# 408 Change 5

**Table A**
**Job-Mix Formula**
**Composition Tolerance**
**Requirements of the**
**CompletedMix**

PG 58-28 Asphalt Cement 215-310
PG 64-22 Asphalt Cement 220-320
PG 76-22 Asphalt Cement 240-330

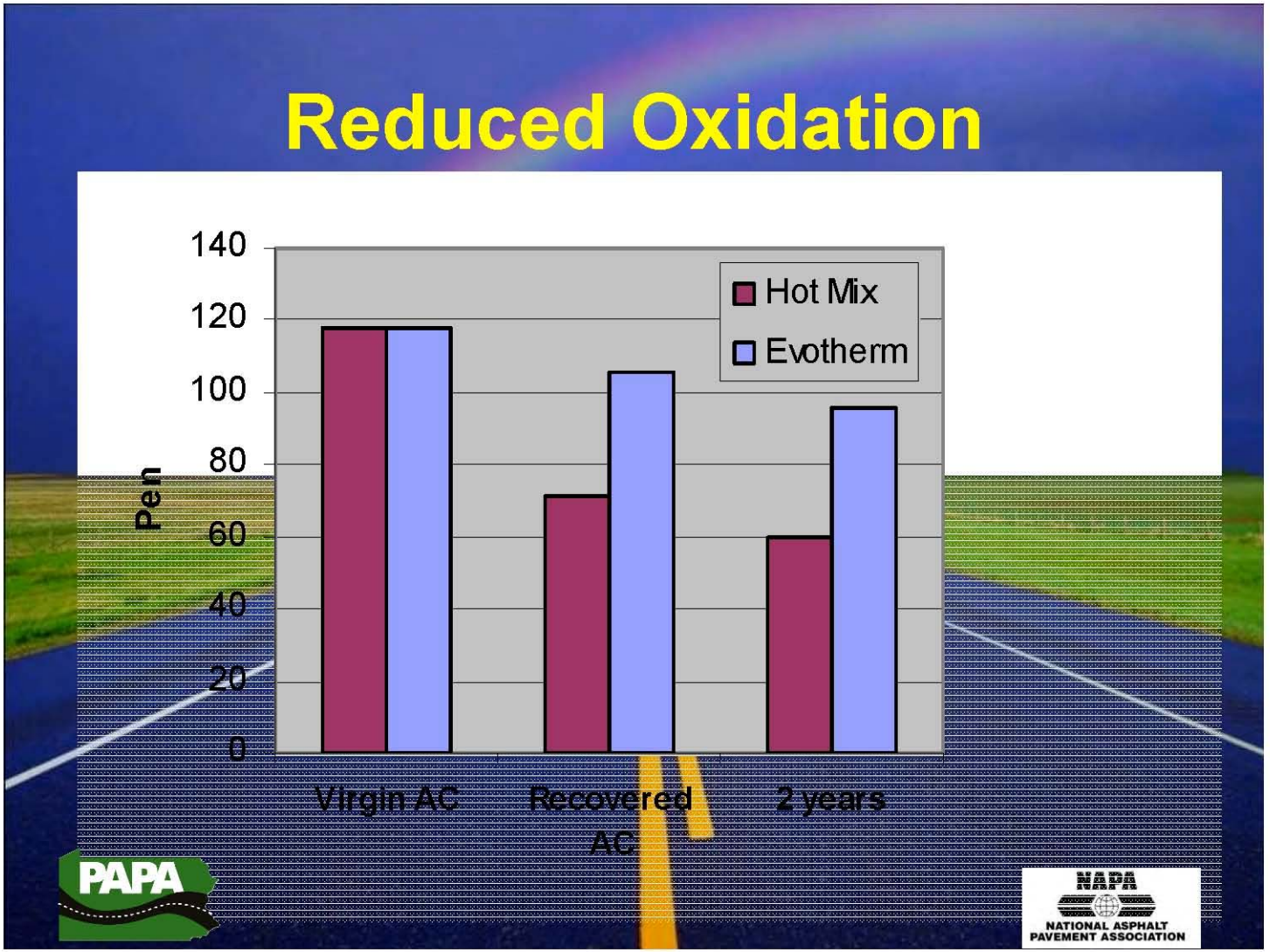
## Decreased binder aging, light oils never reach boiling point (285℉)


## Pavement stays blacker, longer

PAPA

NAPA
NATIONAL ASPHALT PAVEMENT ASSOCIATION

# Reduced Oxidation



# Absorption

Warm Mix

Hot Mix

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# FINAL REPORT

# District 1-0
# 2015 Annual Bituminous Paving Project Review using (Modified Superpave Mix Design Criteria)

PREPARED BY:
BILL CARR, Materials Manager I

**Field Review Conducted in March 2016**

## MERCER COUNTY - PROJECT LOCATIONS AND INFORMATION

**Mercer County**
**SR/Section:** 760-01M
**Segment:** (SR 3005) 0010/0000 to 0050/1095
**ECMS:** 98022
**Contractor:** Kirila Construction Inc
**Bit. Plant:** Dunbar asphalt Wheatland plant
**Mix Design:** W601 (0 to <30 / 65 gyration / PG 64-22 / 4.0 Voids / SRL-H)
**Notes:** WMA, Cold in place recycle project. Limestone/ calcareous sandstone course aggregate and limestone fine aggregate mix
**Findings:** Mat looks good.

**Mercer County**
**SR/Section:** 3006-01M
**Segment:** 0010/0000 to 0050/0240
**ECMS:** 98026
**Contractor:** Kirila Construction Inc
**Bit. Plant:** Dunbar asphalt Wheatland plant
**Mix Design:** W639 (3 to <10 / 65 gyration / PG 64-22 / 4.0 Voids / SRL-G)
**Notes:** WMA, limestone / calcareous sandstone course aggregate and limestone / gravel fine aggregate mix
**Findings:** pavement looks good.

**Mercer County**
**SR/Section:** 18/451
**Segment:** (SR 18) 0310/0553 to 0370/0562
(SR 18) 0311/0615 to 0371/0568
**ECMS:** 104415
**Contractor:** Sharon Paving & Construction Co.
**Bit. Plant:** Dunbar asphalt Wheatland plant
**Mix Design:** AW732 (.3 to <3 / 65 gyration / PG 64-22 / 3.5 Voids / SRL-H)
**Notes:** WMA, limestone/ gravel course aggregate and fine aggregate mix
**Findings:** pavement looks good.

**Warren County**
**SR/Section:** 6-25M
**Segment:** 0650/0000 to 0700/1858
**ECMS:** 100006
**Contractor:** I.A. Construction Co.
**Bit. Plant:** Warren plant
**Mix Design:** WW200 (3 to <30 / 65 gyration / PG 64-22 / 3.5 Voids / SRL-E)
**Notes:** WMA mix, gravel course and fine aggregate mix
**Findings:** Mat looks good. No issues

## REPORT SUMMARY

This year's Spring Pavement Review of the 2015 paving projects is one of the best reviews we have had as durability continues to improve as the result of implementations of the PQTF. There are several key factors contributing to the improved performance of our bituminous pavements. Department Special Provision requiring minimum asphalt content based on the combined aggregate specific gravity. District Special Provision requiring anti-strip to be added to mixes using gravel course and/or fine aggregate, District Special Provision limiting the use of high absorptive course aggregate in our wearing courses, and the use of warm mix asphalt at the reduced temperature to minimize oxidation of the mix. Both Department and District Special Provisions for Longitudinal Joint Density. In addition with the mild winter this year's review of the 2015 bituminous paving projects has resulted in less reflective and thermal cracking. Although durability has improved we continue to see isolated instances of slippage damage to our pavements which is currently under study.

Four (4) State Routes (27, 36, 89, & 8) in addition to the three (3) State Routes from2014 construction season (308, 322, & 258) have had pavement slippage distresses.

## CONCLUSIONS & RECOMMENDATIONS

With the exception of SR 308, all pavement slippage distress areas have been patched and currently performing well. SR 308 has had multiple pavement slippage distress areas and has been patched with reoccurring pavement slippage issues. Cores have been drilled and logged for forensic analysis on these pavements.

It has become District policy to lift samples of tack coat for testing at LTS on all projects. We will also be evaluating our wearing courses and scratch courses for potential tenderness.

With the majority of our bituminous paving being overlays it is our recommendation to place emphasis on drainage improvements and base structure/repairs that are needed to preserve our pavements.

We believe that we are at a point, until more is learned about the slippage issue, no major revisions of our mix design revisions are required. We should continue to monitor our pavements to ensure that the mix design changes and best practices we have implemented are continue to produce durable long lasting pavements

TR-448A (6-15)

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# JOB MIX FORMULA REPORT

| PennDOT Mix Design Designation | |
|---|---|
| Year | Number |
| 2015 | WA008 |

Supplier JMF/Design Number (Optional): WA008

| | |
|---|---|
| Supplier Code | INA16A41 |
| Material Class | WR9.5 |
| Design ESAL Range | 0.3 to < 3 Million |
| Aggregate Skid Resistance Level (SRL) | H |
| Mixure Final Asphalt Binder Grade | PG6422 |
| Asphalt Mix Type | WMA |
| Gradation Classification | Coarse-Graded |
| Original Approval Date | |
| JMF Status | Approved |

Supplier Name: IA Construction Corporation  Location: PAINT TWP #4
ECMS Number  PO No.-Line Item No.  408 Spec
SR & Section  Plant Type: AB  Plant Size: 10
Contractor  Location

| Mix Time | |
|---|---|
| Dry(s) | Wet(s) |
| 5 | 40 |

| Material Supplier | Material Code - Class | Product Name | % Material | Spec. Grav. | % Absorption |
|---|---|---|---|---|---|
| ALC10C14 | 207 (Aggregate Fine) - B3 | Allegheny Mineral | 38.700 | 2.668 | 0.70 |
| INBNYC14 | 203 (Aggregate) - A8 | LIPPERT (IAC) | 20.400 | 2.505 | 2.72 |
| HAP14A14 | 203 (Aggregate) - A8 | Hanson | 20.400 | 2.742 | 0.66 |
| MAXEQ 15 | 187 (WMA Technology) - AQUABL | AQUABLACK | 2.000 | | |
| | 186 (Bituminous Mixture-additive) - ASTRIP | PAVEBOND LITE | 0.250 | | |
| VARIOUS | 17 (Hot Rap Design) - RAP | Clarion Rap | 14.200 | 2.699 | 0.00 |
| UNRC0 15 | 1 (Asphalt Cement) - 64-22 | United Refinery | 6.300 | 1.029 | 0.00 |

## JOB MIX FORMULA AND DESIGN

| A.C. / Sieve Size | A.C% | #200 | #100 | #50 | #30 | #16 | #8 | #4 | 3/8" | 1/2" | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Target | 6.3 | 5.6 | 8 | 11 | 16 | 26 | 44 | 66 | 99 | 100 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| % Virgin A.C. | 5.5 | % Reclaimed A.C. from RAP | 0.80 | Total % Asphalt (Pb) | 6.3 |
| Virgin A.C. PG Binder Grade | PG6422 | % Reclaimed A.C. from RAS | | % Eff. Asphalt Binder (Pbe) | 5.7 |
| Calc. Asp. Film Thickness | 10.80 | Total Reclaimed Binder Ratio | 0.13 | Fines / Asphalt (F/A) Ratio | 1.0 |

## MIX CHARACTERISTICS (GYRATORY)

| Design ESAL Range | Mold Diameter (mm) | # Gyrations at Ninitial | # Gyrations at NDesign | # Gyrations at NMaximum | Voids in Mineral Aggregate (VMA) % | Theoretical Max. Sp. Grav. (Gmm) | Bulk Sp. Grav. of Mixture (Gmb) |
|---|---|---|---|---|---|---|---|
| 0.3 to < 3 Million | 150 | 7 | 65 | 115 | 16.5 | 2.448 | 2.362 |
| **Bulk Sp. Grav. of Combined Aggr.(Gsb)** | **Mixture Mass to Compact (g)** | **% Air Voids at Ninitial** | **% Aid Voids at NDesign** | **% Air Voids at NMaximum** | **Voids filled with Asphalt (VFA) %** | **Theoretical Max. Density (lbs/ft3)** | **Bulk Density of Mixture (lbs/ft3)** |
| 2.650 | 4,685.0 | 12.9 | 3.5 | 2.6 | 79.0 | 152.4 | 147.0 |

## ASPHALT CONTENT TEST METHOD

| A.C. Test Method | External Party Oven Make/Model | Furnace Temp (°C) | Sample Size for C.F. | Asphalt C.F. | 200 C.F. |
|---|---|---|---|---|---|
| PTM No. 757 | NCAT | 538.0 | 1,200.0 | 0.39 | 0.50 |

## MOISTURE SUSCEPTIBILITY DATA

| A.C. Supplier | Name | Dry PSI Strength | Wet PSI Strength | TSR Value | Date of TSR Test | Date of Boil Test |
|---|---|---|---|---|---|---|
| UNRC0 15 | United Refinery | 149.7 | 132.6 | 0.89 | 3/30/15 | |

## COMBINED AGGREGATE CONSENSUS PROPERTIES

| AASHTO T 176 Sand Equivalency (%) | AASHTO T 304 Fine Aggr. Angularity Uncompacted Voids (%) | ASTM D5821 - Coarse Aggregate Angularity | | ASTM D4791 Flat / Elongated Particles | | Total % Reclaimed Agg. From RAP and / or RAS |
|---|---|---|---|---|---|---|
| | | % 1 Face Crush | % 2 Face Crush | 5:1 | 3:1 SMA only | |
| 93.3 | 45.6 | 98.5 | 95.0 | 0.0 | | 14.2 |

| | | | | | |
|---|---|---|---|---|---|
| Designed By : | Kevin J. Casper | Designed By Certification ID : | 2067 | Designed Date : | 3/24/15 |
| Submitted By : | Kevin J. Casper | Submitted By Certification ID : | 2067 | Submitted Date : | 7/6/15 |
| Approved By : | Larry A Riggleman | Approved By Certification ID : | 51728 | Approved Date : | 7/16/15 |

SR 5 – DOI (SR20) approximately 65' in WBPL is unacceptable due to segregation and needs replaced

# Pavement Database

# Service Life Greater Than 10 Years
# ADT Greater Than 5000

New Report | Close Report

| County<br>ERIE | Service Life | Contract | SR | Route & Section | Begin Segment | Begin Offset | End Segmen | End Offset | ADT at time of Construction |
|---|---|---|---|---|---|---|---|---|---|
| | 10 Yrs. | 67947 | 97 | 97-11M | 240 | 1553 | 290 | 1430 | 5838 |
| | 10 Yrs. | 12291-B | 19 | 19-08M | 90 | 130 | 290 | 2574 | 13736 |
| | 10 Yrs. | 12290-C | 20 | Group 231 | 780 | 165 | 820 | 2306 | 5056 |
| | 10 Yrs. | 12293 | 97 | 97-10M | 170 | 16 | 240 | 1553 | 5928 |
| | 10 Yrs. | 12291-C | 97 | 97-09M | 100 | 1763 | 160 | 1877 | 10361 |
| | 10 Yrs. | 122 | 20 | 20-10M | 690 | 100 | 720 | 100 | 7842 |
| | 10 Yrs. | 67879 | 99 | 99-05M | 260 | 57 | 380 | 268 | 8936 |
| | 11 Yrs. | 12274 | 832 | 832-03M | 170 | 152 | 220 | 54 | 8046 |
| | 11 Yrs. | 12269-C | 20 | Group 222 | 830 | 100 | 890 | 3064 | 5056 |
| | 12 Yrs. | 12274 | 832 | 832-03M | 170 | 152 | 220 | 54 | 8046 |
| | 13 Yrs. | 12247-F | 955 | 1-00-201 | 40 | 100 | 100 | 682 | 5751 |
| | 14 Yrs. | 12260 | 98 | 98-01M | 200 | 2499 | 320 | 1902 | 7888 |

| County<br>MERCER | Service Life | Contract | SR | Route & Section | Begin Segment | Begin Offset | End Segmen | End Offset | ADT at time of Construction |
|---|---|---|---|---|---|---|---|---|---|
| | 10 Yrs. | 1850-D | 376 | 60-A01 | 10 | 0 | 120 | 275 | 7887 |
| | 10 Yrs. | 70224 | 80 | 80-A06 | 3 | 0 | 211 | 1437 | 27919 |
| | 11 Yrs. | 67894 | 18 | 18-13M | 330 | 2565 | 370 | 1443 | 13980 |

| County<br>VENANGO | Service Life | Contract | SR | Route & Section | Begin Segment | Begin Offset | End Segmen | End Offset | ADT at time of Construction |
|---|---|---|---|---|---|---|---|---|---|

# Service Life Summary Report

New Report | Close Report | Print Report

## Service Life Greater Than 10 Years
## ADT Greater Than 5000

### Joint Summary

| | | | | | |
|---|---|---|---|---|---|
| Maryland: | 0 | Unsealed Vertical: | 0 | Unspecified: | 38 |
| Sealed Vertical: | 0 | Unsealed Notch Wedge: | 0 | | |
| Sealed Notched Wedge: | 0 | Other: | 0 | | |

### Surface Summary

| | | | | | |
|---|---|---|---|---|---|
| HMA: | 38 | UTFC (Novachip): | 0 | Unspecified: | 0 |
| Micro Surfacing: | 0 | Surface Treatment: | 0 | | |
| SMA: | 0 | WMA: | 0 | | |

### Aggregate Summary

| | | | | | |
|---|---|---|---|---|---|
| CS: | 3 | LS: | 3 | SS: | 0 |
| CS/GL: | 2 | LS/CS: | 0 | Unspecified: | 0 |
| GL: | 21 | LS/GL: | 9 | | |

### Fine Aggregate Summary

| | | | | | |
|---|---|---|---|---|---|
| GL: | 19 | LS/GL: | 12 | Unspecified: | 0 |
| SL: | 7 | LS/CS: | 0 | | |

### RAP Summary

| | | | | | |
|---|---|---|---|---|---|
| Yes: | 1 | No: | 37 | Unspecified: | 0 |

### PG Grade Type Summary

| | | | | | |
|---|---|---|---|---|---|
| PG 52-28: | 0 | PG 64-22: | 21 | Unspecified: | 0 |
| PG 58-28: | 1 | PG 76-22: | 16 | | |

### Pavement Averages

| | | | |
|---|---|---|---|
| AC Content: | 6.132 | VMA: | 15.895 |
| #200 Screen: | 4.095 | Effective AC: | 5.262 |

# Average Service Life by Material

MATERIAL CLASS

**HMA**

(173 detail records)

Average Service Life: 7.5 Years

**MARSHALL**

(22 detail records)

Average Service Life: 8.9 Years

# Average Service Life by Nominal Size

| Nominal Size | Service Life |
|---|---|
| 12.5 mm | |
| (6 detail records) | |
| Average Service Life: | 8.33 Years |
| 9.5 mm | |
| (167 detail records) | |
| Average Service Life: | 7.52 Years |
| ID2W | |
| (22 detail records) | |
| Average Service Life: | 8.86 Years |

# Average Service Life By Effective AC

| Effective AC Range | Projects That Have Reached End Of Service | Average Service Life In Years |
|---|---|---|
| 3.9 - 5.0 | 50 | 7.84 |
| 5.1 - 6.0 | 141 | 7.667 |
| 6.1 - 7.0 | 3 | 8 |

# Project Pavement History

## Contract Information

County:
ERIE

Contract: 92506 Construction Year 2011 Contractor: Russel Standard Corp.

## Route Information

| SR: | Beginning Segment: | Beginning Offset: | Ending Segment: | Ending Offset: | Route and Section: |
|---|---|---|---|---|---|
| 430 | 80 | 0 | 170 | 3428 | 430-244 |

ADT At Time Of Constructio: 2939
Failures:
Failure Remarks:

## JMF Information

| Supplier | JMF | Nominal Size | SRL | CLASS | Gyration Level | ESALs | Total AC |
|---|---|---|---|---|---|---|---|
| Russell Standard | WR17 | 9.5 mm | H | WMA | 75 | 0.3 TO | 6.3 |

| #8 | #200 | Voids | VMA | Effective A | PG Grade | AC Sourc | Rap Y/N |
|---|---|---|---|---|---|---|---|
| 40 | 4.5 | 3.5 | 16 | 5.4 | PG 58-28 | United Refinery | N |

| Course Aggregate | | Fine Aggregate | |
|---|---|---|---|
| CALMIA14/GEANYC14 | LS/GL | TSG25A14 | GL |

## Pavement Review

### Spring Review

Inspection Year: 2012

| Primary Distress | Primary Distress Severity | Secondary Distress | Secondary Distress Severit |
|---|---|---|---|
| Transverse Cracking | Low | | |

Remarks
MINOR REFLECTIVE CRACKING

### 4 Year Review

Inspection Year: 2016

| Primary Distress | Primary Distress Severity | Secondary Distress | Secondary Distress Severit |
|---|---|---|---|
| Transverse Cracking | Low | | |

Remarks
isolated areas of low to med. Transverse cracking otherwise the pavement is in good condition

### 7 Year Review

Inspection Year: N/A

| Primary Distress | Primary Distress Severity | Secondary Distress | Secondary Distress Severit |
|---|---|---|---|
| N/A | N/A | N/A | N/A |

Remarks
N/A

### 10 Year Review

Inspection Year: N/A

| Primary Distress | Primary Distress Severity | Secondary Distress | Secondary Distress Severit |
|---|---|---|---|
| N/A | N/A | N/A | N/A |

Remarks
N/A

Report Prepared on: 08.01.2016


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