Rolling Out!

Mobile Asphalt Technology Center (MATC)
&
Asphalt Binder and Mixture Laboratory – Implementation & Delivery (ABML-ID)

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Acronyms

- AASHTO: American Association of State Highway and Transportation Officials
- ABML-ID: Asphalt Binder and Mixture Laboratory – Implementation Division
- AIDPT: Accelerated Implementation and Deployment of Pavement Technologies
- AIMS: Aggregate Imaging Measurement System
- AMPT: Asphalt Mixture Performance Tester
- ASTM: American Society for Testing and Materials
- BMD: Balanced Mix Design
- DO: FHWA Division Office
- DPS: Density Profiling System
- ETG: Expert Task Group
- FLH: FHWA Federal Lands Highway
- FTIR: Fourier Transform Infrared Spectroscopy
- GTR: Ground Tire Rubber
- HICP: FHWA Office of Preconstruction, Construction, and Pavements
- I-FiT: Illinois Fatigue Test
- MATC: Mobile Asphalt Technology Center
- NCHRP: National Cooperative Highway Research Program
- NDE: Nondestructive Evaluation
- PEM: Performance Engineered Mixtures
- PMS: Pavement Management System
- PRS: Performance-Related Specifications
- QA: Quality Assurance
- R&D: Research & Development
- RC: FHWA Resource Center
- SAPA: State Asphalt Pavement Associations
- SCB: Semi-circular Bend
- SMA: Stone Matrix Asphalt
- SSR: Stress Sweep Rutting
- TFHRC: Turner-Fairbank Highway Research Center
- TxE: Texas Overlay Text
- UAS: Unmanned Aerial Systems
- XRF: X-Ray Florescence
Agenda

**MATC**
- Status
- Future Vision
- Activities

**ABML-ID**
- Background
- Process
- Project logistics
Mobile Asphalt Technology Center (MATC)

Program Goal

Innovative technologies and practices are implemented by agencies and industry to provide longer-lasting, safer, better-performing, and more cost-effective asphalt and concrete pavements on our nation’s highways.
MATC - MISSION

Bridging the Gap...

Research

Implementation
MATC Objectives

- Demonstrate emerging technologies & maintain focus on customer needs
  - Tiered technical assistance and troubleshooting
  - Specification review and development
  - Equipment loan program

- Deploy technology from TFHRC, Every Day Counts, other research & development (R&D)
  - Workshop activities that yield measurable outcomes

- Leverage the asset for whole Pavements program & increase MATC’s impact
  - Integrated more fully with FHWA R&D, Resource Center, Federal Lands Highway, and Division Offices
MATC Mission Approach

- **Project Site Visits**: Independent party with a national perspective
- **Customized Training Workshops**: Test results and observations facilitates implementation
- **Equipment Loan Program**: Loan equipment to partners to gain hands-on experience
- **Technical Guidance**: Topical guidance documents based on national trends
Past Focus of MATT

Planning

End of Service

Use

Past

Pavements as resources
- Life cycle thinking
- Performance impacts

End of Service

Recycled materials
Pavement Reuse

Future Focus of MATC

Planning

Materials

- Performance tests
- Deployment of R&D (FTIR, XRF, etc.)
- Specification review & materials QA

Use

Distress monitoring
Preservation & Maintenance

Use

Data that supports:
- Pavement management
- Smoothness

Design

- Inputs for pavement design
  (includes AASHTO ME and FlexPAVE)
- Assess new & in-service pavements for resiliency (LiDAR, UAS, etc.)

Construction

- Mat and joint density monitoring (DPS, IR scanner)
- Intelligent construction techniques
- Specification review & construction QA

Unless otherwise noted, FHWA is the source for all images.
MATC can serve as conduit to deploy initiatives and tools from many pavement-related areas.
MATC Activities

Core Activities of MATC
- Demonstrating test methods
- On-site support (States, FLH)
- Equipment training
- Case examples developed from innovation trials
- Specification review (QA, materials, construction)
- Equipment loan program
- FHWA DO Rotational

Deployment
- Quality in Asphalt Paving Workshop: multiday, focused on flexible pavement
- Recorded video briefs: topical to MATC equipment

Level of troubleshooting
- On-site: within scope of standard or agency spec.
- In-depth: direct to FHWA ABML-ID

Post-installed pavement
- Density, sustainability, M&P option selection
- Surface characteristics (smoothness, etc.)
- Monitoring performance (handheld, other tech.)
New MATC Activities for 2020

- Support performance engineered pavements (PEP) and other pavement-related initiatives from HICP, and partner programs
- Offer construction & materials specification review for each project
- MATC program webpage updates & recorded video briefs
- Deploy Equipment Loan Program
- Grow the DO Rotational Assignments (3 already pending for 2020)
- Develop Asphalt Quality and Innovation Workshop
- Demonstrate additional materials & construction tools (inc. AMPT):
  - Index-based tests (SCB, I-FIT, TxOT)
  - Spectroscopy (XRF, ABT test) for binders: field evaluations of TFHRC products
  - Paver-mounted IR-Scanner for mat temperature / thermal segregation
  - Density profiling system (DPS) for mat & joint density
Past Visits and 2020 Requests... so far
Asphalt Binder and Mixture Laboratory – *Implementation and Delivery* (ABML-ID)

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What Led Us to ABML-ID?

• The Mobile Asphalt Testing Trailer had operated the Asphalt Binder Testing Laboratory for 25+ years
  – Primarily housed at TFHRC
  – Recently housed at AAT in Kearneysville, WV

• Critical review conducted by D. Mensching in 2017/18
  – Need for revamp of binder lab location and resource identified
  – Summer/Fall 2018 – determination made within FHWA to move to TFHRC, operate under ABML with AIDPT funding
The "Deeper Dive" Concept

MATC
- Demonstrating test methods
- On-site support (SHA, FLH)
- Equipment training
- Case example developed from innovation trials
- Spec. review (mix, post-installed pавt)
- Equipment loan program
- FHWA DO Rotational

ABML-ID
- Troubleshooting: customer support
- Specification review (binder)
- Contribution to test refinement
- In-depth support (SHA, FLH)
- Innovation case studies (materials, data, sensitivity analyses)
- Inform TFHRC product development (validation, stakeholder needs)
Purpose and Resources

• Purpose:
  – Create active support mechanism for implementation-focused activities of FHWA – PRODUCT-DRIVEN LABORATORY
  – Lead advancement of HRDI products into field evaluation and deployment
  – Engage internal stakeholders to actively respond to State/FLH concerns in short-order

• Staffing:
  – 1 full-time engineer, 1 half-time technician

• Testing capabilities:
  – Mixture, binder, aggregate, chemistry through TFHRC
  – NDE under discussion, also through TFHRC
Process

• What would be an ideal requested project?
  – High-impact (multiple States and FHWA interest)
  – Short-duration (less than 6 months to completion)
  – Will generate multiple products that can be broadcast to national audience

• How do I request a project?
  – Send a request form to D. Mensching via FHWA Division in your state
  – Form is being generated now
    • Potential products identified upfront
    • Follow-up discussion with requestor possible
Project Logistics

- Ideas received and added to ABML-ID Master Tracker
- Panel will meet quarterly to select projects
  - Office of Infrastructure Research and Development – David Mensching
  - HICP – Leslie McCarthy
  - Office of Technical Services – Chris Wagner (replaced by new hire in 2020)
  - Division – Matt Daly (WV) – 1-year rotation
  - FLH – Mohammad Elias (Eastern Fed Lands) – 1-year rotation
- Requests from active MATC field projects do not undergo panel selection
Project Coordination

- Regular status update meetings on ABML-ID projects
  - Proposing monthly with requestor
- Monthly sharing of ABML-ID Master Tracker
- Quarterly panel meetings
  - Review project requests and make selections
  - Discuss internal/external research products to be evaluated by ABML-ID
    - Brainstorm implementation plan to move through agency to deployment
Automatic Binder Extraction (ID-19002)  
Informing stakeholders

**INPUT:**
- ASTM standard - automatic extraction
  - States interested in adoption
  - How does it compare to current practice?
- Request from ABML-RD
- ABML-ID Log created

**Process Flow:**
1. **Review of existing practice**
2. **Program Manager review 1**
   - Material testing request
   - Workplan development
   - Program Manager review 2
   - Further investigation not warranted
     - **Product:** Distribute Fact Sheet to Divisions & FLH
Automatic Binder Extraction (ID-19002)
Informing stakeholders

Materials collection → Binder testing → Execute test plan & analyze results → Program Manager review 3 → Results inconclusive

- Present to partner agencies/SAPAs
- Include feedback & revise/expand analysis (if needed)

Troubleshooting “deep dive” complete

Potential Products:
- Report for requesting agencies & industry
- Tech Brief on subject
- 1-pagers for MATC
- Problem statement for NCHRP
- Presentation at FHWA Discipline meeting
- Presentation through RC at regional asphalt meetings
- HQ use for revising/establishing policy re: binder extraction and automation
ABML-ID Sample Scenario:
SMA Performance (ID-19003)

**INPUT:**
WA and MD DOTs contacted MATC
↓
MATC contacted RC
↓
No resolution, needs investigation
↓
Request from MATC on SMA

ABML-ID Log created

Review of existing practice

Program Manager review 1

Material testing request

Workplan development

Program Manager review 2

Further investigation not warranted
**Product:** Distribute Fact Sheet to Divisions & FLH
ABML-ID Sample Scenario: SMA Performance (ID-19003)

**Materials collection**
- From RC (or directly from agency/industry)
- From MATC field visit (if applicable)

**Mixture testing**

**Execute test plan & analyze results**

**Program Manager review 3**

**Troubleshooting “deep dive” complete**

**Potential Products:**
- Report for requesting agencies & industry
- Tech Brief on subject
- 1-pagers for MATC
- Problem statement for NCHRP
- Presentation at FHWA Discipline meeting
- Presentation through RC at regional asphalt meetings
- HQ use for revising/establishing policy re: VMA spec limits for SMA mixes

**Results inconclusive**

**Present to requesting agencies/SAPAs**

**Include feedback & revise/expand analysis (if needed)**
MATC Service Request:
OK16106 XRF and FTIR (ID-19004)

- Identified need for further analysis
- Identified products
  - Slides and brief presentation for closeout meeting
- Coordination with TFHRC Chemistry Lab
- Product delivery
- Save data for regional/national trend monitoring
- Turnaround: 3 weeks
The average REOB content is 1.5%
- Research conducted at TFHRC suggests this level of REOB content does not impact mixture performance
FTIR spectra did not show peaks associated with presence of lime, butadiene and/or styrene
Calcium found with XRF analysis is not from lime used to neutralize the sour crude
The peak at 1033 wavenumber suggests the presence of sulfoxide, an oxidation product of asphalt.
ABML-ID plans to monitor trends with low REOB content but poor delta Tc values
Current Ideas

- Fact sheets
- Reports
- TechBrief
- 1-pagers to be distributed by MATC
- NCHRP problem statements

- FHWA Discipline presentations
- Presentations at User-Producer Groups
- Revising/establishing policy
- Others
Closing

- ABML-ID and MATC are agency resources
- High-impact, short-duration “deeper dives”
- Requests made through FHWA staff
  - Can come from anywhere within Discipline!
  - Project selection panel meets quarterly
- This is intended to be a dynamic element of FHWA’s technical “catalog”
  - Feedback always welcome!
Contact Us

Ideas on Technologies or Practices to Deploy? Trends that you’ve observed?
Let us know!

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