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Asphalt ETG Update

NCAUPG

Indianapolis, IN – February 15th 2012

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Asphalt Pavement Engineer

FHWA Office of Pavement Technology

U.S. Department of Transportation
Federal Highway Administration

Asphalt Expert Task Groups





Provide a forum for Government, Industry, and Academia in the discussion of ongoing asphalt binder and mixture technology and to provide technical input for current and future research, development, and specifications.

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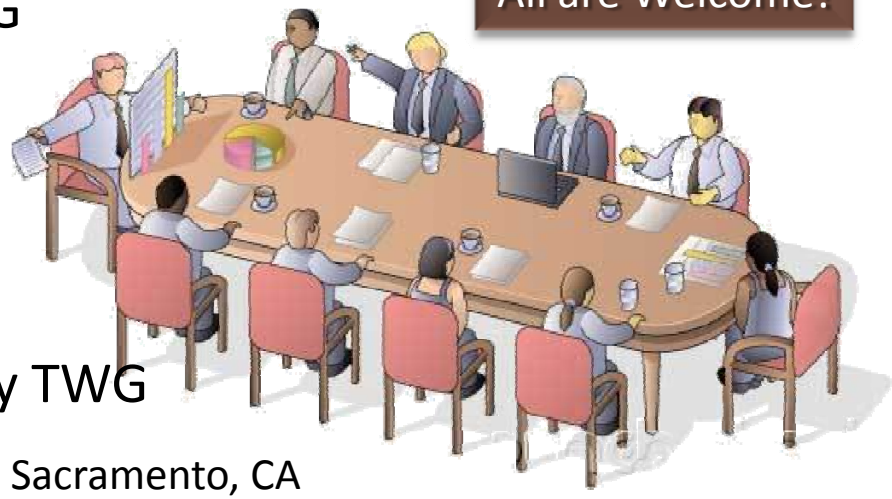
Asphalt Expert Task Groups





- Asphalt Mixture & Construction ETG
  - Week of March 19th in Baton Rouge, LA
- Asphalt Binder ETG
  - Week of March 19th in Baton Rouge, LA
- Warm Mix Asphalt TWG
  - July, 2012
- High RAP/RAS ETG
  - July, 2012
- Pavement Sustainability TWG
  - April 25-26 at UC Davis in Sacramento, CA

Open Meetings
All are Welcome!



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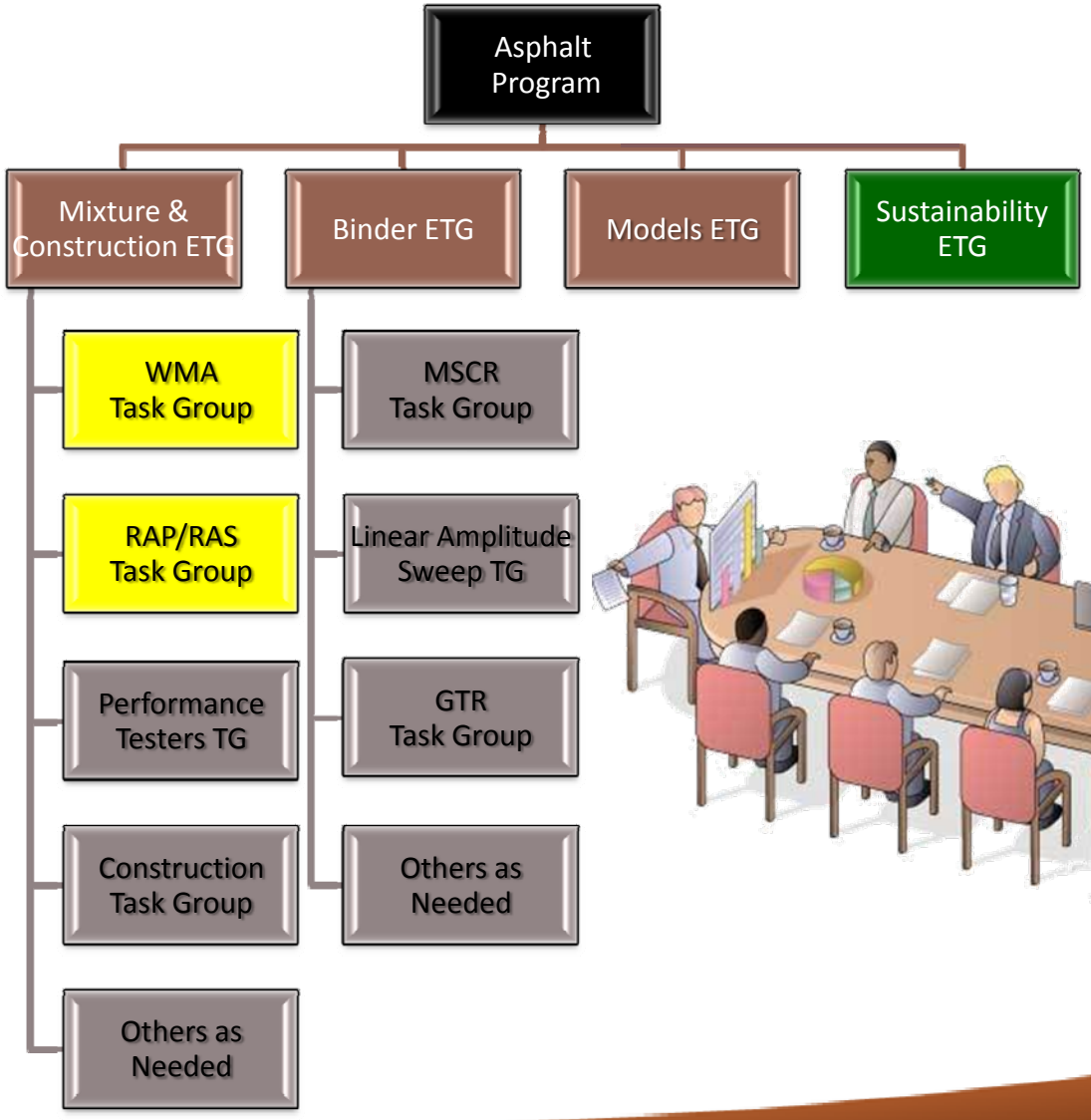
Technical Discussion & Input







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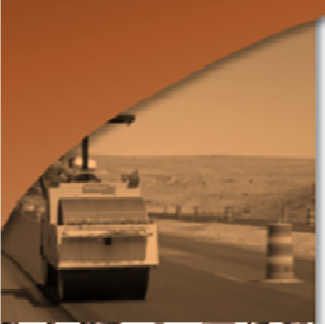



Asphalt Binder ETG – Key Activities

- Multiple Stress Creep Recovery Specifications
  - TP-70 MSCR Test of Asphalt Binder Using DSR
  - Performance-Graded Asphalt Binder Using MSCR
- CRM within the PG System
- Clean-up AASTO test Standards
- Input to SOM

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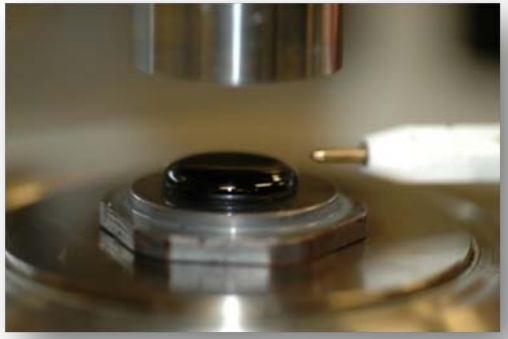
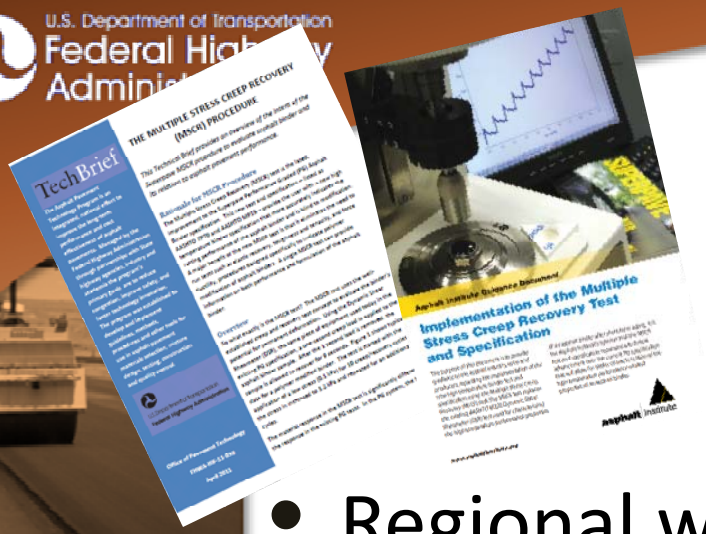
Multiple Stress Creep Recovery Test Method

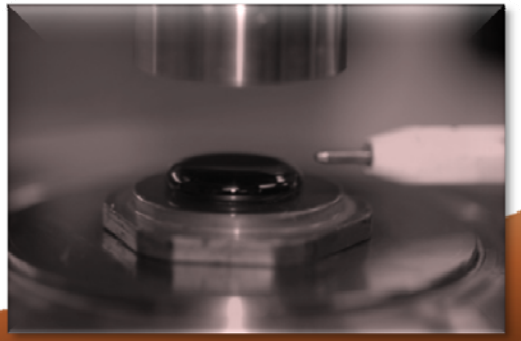
- Challenge:
  - Current Superpave HT Binder spec, G*/sin δ inadequately predicts modifier behavior
- Solution… MSCR (J_{nr}):
  - Existing equipment but at actual pavement temperatures
  - AASHTO MP-19 and TP-70
  - Correlates to rutting for both neat & polymer modified binders





MSCR - Implementation Efforts

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



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Ground Tire Rubber, GTR

- GTR blending study – size, source, %
- Evaluate GTR modified binders to PG and MSCR specifications
- Potential crude source dependency
- GTR size will effect test results
  - Particles should 1 mm size or less in DSR
  - DSR fixture change
- Careful formulation is needed to meet all J_{nr} specs
  - but it can be done successfully

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AI and the FHWA

- FHWA is working with the Asphalt Institute to assist States to effectively understand and implement MSCR & better understand GTR

Michael Anderson

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Asphalt Mix ETG – Key Activities

- Asphalt Mixture Performance Tester
- Mix Design Manual NCHRP 9-33
- Mixing & Compaction Temperature (NCHRP 9-39)
- Input to SOM

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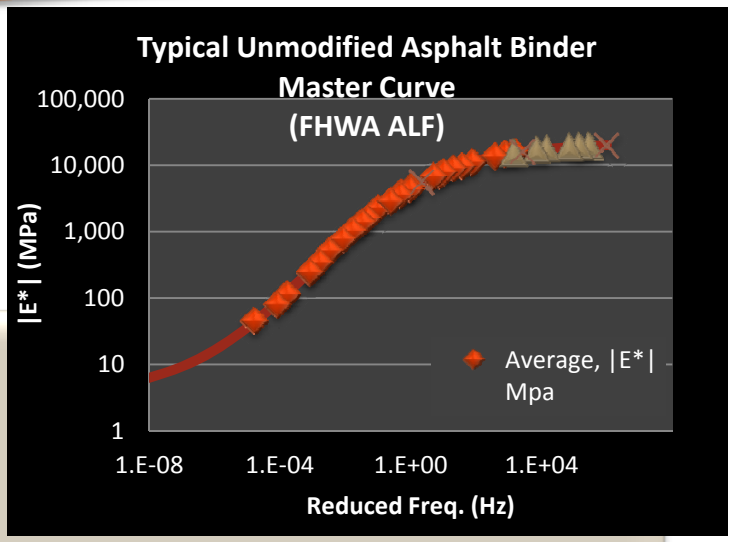
Asphalt Mix Performance Tester

- Refined under NCHRP 9-29
- Provides DARWin-ME™ input (MEPDG)
- Dynamic Modulus |E*| and Flow (Fn)
- AASHTO TP-79 procedure
- Pooled Fund & Training

AMPT



- Dynamic Modulus, |E*|
  - key input for DARWin ME™ asphalt mixtures
- Flow Number (Fn)
  - relation to mixture rutting performance
  - More than 1 approach to determine Fn

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Asphalt Mix Performance Tester Equipment & Training

- Pooled fund for training and equipment purchase AMPT - 22 States (TPF5-178)
- Technician training for operation of the equipment (AAT contractor/NCAT Lab)
- Remaining issue with determination Fn– Current Round Robin

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AMPT Pooled Fund Study TPF-5(178)

- **Objectives**
  - Procure AMPT for highway agencies
  - Provide training on AMPT
  - Support national AMPT implementation

- **Progress and Schedule**
  - 12 AMPTs delivered
  - Remainder in 2012
  - Training course completed/materials available
  - National Pooled Fund Conference 2012
    - **September 21st 2012 in Atlanta, GA**
  - 2012 Regional Conferences TBD
  - 2013 International Performance Tester Conference
    - FHWA working with NCAT

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AMPT Pooled Fund Study TPF-5(178)

- Participants
  - Alabama
  - Colorado
  - Connecticut
  - Florida
  - Georgia
  - Illinois
  - Kansas
  - Kentucky
  - Maine
  - Maryland
  - Nevada
  - New Hampshire
  - New Jersey
  - New York
  - North Carolina
  - Oregon
  - Pennsylvania
  - Tennessee
  - Utah
  - Virginia
  - Wisconsin
  - Wyoming
  - Ontario
  - FHWA – Lead agency

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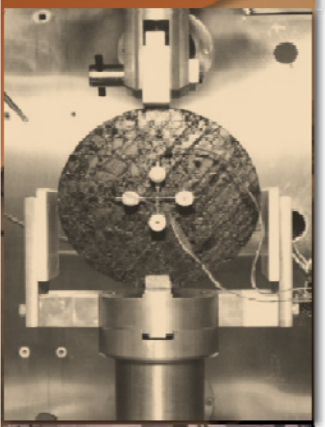
NCAT and FHWA

- FHWA is working with NCAT (Cooperative Agreement) to assist States to effectively address flexible pavement challenges in AMPT & DARWin ME™

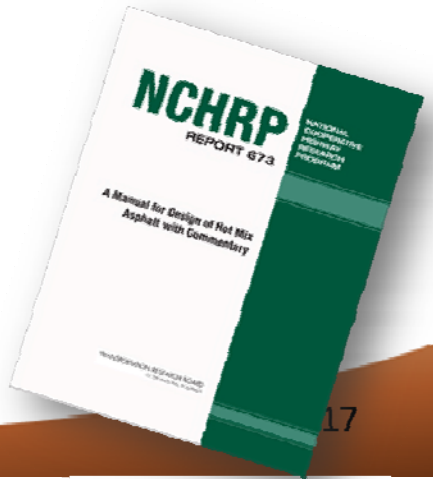
Randy West

National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

Mix Design Manual
NCHRP 9-33 (AAT) & 9-33A (ASU)



- Report: http://www.trb.org/Main/Blurbs/165467.aspx
  - *A Manual for Design of Hot-Mix Asphalt with Commentary*
  - *Adapting Specification Criteria for Simple Performance Tests to HMA Mix Design*
- Performance Tester 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 testing…



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National Center for Asphalt Technology
NCAT
at Auburn University

RAP/RAS ETG – Key Activities

- High RAP Mix Design NCHRP 9-46 (Active)
  - NCAT
  - Investigation of Low Temp RAP-Mix Properties
  - Contribution of RAP/RAS binder % toward total binder % in the mix
- RAS Pooled Fund
- Workshops/ Publications

Website: www.moreRAP.us

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RAP/RAS ETG – Key Activities

- Usage: NAPA Member Survey
- http://www.asphaltpavement.org/index.php?option=com_content&task=view&id=25&Itemid=45

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NATIONAL ASPHALT PAVEMENT ASSOCIATION

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Asphalt Pavement

- Overview
- Contractor How-To Tools
  - How to Determine Quantities
  - How to Determine Mix Cooling Time
- Diamond Paving Commendation
- Diamond Quality Commendation
- Energy Conservation Symposium
- Engineering & Research
  - National Asphalt Roadmap
  - Airfield Research
- FAQ's
- History of Asphalt
- Materials and Mix Design
  - Statistical Specifications
- Mechanistic-Empirical Design
- Mix Type Selection
  - Life-cycle Cost
- Online Asphalt Pavement Resource Library
- Other Resources
- Recycling
- Thin Overlays
- Training
- Types of Asphalt Pavement
  - Perpetual Pavement
  - Porous Asphalt
  - Quiet Pavement
  - Warm-Mix Asphalt

Recycling

New FHWA Survey Finds Asphalt Recycling Reaches 99 Percent;
Warm Mix Usage Skyrockets

Asphalt pavement is not only America's most recycled and reused material, it now is being recycled and reused at a rate over 99 percent. Use of environmentally friendly warm-mix asphalt grew by more than 148 percent from 2009 to 2010, a trend that is expected to continue. Recycling of asphalt pavements and asphalt shingles in 2010 alone conserved 20.5 million barrels of asphalt binder.

These are some of the key findings in a new survey of asphalt pavement usage, which NAPA completed under contract to the Federal Highway Administration. The report, titled ***Asphalt Pavement Mix Production Survey: 2009-2010*** (NAPA Information Series 138), is available as a free download. The survey examined the use of reclaimed asphalt pavement (RAP), recycled asphalt shingles (RAS), and warm-mix asphalt (WMA) in 2009 and 2010. RAP, RAS, and WMA conserve raw materials; conserve energy; cut emissions from production and paving operations; and improve conditions for workers.

Some highlights from the data:

• **RAP:** The asphalt industry remains the country's number one recycler. The amount of RAP used in asphalt pavements was 56.0 million tons in 2009 and 62.1 million tons in 2010.
Assuming 5 percent liquid asphalt in RAP, this represents over 3 million tons (19 million barrels) of asphalt binder conserved. About 96 percent of the contractors/ branches reported using RAP. Less than 1 percent of RAP was sent to landfills.

• **RAS:** Use of recycled asphalt shingles (both manufacturer's waste and tear-offs) increased from 702,000 tons to 1.10 million tons from 2009 to 2010, a 57 percent increase.
Assuming conservative asphalt content of 20 percent for shingles, this represents 234,000 tons (1.5 million barrels) of asphalt binder conserved.

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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

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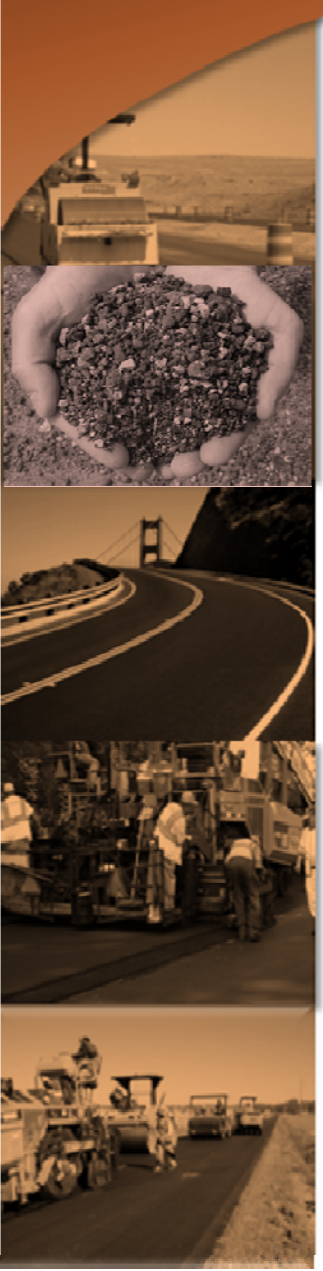
RAP % Based on % Binder



- Historically, Agency limit RAP based on % by weight of total mix – need change to M323?
- 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”

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NCHRP 9-46

"Mix Design and Evaluation Procedure for High Reclaimed Asphalt Pavement Content in HMA"

- Develop mix design method & specification for Mixes 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

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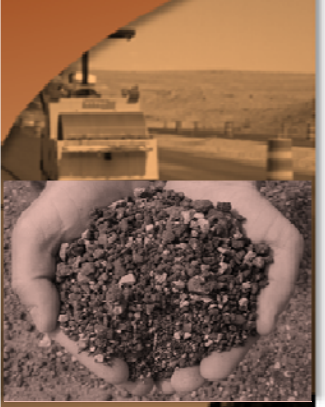
Performance of Recycled Asphalt Shingles in Hot Mix Asphalt – Pooled Fund Study



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

http://www.pooledfund.org/projectdetails.asp?id=1208&status=1

MoDOT

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FHWA Field Support – Mobile Lab

- Mobile Asphalt Testing Laboratory (MATL)
  - Site Visit
  - Field Data/Testing
  - Use/Demo Emerging Test Devices

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Pavement Website

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

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Thank You