HMA Latest & Greatest
HMA STAFF

STEVE HEFEL, SUPERVISOR
RICHARD BARDEN, BINDER LAB
JEFF ANDERSON, HMA LAB, DESIGNS, DISPUT RESOLUTION
VACANT, HMA PERFORMANCE TESTING
DAN KOPACZ, HMA ENGINEERING
JAMES PFORR, HMA ENGINEERING CONSULTANT
ERIK LYNGDAL, LAB COORDINATOR
Overview

- Density Testing
- Notched Wedge Joint
- HMA Samples
- Asphalt Binder Content Testing
- HMA Percent Within Limits (PWL)
- Stone Matrix Asphalt (SMA)
- Longitudinal Joint Density
- Training (HMA/PWL)
1-Min Nuclear Density Testing Times

- CPN, Troxler, Humboldt, and InstroTek gauges.
- Tests with Seaman gauges require 30 seconds

Applicable to all 2019 projects, 180 Degrees

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DENSITY DATA FORM (LANE FOOT)

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Road Name</th>
<th>Contractor</th>
<th>QC</th>
<th>Mix Type</th>
<th>Target Gmm</th>
<th>Target Max Density (PCF)</th>
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<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>2.49</td>
<td>154.98</td>
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</table>

<table>
<thead>
<tr>
<th>Lift/Layer (circle one)</th>
<th>Lot Type (circle one)</th>
<th>Offset Reference (circle one)</th>
<th>Lot Limits</th>
<th>Lot Length (ft)</th>
<th>Lane Width (ft)</th>
<th>Nominal Thickness</th>
<th>Date Placed</th>
<th>Date Tested</th>
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<tbody>
<tr>
<td>Mainline</td>
<td>Centerline</td>
<td>Transit line</td>
<td>to</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td>Reference Line</td>
<td>Other (describe)</td>
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<table>
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<tr>
<th>Lot - Sublot ID</th>
<th>Random Station</th>
<th>Density Count</th>
<th>Wet Density</th>
<th>% Max Density 1</th>
<th>Density Count</th>
<th>Wet Density</th>
<th>% Max Density 2</th>
<th>Density Count</th>
<th>Wet Density</th>
<th>% Max Density 3</th>
<th>Average PCF</th>
<th>% Max Density</th>
<th>Adjusted % Max Density</th>
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<tr>
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<td>146.45</td>
<td>95.79</td>
<td>95.79</td>
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</tbody>
</table>
New Specifications for Notched Wedge Joint Construction in 2019

Implemented via ASP 6

Now $\frac{1}{2}'' - \frac{3}{4}''$

Bottom vertical edge was added.

Slope changed from 12:1 to 3:1 MAX over 12” width

Typical pavement cross section of notched wedge longitudinal joints
Samples

3-Part Splits
QC, QV, and QC Retained
Only Required for:

• SMA test strip volumetric testing
• All volumetric testing on PWL jobs
Sample Security

QC-Retained Samples

• Implemented in 2018

• Department representative to secure retained samples with security tape and sign over the tape when they come to the plant to collect a QV sample
Asphalt Binder Testing
Asphalt Binder Content Testing
Required on all HMA Contracts in 2019

• QV AC% test results will affect pay:
  ▪ Minus 0.4%-0.5% of JMF AC content = 75% pay
  ▪ More than minus 0.5% of JMF AC content = 50% pay or remove and replace

• QC AC% test results may require corrective actions

• Accepted methods of AC% testing
  ▪ Chemical extraction
  ▪ Automated extraction
  ▪ Ignition oven, see CMM 8-36.6.3.6
Ignition Oven Correction Factors (IOCF)

Required for each mix design/ignition oven combo used on 2019 WisDOT Projects

- **Department**: Ignition oven asphalt binder correction factor (IOCF)
- **Contractor**: Ignition oven asphalt binder correction factor IOCF and aggregate correction factor

**Material for IOCF determination:**
- Prior to 12/1/2018: Plant-produced mix on first day of production
- After 12/1/2018: Lab-batched mix 10 days prior to production
Recalculate IOCF

The IOCF for a given mix must be recalculated if any of the following occur:

- The mixture produced exceeds 50,000 tons
- An individual aggregate (virgin or RAP) quantity changes by more than 5 percent from the JMF
- Any changes in the percentage of RAS
Percent Within Limit (PWL) Update
2019 PWL Construction (28)

- No longer in Pilot Stage
- All “contracts” that qualify should be PWL
  - See FDM Chapter 19-21 for guidance
- New SPVs - available thru Proposal Management Section
  - Effective with December 2018 through April 2019 lettings
- SPVs moved to STSPs
  - Effective with February 1, 2019 PS&E submittals
  - May, June, and July 2019 lettings
- 2019 PWL spreadsheets available in April.

\[
\geq 12,000 \text{ tons of single mix type}
\]
2019 PWL Changes

• New Administrative Items for 2019:
  ▪ HMA Delayed Test Strip
  ▪ HMA Additional Test Strip
  ▪ HMA Regional Lab Testing (Production)
  ▪ Disincentive HMA Asphalt Binder Content (Production)

• Asphalt Binder Content Testing Required

• Send all data in a final email to BTS-HMA unit
  ▪ Files include Test Strip, Production, I.O. AC content
  ▪ Send in Excel format
## CMM 2-38 Administrative Items

<table>
<thead>
<tr>
<th>Code</th>
<th>Item</th>
<th>Owner</th>
<th>Provision</th>
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<tbody>
<tr>
<td>804.4420</td>
<td>Grinding for Bridge Ride</td>
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<td>Bridge Ride special provision</td>
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<td>804.4625</td>
<td>Nonconforming Tack Coat</td>
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<td>Nonconforming Thickness Concrete Pavement</td>
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<td>HMA Delayed Test Strip</td>
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<td>PWL special provision</td>
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<td>HMA Additional Test Strip</td>
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<tr>
<td>804.5015</td>
<td>HMA Regional Lab Testing</td>
<td>DOL</td>
<td>PWL special provision</td>
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## November 2018

<table>
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<tr>
<th>Code</th>
<th>Item</th>
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<tr>
<td>804.5105</td>
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<td>804.2002</td>
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<tr>
<td></td>
<td>Standard: Safety Requirements</td>
<td>DOL</td>
<td>PWL special provision</td>
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</table>
QMP compared to PWL

2017 Density Data

QMP compared to PWL

QMP 28% of values below spec.
PWL 3% of values below spec.

QMP Avg. 93.9
STD. Dev. 1.6

PWL Avg. 94.7
STD. Dev. 0.9
QMP compared to PWL

2017 Air Void Data

QMP

PWL

PWL Avg. 3.01
STD Dev. 0.35

QMP Avg. 3.11
STD Dev. 0.58

PWL 0.1% of values below spec.

QMP 2.2% of values below spec.

PWL 0.01% of values above spec.

QMP 1.6% of values above spec.

PWL 0.11% total out of spec.
QMP 3.8% total out of spec.
## QMP compared to PWL

<table>
<thead>
<tr>
<th>QMP</th>
<th>PWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not eligible for air void incentive</td>
<td>Average Air Void incentive <strong>$1.08</strong> per ton</td>
</tr>
<tr>
<td>Average Density incentive <strong>$0.70</strong> per ton</td>
<td>Average Density incentive <strong>$0.66</strong> per ton</td>
</tr>
<tr>
<td>No test strip</td>
<td>Test Strip costs average <strong>$0.50</strong> per ton</td>
</tr>
<tr>
<td>Average mix price <strong>$52.48</strong> per ton</td>
<td>Average mix price <strong>$54.41</strong> per ton</td>
</tr>
<tr>
<td><strong>$52.48 + $0.70 = $53.18</strong></td>
<td><strong>$54.41 + $1.08 + $0.66 + $0.50 = $56.65</strong></td>
</tr>
</tbody>
</table>

Table 2: 2017 Cost Data
QMP compared to PWL

QMP vs. PWL Costs

- **Unit Price ($/ton)**: QMP, 2017 data = 53.18, PWL, base QMP vs base PWL = 56.65, PWL, 2017 data = 56.65
- **Expected Life (years)**: QMP, 2017 data = 15, PWL, base QMP vs base PWL = 17.1, PWL, 2017 data = 16.2
- **Annual Cost ($/ton/year)**: QMP, 2017 data = $3.55, PWL, base QMP vs base PWL = $3.31, PWL, 2017 data = $3.50
Region PWL Reps

- SWR - Travis Mikshowsky, Scott Syron, Tim McCarthy
- SER - Justin Kutschenreuter
- NER - Leslie Ashauer, Brian Jandrin
- NCR - John Brophy, Jeff Michalski, Tom Nelson
- NWR - Amber Bever, Devin Harings
2019 SMA Changes

• STSP updated--effective with Dec. 2018 lets
• Cellulose fiber stabilizing additive required
• Asphalt binder content testing required
• SMA minimum density
  ▪ 93.0% for mainline
  ▪ 92.0% for shoulders and appurtenances (offsets applied to all)
• SMA test strip approval criteria
  ▪ Department will test one of the two mixture split samples for volumetrics
  ▪ QV test fails Va or QV/QC test results exceed testing tolerances (0.015 for Gmm or Gmb), dispute resolution by BTS
Longitudinal Joint Updates
Longitudinal Joint Density

Benefits observed in 2018 LJD Projects

• Longitudinal Joint Density:
  - 2014 WHRP:
    • Avg Confined Joint Density = 1.9% below ML
    • Avg Unconfined Joint Density = 3.2% below ML
  - 2018 LJD Projects
    • Avg Confined Joint Density = 0.8% below ML
    • Avg Unconfined Joint Density = 2.0% below ML
2018 WisDOT LJD Pilot Projects
Mainline vs. Joint Density Traffic Level

<table>
<thead>
<tr>
<th>Density (%)</th>
<th>Traffic Volume</th>
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</thead>
<tbody>
<tr>
<td>LT</td>
<td>MT</td>
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<tr>
<td>95.7</td>
<td>95.7</td>
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<td>94.6</td>
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<td>96.0</td>
<td>96.0</td>
</tr>
<tr>
<td>97.0</td>
<td>97.0</td>
</tr>
</tbody>
</table>

- **Mainline**: Red bars
- **Confined**: Blue bars
- **Unconfined**: Light blue bars

Minimum Upper ML: Dashed green line
Minimum Lower ML: Dashed green line
2019 Longitudinal Joint Density Changes

- Alternative Joint Construction Methods Allowed*:
  - Paving wide/milling excess material at joint
  - Echelon Paving
  *At no additional cost to WisDOT

- Use with HMA PWL Projects ONLY

- Designers also should not specify any other type of joint treatment simultaneously
2019 Longitudinal Joint Density Pilots

• Looking for more pilot projects

• We have enough data from LV mixes
  ▪ HMA PWL Projects
  ▪ With MV and/or HV mixes
2019 HMA Training Plan

• General Inspector training - AASHTO TC3
  ▪ Available thru the Learn Center (4.5 PDHs)
    • For both DOT & consultants ($75 for non DOT)

• HMA WisDOT Specific Classroom training
  ▪ Available thru the Learn Center and also held at regional offices across the state (1 day)
    • For both DOT & consultant construction staff
  ▪ Covers specific inspection items
    • Ignition oven, SMA, Tack, Long. Joint, Cold Weather, Regional concerns

• PWL training – Required for PWL contracts
  ▪ Available thru the Learn Center (3 PDHs)
    • For DOT, consultants, contractors
QUESTIONS?