PPETG Emulsion Task Force Update

August 4, 2009
AASHTO SOM
ANCHORAGE ALASKA
ETF Original Scope Outline

- Review Needs for Preservation Materials Research - Emulsion & Aggregate
- Evaluate Existing R&D Roadmap Problem Statements
- Evaluate Consortium Work Plans and Review Ongoing Research’
- Make Recommendations and integrate work activities
ETF Original Scope Outline

- Coordinate and Share Activities and Results with Existing Superpave binder/mix/modeling ETGs
- Facilitate Adoption of New Findings and Research Results Through Appropriate AASHTO/ASTM Channels
Original Scope Outline

- Advance the Effort to Develop Performance Based Methods & Specification for Emulsions
- Encourage Adoption of Uniform National Standards
- AEMA/ISSA/ARRA/AI Coordination
Task Force Representation

Co Chair- Roger Hayner, Colas Inc., AEMA, Asphalt Institute TAC

Co Chair- Colin Franco RI DOT, TSP2, PPETG, SCoMtrls, SCOR

Delmar Salomon-AEMA, Pavement Preservation Systems LLC

Chris Abadie- Louisiana Transportation Research Center

Arlis Kadrmas- AEMA, Sem Materials

Darren Hazlett- TXDOT

Jeff Seiders- TXDOT
Task Force Representation

Gaylon Baumgardner- Paragon Technical Services, AEMA, ISSA, AI
Alan James- Akzo Nobel Surface Chemistry, AEMA, ISSA,
Barry Baughman- Ultrapave Corp., AEMA Chair
Chris Lubbers- Kraton Polymers, AEMA
Fred Mello- BASF
Charles Glover- TEXAS A&M
Task Force Representation

Laurand Lewandowski - PRI Asphalt Technologies
Scott Shuler - CSU - Ft. Collins
Hussain Bahia - UWisc. - Madison
Peter Seebaly - UNev. Reno
Amy Epps Martin - Texas A&M - C.S.
Yetkin Yildirim - Univ. Texas Austin
Mary Stroup-Gardiner - CSU Chico
Jim Moulthrop - ISSA, AEMA, TRB, Fugro
Gayle King - AEMA, TRB, GHK Inc.
Kevin Van Frank - UTDOT
Task Force Representation

Larry Galehouse- NCPP, TSP2
Patte Hahn- Administrative Support NCPP, TSP2
John Johnston- Information Technology Support NCPP, TSP2
Jack Youtcheff-FHWA
Joe Gregory- FHWA
Chris Newman- FHWA
Subcommittee Organization

- 1 Emulsion Testing & Residue Recovery Methods

Arlis Kadrmas - Chair
Paul Morris, Gaylon Baumgardner, Laurand Lewandowski, Chris Lubbers, Roger Hayner, Barry Baughman

- ID Emulsion tests
- ID Recovery Methods & Resulting Tests on Residue
Subcommittee Organization

- **2 Residue Tests**
- Gayle King - Chair
- Hussain Bahia, Amy Epps Martin, Paul Morris/Gaylon Baumgardner, Arlis Kadrmas, Lauren Lewandowski, Chris Lubbers, Barry Baughman

- **High Temp, Low Temp, Polymer ID, High Floats, Aging LT Performance**
Subcommittee Organization

- 3 Aggregates, Mix Design, and Performance Tests
  Mary Stroup-Gardiner- Chair
  Hussain Bahia, Scott Schuler, Gayle King, Chris Lubbers, Laurand Lewandowski, Barry Baughman, Jack Youtcheff
- Microsurfacing & Chipseals Primary Focus
Subcommittee Organization

- 4 Approved Supplier Certification

Roger Hayner - Chair
Arlis Kadrmas, Colin Franco, Chris Abadie, Darren Hazlett
Jim McGraw (Combined States Group)
Asphalt Institute Rep (Mike Anderson)

- Develop Draft Acceptance Document in R26 Image
Subcommittee Organization

- **5 Inspection & Acceptance**
  - Colin Franco- Chair
  - Roger Hayner, Delmar Salomon, Chris Abadie, Tom Wood
  - Agency Level Methods for Inspection & Acceptance of Emulsion Products/Systems
Emulsion Task Force

- Priority focused initially on Chipseals & Microsurfacing Surface Treatments
- Development of Matrix of Application Type vs. Design, Placement, Functional Performance, Durability Performance
ETF Subcommittee Updates

- Emulsion Testing & Residue Recovery Methods – Arlis Kadrmas
  - Identified need for preparation of Research Needs Statement
    - Comparison of various techniques and variability in tests
    - Amy Epps-Martin and Laurand Lewandowski prepared RNS and ETF submitted to AASHTO June 15, 2009
ETF Subcommittee Updates

- Emulsion Testing & Residue Recovery Methods (Cont.)
  - Darren Hazlett presented TXDOT Test
    - 6 hour recovery on residue vs. 48hr
    - Prepared Procedure and Submitted to AASHTO June 15, 2009
  - Compared Variability for Distillation, 48Hr, 6Hr data
TxDOT Evaporation Procedure

- Uses silicone baking mat
- Draw down sample to 0.015” thickness
- Evaporate at 140°F for 6 hours
- Entire sample can be rolled up from mat after evaporation
ETF Subcommittee Updates

- Emulsion Testing & Residue Recovery Methods Cont.)
  - ASTM D7497 Method issued for Evaporative Recovery Method
  - Submitted to AASHTO as a dual procedure method by including TXDOT 6 hour method for Provisional Specification
ETF Subcommittee Updates

- Residue Tests- Gayle King
  - PAV Aging- identified need to move forward on procedural development based upon promising work at PRI
  - Pans need additional development work
ETF Subcommittee Updates

- Residue Tests (Cont.)
  - DSR Strain Sweep- Work by Hussein Bahia at U of Wisconsin, Madison
    - Need to establish connection to Raveling vs. Lab predictive test
    - Promising, but Validation now needed
  - MSCR-routine general acceptance for polymer presence identification
  - High Floats being evaluated via Harmonic Method of Rheology Analysis
ETF Subcommittee Updates

- Residue Tests (Cont.)
  - Frequency Sweep - will keep in the ARC study
- Low Temperature Testing
  - 2 competing methods identified
    - University of Wisc. Method
    - WRI- DSR 4mm plate
ETF Subcommittee Updates

- Aggregates, Mix Design, and Performance Tests - Jim Moulthrop
  - Jim Moulthrop resigned as subcommittee chair
  - Mary Stroup-Gardiner Interim SC
  - Pooled Fund Study on “Microsurfacing Mix Design” not complete
ETF Subcommittee Updates

- Approved Supplier Certification - Roger Hayner
  - Provisional Draft Specification prepared in AASHTO format and submitted for AASHTO review and acceptance
    - Modeled from R-26 for PG Binders
  - ETF has presented to AI TAC and AEMA ITC for review and comment
  - Will require updating with Performance Specifications as developed
ETF Subcommittee Updates

- Inspection & Acceptance - Colin Franco
- Reviewed Spreadsheet on Needs
- Material Engineering & Design, Manufacturing of Emulsions, Design & Pre-Construction Engineering, Construction, In-Service Performance & Durability
- Initial focus is on Chipseals and Microsurfacing
ETF Subcommittee Updates

• Inspection & Acceptance (Cont.)
  • Preparing compendium of tests from various groups; ASTM, AASHTO, etc.
  • Will review ongoing research to identify if any fill gaps- New Performance Tests
  • Preparing survey to gather industry and agency input
  • Working to identify critical tests in each step of the process
ETF Research Project Reviews

- Asphalt Research Consortium - Hussein Bahia/Andrew Hanz, Univ. Wisconsin
  - Focusing on Chipseals and Slurry/Microsurfacing on Initial Work
  - Identifying Specific Properties
    - Construction - Storage Stability, Sprayability and Drain out, Breaking and Setting Properties, Early Raveling and Chip Retention
ETF Research Project Reviews

- Asphalt Research Consortium (Cont.)
  - In Service Residue Properties - Bleeding, Raveling, Fatigue Cracking, Thermal Cracking
- Aggregate Selection - Wear, Soundness, Surface Chemistry Effects
- Curing Rates - Multiple emulsion types and modifiers, recently added SBR modified
ETF Research Project Reviews

- Asphalt Research Consortium (Cont.)
  - PATTI Adhesion Test Developed
    - Adhesion on various Aggregate slabs at different temperature/humidity and cure times (2, 6, and 24 hr)
    - Pneumatic loading to measure pull of strength at failure
    - Promising but further work needed
ARC Adhesion Testing

- Chip seal performance *highly dependent on development of adhesion* between emulsion and aggregate chips.
  - Current test is qualitative – ASTM D244 Coating Ability
  - Concept is to *develop a simple test* to measure:
    - Bond strength
    - Development of adhesion
    - Aggregate / emulsion compatibility
Pneumatic Adhesion Tension Test
PATTI

- Measures pressure and deflection

50 kHz. 8 channel DAQ card

Three-leg LVDT frame

Three-leg LVDT frame

LVDT

Self-aligning screw plate

Gasket

Gasket

Pull stab

Binder

Space (Pullout stub support)

Pressure transducer

To PATTI test controller

Pressurized gas inlet

Tektronix Oscilloscope
ETF Research Project Reviews

- Asphalt Research Consortium (Cont.)
  - Evaluating Residue on DSR
    - Strain Sweeps
    - MSCR, % Recovery
  - Work continuing in Conjunction with NCHRP 14-17 Project and Federal Lands Study Researchers
ETF Research Project Reviews

• NCHRP 14-17 Chipseal Evaluation- Amy Epps-Martin
  • Evaluation of 8 emulsions at 3 field sites
  • Comparison of Residue Recovery Methods
    • Stirred Can vs. Hot Oven Evaporation
    • Residue analysis includes Strain Sweep
      • Parameters still need defined- limits
ETF Research Project Reviews

- Chipseal Evaluation NCHRP 14-17 (Cont.)
- Effects of Surface Texture
  - 3 field sites using CT Meter and Sand Patch Test
  - Very Good correlation between CT and Sand Patch Test
  - Evaluating low, medium, and high surface profiles and effects on emulsion requirements
ETF Research Reviews

• Federal Lands Study Update- Gayle King/Laurand Lewandowski
  • Performance Based Testing from FLH Study
    • Addresses current specifications failure to correlate to field performance
    • More Data produced variations calling for further research
  • Needs to include SBS Modified Emulsions
ETF Research Reviews

• Federal Lands Study Update (Cont.)
  • Evaluating effects of
    • Aging
    • Rheological Correlations to bleeding, shelling, raveling, chip retention
  • Using data thus far to put together research needs statement for further study
ETF Research Reviews

- Emulsion Training Program Update - Mary Stroup-Gardiner
  - NHI Course Emulsion Training - “Emulsion Course Guideline”
  - Outlined 9 modules
    - Intro to Highway Applications through Emulsions for the 21st Century
    - Needs for Basic Fundamental Best Practices
    - Task Force met May 20, 2009 to review and revise with Chris Newman of FHWA
ETF Research Reviews

- AI/AEMA MS-19 Basic Asphalt Emulsion Handbook Review
  - Fourth Edition Reviewed by 5 member panel from ETF
  - Revisions and comments complete
  - Submitted for future issue consideration upon reprinting
ETF Research Reviews

• Federal Lands Polymer Modified Emulsions Handbook - Prepared by Helen King
  • ETF Reviewed Handbook from FLH Project
  • ETF has reviewed but not endorsed
  • 20 page Guide prepared for field training use
    • Project Development & Maintenance Engineer use
    • For use by Agencies such as APWA, NACE, LTAP, AASHTO
Federal Lands Study Field Guide
ETF Action Items from 5/14/09 meeting

- Prepared Evaporation Recovery Method Provisional Specification including Method A (ASTM) and Method B (TxDOT) and submitted to AASHTO
- Prepared Research Needs Statement for Pooled Funds Study for Performance Criteria on Methods A and B
- Prepared and submitted Research Needs Statement for AASHTO/NCHRP Submission continuing work from Federal Lands Study
- Reviewed and Revised Draft of Approved Supplier Certification Provisional Standard and submitted for AASHTO consideration
ETF Industry Action Items from 5/14/09 meeting

- Seeking ETF Member for Panel Review Positions on NCHRP projects involving Asphalt Emulsions and processes
- Provide Updates to AEMA, AI, ISSA, and AASHTO
Pavement Preservation ETG
Emulsion Task Force Update

Questions?