LONG LIFE ASPHALT PAVEMENTS
Regional Technical Meetings

PA Asphalt Pavement Association
- Gary Hoffman, Director of Technical Services

Committed to:
- Safe, Smooth, Sustainable, Long Lasting Pavements!
Long Life Asphalt Pavements
TQI Technical Work Group Schedule

- PennDOT, FHWA, Industry Coordination Meeting – October 2015
- CT Step 1 for Review – April 2016
- CT Step 2 for Review – June 2016
- Request Candidate Pilot Projects (2017 Const. Season) – November 2016
PAPA LLAP Flow Chart

**Asset Management**
- Select right treatment for the right pavement at the right time in performance life (routine maintenance, preservation, rehab)
- Use best pavement assessment tools (FWD, GPR, video logs, etc.)
- Best treatment selection algorithms

**Pavement Design**
- Perpetual Pavements best practices
- Limit strain Design philosophy
- MEPD with elastic modulus & Poisson ratio requirement on mixes
- Reassess structural layer coefficients per NCAT research
- Implement thinlay treatment
- Promote crack and seat with structural asphalt overlay

**Asphalt Mix Design**
- Balance or Optimize Mix design using laboratory performance testing
- Appropriate use of binder modifiers to achieve mix properties (polymer, GTR)
- SMA on interstates
- Anti-strip requirements
- SuperPave volumetric design adjustments
- Use of WMA as compaction aid

**Best Construction Practices**
- Apply ID dense to achieve tighter consistency for important characteristics
- Best practices for longitudinal joint performance
- Task coat requirements
- Improved compaction consistency through I/C
- Longitudinal Joint Best Practices
- Get late season paving requirement right
- Use of MTV to promote homogeneity of mix

**Contract Management & QC/QA**
- Verify mix volume during production
- PWT/Local Acceptance
- Apply warranty specs. only where meet Use Guidelines
- Reconsider PASIN process
PennDOT LLAP Flow Chart

**Long Life Asphalt Pavement Specification Outline**

**New Section 3XX Base**

**Base Course**

- (You want more AC and resistance to thermal stress in here) Reduced design
  values for asphalt mixtures of base course to 0.5%.
  (High Bottom Base)
- Lintex RAP/RAA
  - You want the modified mix here
- Tack coat every course
- Intelligent Compaction used to monitor compaction coverage
- Use 76 gpm mix in 76 million BASHA

**New Section 4XX Binder and Wearing**

**Binder Course**

- Polymer Modified Asphalt only
- RMC always required
- Tack coat every course
- Intelligent Compaction used to monitor compaction coverage
- Use PWT incentive/disincentive concept for payment.
- Incentivize the minimization of power shovels.

**Wearing Course**

- SMA only
- Polymer Modified Asphalt only
- RMC always required
- Tack coat every course
- Intelligent Compaction used to monitor compaction coverage
- Consist 73 gpm design for mixes with <= 10 million EASI and Polymer modified asphalt
- Use PWT incentive/disincentive concept for payment.
- Incentivize the minimization of power shovels.

**Base Mix Design Issues**

- Minimum 0.25% anti-strip in all mixes with extra 0.05% for use of RAP or RAS and course aggregate from highly susceptible sources.
  (still being debated)
- Rutting and low-temperature durability performance testing during mix design process.

**Wearing and Binder Mix Design Issues**

- Minimum 0.25% anti-strip in all mixes with extra 0.25% for use of both fine and coarse aggregates from highly susceptible sources.
  (still being debated)
- Rutting and low-temperature durability performance testing during mix design process.

* - Potential for Incentive / Disincentive Pay.
** - Applicable to Interstate and Interstate "look-alikes"

Will require changes to Pub. 382 - Pavement Policy Manual

Other Potential Issues to be addressed

- Reevaluate Gyration levels or consider special rules for high absorption aggregates similar to District 1, Ohio, Virginia, and recommended by NCHRP Report 973.

- In addition to minimum anti-strip requirement require testing of multiple chemical agent dosages and select the dosage that gives the best combination of tensile strength and TSR.

- Require a certain amount of crushed fine aggregate (50%?) in order to avoid tension mixes.
  (FTP requires 90% crushed fine aggregate)

- Where are pavement design and construction techniques opportunities (e.g., warranty spec and longitudinal joint construction) being considered?

New FHAs may be required
Although the spec is early in process, many of the components are well along.
Long - Life Asphalt Pavements (LLAP) Pavement Design

- Use Guidelines
- PavementME (Binder Modification)
- Perpetual Pavement Design
- Limiting Strain Design
- Rich Bottom Base
Long - Life Asphalt Pavements (LLAP) 
Asphalt Mix Design

- Minimum Effective AC Content ($P_{be}$)
- SuperPave Design Volumetric Adjustments
- Binder Modification (i.e. polymer, GTR, Fiber, etc.)
Long - Life Asphalt Pavements (LLAP)
Asphalt Mix Design

- **SMA on Interstates**
- **Full Deployment of WMA**
- **Use of Anti-Strip Additive**
- **Asphalt Rich Base**
- Optimized Mix Design (i.e. Performance Testing)
Disk-Shaped Compact Tension - DC(T)

Motivation – measure fracture energy, use cylindrical specimens, maximize repeatability, use true fracture test

Based on ASTM E399 – Geometry slightly modified to account for differences in the fracture behavior of steel and asphalt concrete

Genesis was NSF GOALI study on reflective cracking: UIUC-NSF-Koch (2004)

Disk-Shaped Compact Tension - DC(T)

Three-dimensional fracture modeling

Fracture behavior is a function of temperature, time, specimen dimensions, test mode, and boundary conditions, local strength, local energy, and modulus.

Disk-Shaped Compact Tension Test (DC(T))
Long - Life Asphalt Pavements (LLAP) Construction Specifications

- Longitudinal Joint Density Specification
- **RIDE SPECIFICATION REQUIRED**
- MTV Required
- Tack Coat Requirements (New Specification)
- Intelligent Compaction (I/C)
- % **WITHIN TOLERANCE (PWT) ACCEPTANCE**
- **INCENTIVIZE CRITICAL ELEMENTS (i.e. MAT DENSITY)**
What still needs to change?
Long Life Asphalt Pavement Spec Development

- Please give us your concerns & comments
- Questions?
Thank you!!

To contact

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