Asphalt Mixture & Binder Expert Task Groups Update

John Bukowski, Deputy Director
Office of Pavement Technology
Mix ETG - Key Activities

- **Objective:** To provide a forum for the discussion of ongoing asphalt binder/mixture technology and to provide technical input for current and future research development and technology implementation related to asphalt mixtures and construction.
- **Initiated in 1994**
- **Government, Industry, Academia**
Asphalt Mix ETG & Binder ETG

- AASHTO SOM Input (Harvey)
- E*, NCHRP 9-19 & 9-26 (Bonaquest)
- SGC Internal Calibration Only (Hall)
- Specific Gravity Task Force (West)
- Mix Design Manual, NCHRP 9-33 (Christensen)
- Aggregate Imaging Task Force (Corrigan)
Subcommittee on Materials
Standards Update – ETG Input

- T 312 – 08 Preparing and Determining the Density of HMA Specimens by SGC
  - Internal Angle Only (1.16 ± 0.02°)
  - Only TP 71 Simulated Loading
  - Precision and Bias Based on External Angle

- TP 62 – 08 Determining Dynamic Modulus of Hot-Mix Asphalt Concrete Mixtures
  - Revisions to Existing Test Method
  - Separate standards to include AMPT
Separate Standards for Performance Tester

--- Under Review

TP 01 - Determining the Dynamic Modulus and Flow Number for HMA Using the AMPT

PP 01 - Preparation of Cylindrical Performance Test Specimens Using the Superpave Gyratory Compactor

PP 02 - Developing Dynamic Modulus Master Curves for Hot-Mix Asphalt Concrete Using the AMPT

PP 03 - Developing Dynamic Modulus Master Curves for Hot-Mix Asphalt Concrete (TP62)
Asphalt Mix Performance Tester

- NCHRP 9-29
- Evaluate mixture rutting and fatigue response.
- Relatively inexpensive and easy to use.
- Provides MEPDG input.
Asphalt Mix Performance Tester (2009)

- Develop pooled fund for training and equipment purchase of the equipment.
- Technician training for operation of the equipment (AAT contractor/NCAT Lab).
- Develop precision and bias for test procedure.
Internal Angle of Gyration for the Superpave Gyratory Compactor RAM and DAV

- Guidance document, possible publication as a TRB Circular through subcommittee AFK50.
- Provide background information on the development of internal angle measurements.
- Incorporate ASTM ILS 151 Results to AASHTO new precision statement.
Specific Gravity Task Group

Task Group Objectives:

- Identify issues with current AASHTO standards
- Evaluate alternate methods
- Make recommendations regarding changes and/or new methods
- Additional scope -- Mixture gravity determination issues T 209
Specific Gravity Task Group Recommendations…..

• Need to improve the reproducibility and accuracy of the fine aggregate Gsb determination.

• The SSD method (AASHTO T 166, ASTM D2726) should be limited to specimens with a water absorption of less than or equal to 1.0 percent.

• Replace paraffin method (AASHTO T 275) with vacuum sealing method.
Specific Gravity Task Group
Recommendations.....

• T166 (Bulk Specific Gravity)
  - Changes sent to replace reference to paraffin method to vacuum sealing method
  - change water absorption limit to 1.0%

• T 331 (Corelok) – for abs. > 1.0%

• Effects on Volumetrics - possible notes:
  - Increase minimum design VMA by 0.5%
  - Reduce minimum in-place density requirement (%Gmm) by 1.0% for coarse mixes
Final report end of 2008 (AAT)

- New volumetric criteria
- HMA performance tests
- Criteria developed with M-E design guide models
- Final critical issues being evaluated:
  - FAA values
  - CAA values
  - Flat & elongated requirements
  - Performance Tests
  - Design VMA values
  - Design gyration levels
  - RAP
Aggregate Image Measurement System (AIMS)

Objective characterization of aggregate shape properties

- FHWA
- Pine Instrument
- Texas DOT
- Texas A&M

www.fhwa.dot.gov/hfl/partnerships/aims.cfm
Binder ETG - Key Activities

- High Temperature Task Group
- Fatigue Task Group Report
- DSR, BBR, RTFOT Procedures
- Low Temperature ABCD alt. to DT
- Emulsion Asphalt Grading
- Polyphosphoric Acid
Multi-Stress Creep and Recovery Test Method

• Inadequacy of Superpave high temp $G^*/\sin\delta$ to predict modifier behavior.
• New MSCR High Temperature Spec correlates to rutting for both neat and Polymer modified binders.
• Testing is done at actual pavement temperatures not some artificially high test temp that the pavement will never experience.
• The MSCR % Recovery does a much better job of identifying polymer and how it works in a binder.
New High Temperature Binder spec
M320 Table 3

- The new specification is based on the non-recoverable compliance ($J_{nr}$) of the binder.
- All testing should be done at the pavement environmental grade temp to reflect response at actual operating temperatures.
- The test should be run at two stress levels 0.1 and 3.2 kPa for ten cycles at each level.
- Low temp BBR and DTT remain unchanged.
Researchers and practitioners from FHWA, state and other agencies, along with industry will present the latest information on the PPA modification and performance.

The workshop to promote interactive discussion between presenters and participants.

Sponsors: TRB, FHWA, MnDOT, Asphalt Institute, AMAP and Industry.

April 7th & 8th, 2009 - Minneapolis, Minnesota
Asphalt Mixture & Binder Expert Task Groups

Thank You!

Download ETG Presentations at:

ftp://fhwaftp.fhwa.dot.gov

User ID: hiptguest
Password: hiptguest
http://www.fhwa.dot.gov/pavement