PennDOT’s 2019 Construction Program & Initiatives

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Deputy Secretary for Highway Administration
PA Department of Transportation

January 28-30, 2019
PennDOT – A Very Large Enterprise

- 40,000 Miles of Roadway
- 25,400 Bridges
- 53 Transit Systems
- 64 Operating Railroads
- 10.3 Million Licensed Drivers & ID Holders
- 11.8 Million Registered Vehicles
- 2,440 Miles of Bicycle PA Routes
- 11,375 Employees
- 7,200 Maintenance Employees
- $10.2 Billion Budget
- $2.4+ Billion Annual Construction Contracts Awarded
- 128 Public Use Airports
- 102 Billion Annual Vehicle Miles Traveled
- 3 Ports
What We’ve Done – Where We Are Headed

- Relationships
- Diversity and Inclusion
- Asset Management
- Evolution
- Innovation
Relationships

- PennDOT Connects
- Partnering
- Future Leaders
- District and Regional Sessions
- Winter Schools
- Workforce Development
Diversity and Inclusion

✓ 2017 Industry Outreach
✓ 2018 Outreach Sessions
✓ ECMS process mapping
✓ Small/Diverse Businesses
✓ Training
Asset Management

- Transportation Asset Management Plan (TAMP) draft approved by FHWA
- MAP-21 Performance Metrics
- Pavement Asset Management System (PAMS)
- Bridge Asset Management System (BAMS)
Quality

- TQI
  - Design
  - Construction
  - Procurement

- RAC
  - Reformatted Approach

- STIC
  - Restructured

- QICs
Quality Improvement Committees

**Existing QIC’s**
- Asphalt Paving Quality Improvement Committee (APQIC)
- Concrete Paving Quality Improvement Committee (CPQIC)
- Aggregate Quality Improvement Committee (AQIC)
- Concrete Quality Improvement Committee (CQIC)

**New QIC’s**
- Pennsylvania Association of Asphalt Material Applicators Quality Improvement Committee (PAAMA-QIC)
- Cement Quality Improvement Committee (CEMQIC)
- Slag Quality Improvement Committee (SlagQIC)
Asphalt Paving QIC (APQIC)

Activities and Accomplishments

- Stone Matrix Asphalt (SMA)
- Longitudinal Joint Density
- High Friction Surface Treatments (HFST)
- Minimum Effective Asphalt
  - 9.5 mm Project Data Collection
- Full Depth Reclamation (FDR)
- Percent Within Tolerance (PWT)
Activities and Accomplishments (continued)

- Long Life Asphalt Pavement (LLAP)
- High RAP Plant Mix for 19 mm Binder/Leveling Course on Low Volume Roads
- NECEPT Subcommittee
  - Course Materials Update
  - Technician Performance Evaluation
- Mixture Performance Testing Subcommittee
Evolution

- Planning
- Design
- Construction
- Maintenance
County Accreditation

- District Accreditation Plans
- District Business Plans
- Core Maintenance
- Secondary Road Improvement
RAP Paving

- Education on Operations and Logistics
- 5-year paving plans evolving
- Some Funding by Formula, some by Project

<table>
<thead>
<tr>
<th>Years</th>
<th>Tons</th>
</tr>
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<tbody>
<tr>
<td>2014</td>
<td>50,000</td>
</tr>
<tr>
<td>2015</td>
<td>100,000</td>
</tr>
<tr>
<td>2016</td>
<td>150,000</td>
</tr>
<tr>
<td>2017</td>
<td>200,000</td>
</tr>
<tr>
<td>2018</td>
<td>75,000</td>
</tr>
</tbody>
</table>
Cold Recycled Pavement - D12 Special Provision

- Contractor **mills** pavement on SR 70
- Contractor **hauls** millings to Stockpile off exit 1
- Department **provides** pugmill and the operator
- Contractor **hauls** millings to projects (SR 3021 & SR 3023) being paved with cold recycled base course
- Contractor **places** cold recycled base course
19.0mm High RAP WMA Binder/Leveling

Why High RAP Mixes?
• Performance risk on low volume routes
• RAP availability
• Reduce cost = more mileage

Direction
• Build structure
• Up to 50% RAP in WMA
• Simplify mix design approvals
• Provide guidance
• Mix Design Approval and Production
• Acceptance Sampling and Testing
9.5mm High RAP WMA Wearing

Use Guidelines for Low Volume Roadways

• Industry / PennDOT Team working together on SSP

• Wearing course more sensitive to high RAP effects.

• Acceptance Sampling and Testing

• Limit risk on Pilot roads

• Future 25 mm High RAP Mix for Base?
SMA with RAP

“Second Tier” Premium Mix
• Roads that can Accept Additional Risk

Environmental and Economical Benefits of RAP
• Pavement Performance more Cost Effectively

Current Status
• Initial Discussions
• Testing (trial and error)
• Pilot Project(s)
Seal Coat Aggregate from RAP

- The ¼” aggregate size is the critical size in seal coats

- Differs from “Normal” seal coats in several ways
  - Need to monitor the roadway temperature.
  - RAP must be from a PennDOT road. (Bulletin 14 aggregates)
  - Only for SRL-L roads (under 1000 ADT) unless DME approves

- Does not look exactly like virgin aggregate Seal Coat
Innovation – RD&D

- Deployment is where we struggle
- Office of Operations and Performance
  - Research
  - STIC
  - New Products
  - QIC’s
  - TQI
New Technology Approval Process(es)

PennDOT & Industry Partnering

• Working together to address the items discussed (both sides involved in the heavy lifting)

• Pushing the right technologies forward that ultimately improve performance, quality, time efficiencies, cost efficiencies, etc.

• Initial use of experimental or pilot projects

Technical Assistance
New Products Evaluation Program/LTAP

Approved Products for Lower Volume Local Roads

LTAP Provides Training and Technical Assistance for Over 6,000 Local Government Personnel Annually FREE OF CHARGE

Technical Assistance
**Extended-Season Paving**

2017 piloted new Extended-Season Paving Specification

2018 specification refined and issued:
- From October 31 to December 15, or from April 1 to March 1
- From October 15 to November 15 (high ESALs, PG 76-22 wearing courses)
- All temperature and surface requirements still apply
- Enhanced quality control and documentation required
- Spring inspection with performance criteria
Percent Within Tolerance (PWT)

- 286 PWT projects **let** in 2018
- 1,583 PWT lots **analyzed** in 2018
- 2% average Incentive
- 76% of Lots earned Incentive
- 2018 Incentives, $3.6 Million
- 2018 Disincentives, -$1.1 Million
- Net: $2.5 Million
### Percent Within Tolerance (PWT)

<table>
<thead>
<tr>
<th></th>
<th>Total #200 PWT Lots</th>
<th>Avg. Pay Factor</th>
<th>Total #8 PWT Lots</th>
<th>Avg. Pay Factor</th>
<th>Total #4 PWT Lots</th>
<th>Avg. Pay Factor</th>
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</thead>
<tbody>
<tr>
<td>2016 PWT*</td>
<td>437</td>
<td>101.12</td>
<td>294</td>
<td>100.01</td>
<td>143</td>
<td>100.74</td>
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<tr>
<td>2017 PWT</td>
<td>1114</td>
<td>100.97</td>
<td>769</td>
<td>99.47</td>
<td>345</td>
<td>100.23</td>
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<tr>
<td>2018 PWT</td>
<td>1553</td>
<td>100.61</td>
<td>902</td>
<td>99.36</td>
<td>651</td>
<td>101.18</td>
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</table>

### Primary Control Sieve (PCS)

**#200 Sieve Avg. from JMF (Absolute Value)**

**Avg. #200 Standard Deviation**
Bars = AC Std. Dev.
Line = % Sublot Results within ±0.2 of JMF Target
ISO for Asphalt ➔ PASIN
Pennsylvania ASphalt Improvement Network

- ISO based Quality Management System (QMS)
- QC data can portray consistency
- “Paperwork” is cumbersome
- IT systems will be the solution
- Consistent quality will yield longest performing assets
Long Life Asphalt Paving – LLAP

Many Best practices
- MTV required
- Tack Every Layer
- PWT spec
- Incentives
- Longitudinal Joint Spec

Balanced Asphalt Mix Design Program
- Predict and balance rutting and cracking
- Traffic loads
- Weather conditions
- Aging

Future Direction
- SMA projects only
- Robust research effort needed
  - Select best test(s)
  - Identify spec. limits
LLAP Full Depth Applications

District 2 Potters Mills Gap, SR 0322 B06
- GOH project
- Full depth pavement on new alignment
- Includes asphalt rich base layer
- Paving scheduled 2019 / 2020

District 11 SR 28 A55
- Lindy Paving Project
- Break and seat project
- Paving scheduled 2018

District 4 SR 0084 450
- James Morrissey project
- Full depth asphalt reconstruction
- Includes asphalt rich base layer
- Paving scheduled 2019 to 2022
Performance-Based Specifications

Performance related testing

$500,000 balanced asphalt mix design research project.

- Evaluate cracking tests.
- Rutting test – Hamburg wheel tracking test.

Semi-Circular Bend Test (SCB)

Hamburg Wheel Tracking Test (HWT)
HOLA?

Lack of Trained Personnel
  • Seasonal need

HOLA comes with extra costs
  • Overtime
  • Travel
  • Sample security
2018 Flood Impacts

- $117 Million total in Emergency Funding
- In 2018 $22 Million has been bid and $18.5 Million anticipated for remainder of the year
- Secondary Road Improvement Program impacts
## Surface Improvement Miles

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural restoration</td>
<td>94</td>
<td>63</td>
<td>70</td>
<td>80</td>
<td>209</td>
</tr>
<tr>
<td>Resurfacing</td>
<td>1,253</td>
<td>1,769</td>
<td>1,785</td>
<td>2,360</td>
<td>2,112</td>
</tr>
<tr>
<td>Surface repairs</td>
<td>3,270</td>
<td>3,367</td>
<td>3,444</td>
<td>3,376</td>
<td>2,940</td>
</tr>
<tr>
<td><strong>Total miles of state</strong></td>
<td><strong>4,618</strong></td>
<td><strong>5,199</strong></td>
<td><strong>5,299</strong></td>
<td><strong>5,816</strong></td>
<td><strong>5,261</strong></td>
</tr>
<tr>
<td><strong>maintained highways</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>improved</strong></td>
<td></td>
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</table>
Contract Letting Trends

* Estimated 2019 Projections
Construction Program

For 2019 we anticipate up to 15 projects will be greater than $20 Million
### Pennsylvania’s Interstate System

#### Annual Funding Need*

<table>
<thead>
<tr>
<th>Amount</th>
<th>Description</th>
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<tbody>
<tr>
<td>$460M</td>
<td>Current Interstate Funding</td>
</tr>
<tr>
<td>$1.2B</td>
<td>Cyclic Asset Based Need</td>
</tr>
<tr>
<td></td>
<td>Maintain existing highway and bridges</td>
</tr>
<tr>
<td>$1.5-$3B</td>
<td>Address Reconstruction Needs</td>
</tr>
<tr>
<td></td>
<td>Modernization</td>
</tr>
<tr>
<td></td>
<td>Strategic Investments</td>
</tr>
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</table>

*Needs are based on current dollars, unadjusted for inflation*
## Project Distribution

<table>
<thead>
<tr>
<th></th>
<th>Cost Based Percentage</th>
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<tbody>
<tr>
<td></td>
<td>2014</td>
</tr>
<tr>
<td>Highway</td>
<td>59%</td>
</tr>
<tr>
<td>Bridge</td>
<td>36%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
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</table>

*Projections for 2019 from MPMS Classification*
# Construction Material Quantities

<table>
<thead>
<tr>
<th>Material</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018 To Date</th>
<th>2019*</th>
</tr>
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<tbody>
<tr>
<td>Asphalt (Tons)</td>
<td>6,118,528</td>
<td>6,750,851</td>
<td>6,105,573</td>
<td>7,591,403</td>
<td>7,182,059</td>
<td>7,290,000</td>
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<tr>
<td>Structural Concrete (CY)</td>
<td>319,582</td>
<td>385,717</td>
<td>371,221</td>
<td>359,393</td>
<td>404,844</td>
<td>440,000</td>
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<tr>
<td>Concrete Paving (SY)</td>
<td>670,206</td>
<td>1,007,192</td>
<td>1,042,982</td>
<td>801,621</td>
<td>674,394</td>
<td>670,00</td>
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<tr>
<td>Aggregate (Tons)</td>
<td>9,551,075</td>
<td>11,586,949</td>
<td>9,881,639</td>
<td>10,807,613</td>
<td>8,996,689</td>
<td>8,150,000</td>
</tr>
</tbody>
</table>

* Estimated Projections
Moving Forward into 2019

We look forward to working with PAPA and its members in 2019!

Any Questions?