U.S. Department of Transportation
Federal Highway Administration

National Asphalt Technology Overview

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Ohio Asphalt Paving & NCAUPG Conference
John Bukowski
Asphalt Pavements Team Leader
FHWA, Office of Pavement Technology

Major Asphalt Initiatives

- WMA Implementation – EDC
- High Reclaimed Asphalt Pavement Usage
- Asphalt Mixture Performance Tester
- Advance Multiple Stress Creep Recovery Test and Binder Specification
- Intelligent Compaction Efforts
- Materials Quality Assurance Reviews and National Assessment

Asphalt Technology Partnerships

- Expert Task Groups
  - Asphalt Mixture & Asphalt Binder
  - Asphalt Modeling
  - Warm Mix Asphalt TWG
  - Recycled Asphalt Pavement
- Cooperative Agreements
  - National Center for Asphalt Technology
  - Asphalt Institute
  - National Asphalt Pavement Association

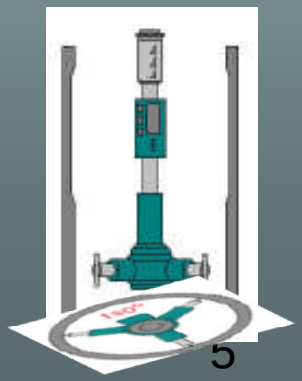
Asphalt Mix ETG – Key Activities

- SGC Operational Issues
- Asphalt Mixture Performance Tester
- Mix Design Manual NCHRP 9-33
- Specific Gravity Recommendations
- Input to AASHTO SOM

Superpave Gyratory Compactor

Operational Issues

- Guidance document publications on internal angle evaluation and Ndesign
- T312 Annex for Evaluating Molds
- Proposed method to compare SGCs



Specific Gravity Task Group

- Identify issues with current AASHTO standards - Recommendations regarding changes and/or new methods
- T166 (Bulk Specific Gravity)
  - Changes sent to replace reference to paraffin method with vacuum sealing method
  - Change mix absorption limit to 1.0%

Asphalt Mixture Technical Briefs

- Superpave Mix Design and Gyratory Compaction Levels (Ndesign)
- Superpave Gyratory Compactor Guide for Assessing Variability
- Aggregate and Asphalt Mixture Specific Gravity Measurements and Their Impacts on Mix Design Properties and Acceptance

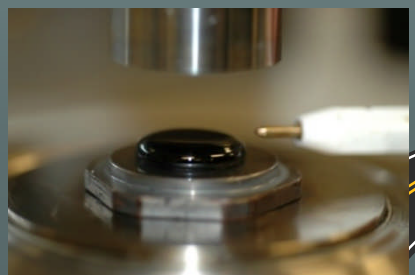
Binder ETG - Key Activities

- High Temperature Task Group
  - MSCR Test Method – MP 19
  - Implementation Efforts
- Evaluate existing tests and alternates
- Development of a CRM Binder performance specification

Multi-Stress Creep and Recovery

Test Method

- Inadequacy of Superpave high temp G*/sinδ to predict modifier behavior
- Testing is still done on existing equipment but at actual pavement temperatures
- New MSCR High Temperature Spec (MP-19 and TP-70) correlates to rutting for both neat and polymer modified binders



MSCR - Implementation Efforts

- Regional workshops Asphalt Institute and FHWA
- Asphalt Institute/FHWA/AMRL efforts on testing Precision and Bias
- Developing user literature – AI/FHWA
- User Producer Groups “round robin” repeatability testing (NE and SE)

Asphalt Binder Technical Briefs

- Understanding the MSCR Procedure
- Implementation of the MSCR Test & Specification
- Asphalt Modification with PPA

Recycled Asphalt Pavement

ETG – Key Activities

- High RAP Mix Design NCHRP 9-46
- Investigation of Low Temp RAP Properties
- Contribution of RAP binder % toward total binder % in the mix
- RAS Pooled Fund
- Technology Transfer – Workshops/ Publications

Website: www.moreRAP.us

RAP Percentage

Based on Percentage Binder

- Historically, agency limit RAP based on RAP percentage by weight of total mix
- With high RAP contents, the primary issue is impact on binder properties
- Determine contribution of RAP binder toward total binder in the mix, by weight.
  - Example - “70% of binder content must be virgin” or “no more than 30% binder content can come from RAP or RAP & RAS”.

Current Guidelines

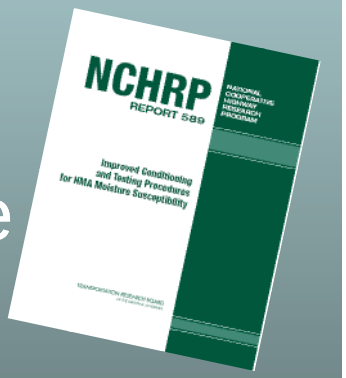
AASHTO M 323 Standard Specification for Superpave Volumetric Mix Design

Recommended Virgin Asphalt Binder Grade	Percent RAP
No change in binder selection	< 15
Select virgin binder grade one grade softer than normal	15 – 25
Follow recommendations from blending charts	> 25

NCHRP 9-46 Mix Design and Evaluation

"Procedure for High Reclaimed Asphalt Pavement Content in Hot Mix Asphalt"

- Develop mix design method and specification for HMA containing up to 50% RAP
- Test method for measuring properties of composite binder – test mix back calculate binder properties
- Specification for RAP quality and processing



National Center for Asphalt Technology
NCAT
at Auburn University

Low Temperature RAP Study

- Higher RAP contents not significantly stiffer than virgin mix
- May be possible to employ higher RAP contents (20%) without changing the performance grade of the virgin binder
- Dropping grade to PG58-28 may not be always neeeded

Performance of Recycled Asphalt Shingles in Hot Mix Asphalt

Pooled Fund Study -TP-5(213)

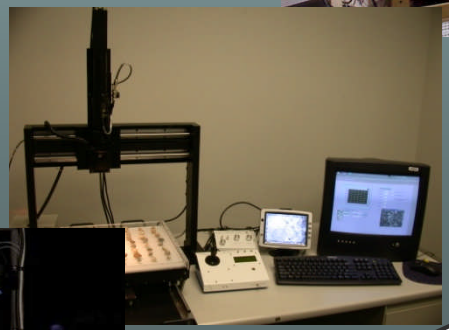
- Best practices for using RAS in HMA with focus on material properties and mixture performance.
- Participants FHWA, MO, CA, CO, IA, IL, IN, MN, and WI
- Also QC/QA concerns, demo projects, performance database

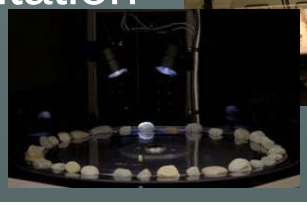
http://www.pooledfund.org/

Materials and Construction Technology

Example of Asphalt Technology Efforts:

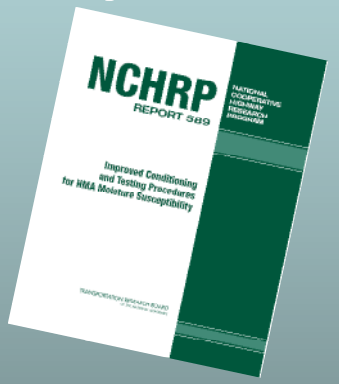
- Provide Mobile Asphalt Lab
- Support National Asphalt R&D Programs
- Advance New Design Methods
  - Asphalt Mixture Performance Tester
    - Field validation & mix quality verification
  - Binder Testing Equipment
    - Effects of modified binders on mix
  - Aggregate Imaging System
    - Testing program & implementation





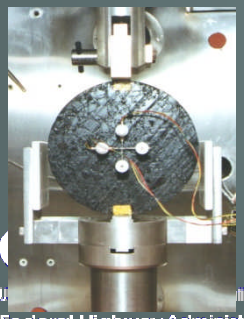
Field Equipment Demos, Training, and Data Acquisition

- Mobile Asphalt Pavement Materials Lab
  - Site visits - State agency/academia/industry 145 site visits in 45 States (1988-2010)
  - On site shadow testing/QA training
  - Showcase equipment/technologies
  - WMA, AMPT, High RAP, MSCR, etc.
  - Support research (FHWA & NCHRP) with field data (9-29/33/43/46/48)



Mix Design Manual Project

- Performance Testing Evaluation Criteria
- 9-33 maintain existing N_{design} criteria
- Proposed Specification: “to be used as a preliminary selection of mix parameters as a starting point for mix evaluation …. prior to T 320..”



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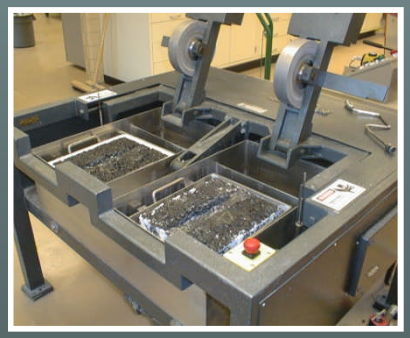


Asphalt Mix Performance Tester

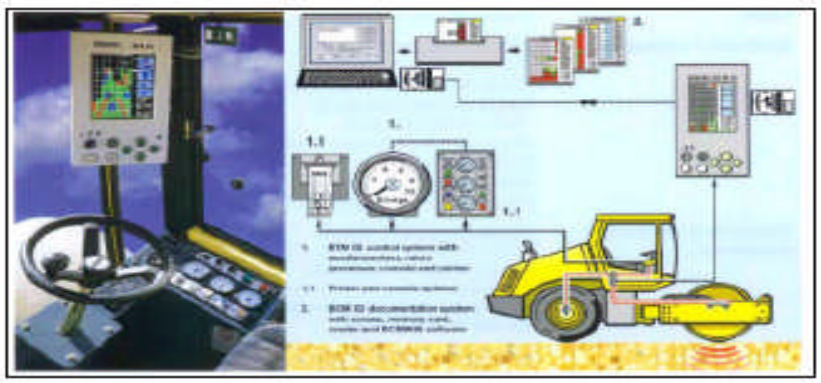
- NCHRP 9-29
- Provides MEPDG input
- Dynamic Modulus (E*) and Flow (Fn)
- TP-79 procedure
- Pooled Fund and Training

Flow Number (Fn) - Rutting

- Too early to prepare standard criteria
- ETG Round Robin Testing
- Continue to monitor work in progress
- Encourage investigation of
  - Relationship to rutting performance
  - Sensitivity to mix design factors
  - Use of both confined and unconfined tests on the same materials

Intelligent Compaction Initiative

- Intelligent Compaction Equipment
  Loan/Demo (TPF5-128)
- Demo Projects
  (MN, NY, MS, MD, GA, IN, TX, KS)
- Best Practice Documents
  (1) Asphalt Materials (2) Soils
- Analysis Software and MN DOT Effort to standardize data



Const & Materials Quality Assurance

Produce quality materials with shared risk to both owner and contractor

Initiatives:

- Guidance on 23 CFR 637
- Use of Contractor Test Results & Sampling Plans
- State Process Reviews (to date in 30 States)
- Develop Training Materials & Sponsor Workshops
- Develop Analysis Tools (SPECRISK, NHI)
- Promote Advanced Quality Systems
  - Quality Assurance Specs
  - Performance Based Specs

Environmental Stewardship

Improve sustainability of pavement materials

Initiatives:

- Participate on Expert Task Groups
- Support AASHTO Recycling Initiatives
- Development of Applications to Reuse Materials
- Develop Publications and Workshops
- Develop Tools (Recycling Took Kit)
- Support Development of Specs
- Support Green Highways Programs

Use of Recycled Materials

- Increased RAP Usage

  www.moreRAP.us
- Effective Utilization of RAS

  http://shinglerecycling.org/images/stories/shingle_PDF/ShingleBPG%2010-07.pdf

  http://store.hotmix.org/index.php?productID=624
- Recycled Materials Resource Center

  http://www.rmrc.unh.edu/
- FHWA Policy on use of Recycled Materials

Asphalt Technology Pooled Funds

- Current Pooled Funds
  - AMPT Procurement/Training (TPF-5 178)
  - RAS Performance Information (TPF-5 213)
  - Intelligent Compaction Equipment Loan/ Demo (TPF-5 128)
  - NCAT Test Track (TPF-5 508)
  - Recycling Materials Resource Center (TPF-5 199)

NHI Training Course

- Current Materials Course Revisions
  - 131118 - Asphalt Mixture Performance Tester
  - 131050 – Asphalt In-Place Recycling Technologies
  - 131023 – Highway Materials Engineering
  - 134059 – Quality Assurance Specification Development and Validation

Thank You !

http://www.fhwa.dot.gov/pavement

Download ETG Presentations at:

ftp://fhwaftp.fhwa.dot.gov

User ID: hiptguest

Password: hiptguest

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