Became Law on December 4, 2015
First long-term authorization act in a decade
Provides 5 years of funding certainty for infrastructure planning and investment
Authorizes $305 Billion (all modes) for Fiscal Years 2016-2020
Highway Contract Authority

Highway Authorizations from Trust Fund (billions)

FY 2015: $41.0
FY 2016: $43.1
FY 2017: $44.0
FY 2018: $45.0
FY 2019: $46.0
FY 2020: $47.1
FHWA's Approach for Pavement Technology

Provide leadership and technologies for the delivery of long-lasting pavements that meet our customers needs and are safe, cost effective, and can be effectively maintained.
Program Overview

“Promote, implement, deploy, demonstrate, showcase, support, and document the application of innovative pavement technologies, practices, performance, and benefits.”
AIDPT - Goals

1. Deploy new, cost-effective designs, materials, recycled materials, and practices to extend pavement life & performance, & improve user satisfaction

2. Reduce initial costs and lifecycle costs

3. Deploy accelerated construction techniques

4. Deploy design criteria and specifications for new and efficient practices, products, and materials

5. Deploy new nondestructive and real-time pavement evaluation technologies and construction techniques

6. Effective technology transfer
Asphalt Materials Program Goals

Direct/Administer the FAST Act AIDPT Program

- Develop Test(s) for Cracking Prediction
- Improve Binder Characterization/Modification
- Increase **Beneficial** Use of Recycled Materials
- Establish Effective State QA Programs
- Engage Stakeholder Technology Groups
- Produce Technology Guidance/Best Practices Information
Delivery Methods for Asphalt Activities

- Cooperative Agreements
- Asphalt Expert Task Groups
- Mobile Asphalt Laboratory
- Highway Materials Engineering Course
- Sustainable Pavements Program
- Electronic Info (Pavements Notebook, websites, computer apps, etc.)
2015 Activities......

• RAP Management Best Practices and Webinar
• Recycled Materials and WMA Survey 2009-2014
• Porous Asphalt Pavements Technical Brief
• Sustainability Conference – Fall 2015
• Best Practices for Recycled Tire Rubber in Asphalt
• Pavement LCCA Webinar
For 2016 on-Going Activities......

- Recycled Materials and WMA Survey 2015
- Webinar RAP/RAS Production Best Practices
- High RAP Japan Experiences Publication
- Update RAS Publication IS-136
- Update Thin Overlay Publication IS-135
- Regional Conference - TBD
- Webinars - Recycled Tire Rubber in Asphalt
2015 Activities......

- RAP/RAS On-site Support & Training
- WMA Workshops
- Conduct AMPT Round Robin
- RAS Binder Characterization Study
- Perpetual Pavement Tools
- Evaluation of Asphalt Mixture Cracking Tests
- Forensic Evaluations/Support
• Develop Asphalt Pavement Construction NHI Course
• Methodologies to Evaluate Bulk Gravities RAP/RAS
• RAS/RAP Cracking Performance Tests
• Developing a Guidance on Thin Lift Surfaces
• Develop Information on Benefits of Improved In-Place Pavement Density
• Forensic Evaluations/Support
2015 Activities ......

• Implementation of MSCR asphalt binder PG grade
• Evaluate binder modified effects, aging variability, etc.
• AMPT Refinement of Procedures and Implementation
• Complete Training Course Delivery on Longitudinal Joints
• Develop/Conduct Tack Coat Training Courses
Continued MSCR asphalt binder PG grade implementation
Evaluate Characterization of RAS Binder
Best Practices/Webinars with REOB
Conduct Training Course on Tack Coats
Develop Training Course on Improved Pavement Density
Develop Training on Thin Asphalt Overlays
FHWA Field Support
Asphalt Guidance Program

- Mobile Asphalt Materials Laboratory
  - Site Visits – emphasis on QC practices
  - 2016 Priority to Support Density and Overlay Efforts
  - Field Evaluation of New Tests/Practices
  - Field Use/Demo Emerging Test Devices
  - Recommendations for AASHTO Standards
Provided AASHTO drafts, revisions, and improvements related to:

Provided improvements, edits, and recommended changes to ASTM specifications D 7405, D 6114, D4125, D6307, D7643 and ASTM D8.
Asphalt Expert Task Groups

- Forum for Government, Industry, and Academia
- Discussion of ongoing asphalt binder and mixture technology
- Provide technical input for current and future research, development, and specifications.
Expert Task Groups

• Asphalt Mixture & Construction ETG
  • Last meeting in Oklahoma City on Sept 15-16, 2015
  • POC – John Bukowski

• Asphalt Binder ETG
  • Last meeting in Oklahoma City on Sept 16-18, 2015
  • POC – Matthew Corrigan

• Sustainable Pavements TWG
  • POC – Gina Ahlstrom
Current Asphalt ETG - Activities

- Asphalt Mixture Performance Tester (AMPT)
- Performance Tests for Cracking/Fatigue
- RAP & RAS Asphalt Binder Replacement
- MSCR Binder Grading
- Ground Tire Rubber
- Re-refined Engine Oil Bottoms (REOB)
- Provide technical input to AASHTO Subcommittee on Materials (SOM) & assist the revision and update standards
Cracking Laboratory Tests

Ten (10) protocols - highlighted as part of NCHRP Proj. 09-57

- Indirect Tensile (IDT)
  - for low temperature cracking
- Indirect Tensile (IDT)
  - for top-down cracking
- Semicircular Bend (SCB)
  - at low temperature
- Semicircular Bend (SCB)
  - at intermediate temp.
- Disk Shaped Compact Tension (DCT)

- Thermal Stress Restrained Specimen Test / Uniaxial Thermal Stress and Strain Test (TSRST/UTSST)
- Texas Overlay Test (TxOT or OT)
- Repeated Direct Tension (RDT)
- Bending Beam Fatigue
- AMPT Cyclic Fatigue (S-VECD)
In service, a pavement experiences multiple:
- Loading cycles
- Load magnitudes
- Strains
- Temperatures

Cracking Modes versus Tests

Low-temperature extremely high strain

Reflection High strain

Bottom-up/top-down Lower strain

One (1) load cycle (monotonic)

No. of cycles

Strain
## Cracking Laboratory Tests

Ten (10) protocols - highlighted as part of NCHRP Proj. 09-57

<table>
<thead>
<tr>
<th>Low Temperature</th>
<th>Reflection</th>
<th>Bottom-Up</th>
<th>Top-Down</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCT (ASTM D7313-13)</td>
<td>Texas OT (TxDOT-Tex 248-F)</td>
<td>Beam fatigue (AASHTO T321)</td>
<td>IDT (Univ. of Florida)</td>
</tr>
<tr>
<td>SCB (AASHTO TP105)</td>
<td>DCT (ASTM D7313-13)</td>
<td>AMPT Cyclic Fatigue (AASHTO TP107)</td>
<td>AMPT Cyclic Fatigue (AASHTO TP107)</td>
</tr>
<tr>
<td>IDT (AASHTO T322)</td>
<td>SCB (Louisiana State Univ. - LTRC)</td>
<td>RDT (Texas A&amp;M Univ.)</td>
<td>RDT (Texas A&amp;M Univ.)</td>
</tr>
<tr>
<td>TSRST/UTSST (Univ. of Nevada, Reno)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SCB (LTRC and Univ. of Illinois)</td>
<td>SCB (LTRC and Univ. of Illinois)</td>
</tr>
</tbody>
</table>

Texas OT (TxDOT-Tex 248-F)
LTTPBind Improvements

• Alpha Release: January, 2016 at TRB

• Beta Release: April 2016

• Please contact Larry Wiser at larry.wiser@dot.gov

• Go-Live: July 2016 with the release of LTPP Standard Data Release 30
Engineering Challenge: Sustainable Pavements

- Expert Technical Working Group
- “Towards Sustainable Pavements: A Reference Document”
- Tech Briefs
  - Pavement Sustainability
  - Life Cycle Assessment
- FHWA Sustainable Pavements Website

http://www.fhwa.dot.gov/pavement/sustainability/
State Quality Assurance Program Reviews
Bi-Annual Material Quality Assessment National Review
Highway Materials Engineering Course
Materials Control/Testing Software and NHI Training Courses
Assumption – Pavement density can be increased with a minimum of additional cost.

Long-Term Objective – States will increase their in-place asphalt pavement density requirements resulting in increased pavement life.
A 1% increase in field density (1% less air voids) is claimed to increase asphalt pavement service-life 10+%! (conservatively)

Today’s compaction target is typically 92% of maximum ($G_{mm}$) (8% air voids), with varying requirements for the area near the longitudinal joint.

Increased Density Pavements target a 1-2% increase across the entire pavement!

– Just 1% more... makes a huge difference!
Summary of National & Emerging Asphalt Issues

- Asphalt Performance Prediction Test(s)
- High RAP & RAS Usage Issues
- Thin Overlays & Preservation Approaches
- Quality Assurance State Practices
- Binder Modifications including REOB
- Improved Field Compaction
- Advance sustainability efforts, LCA systems, as well as all recycled materials
• Technology and Innovation Deployment
  – Accelerated Implementation and Deployment of Pavement Technologies
  – Every Day Counts
  – SHRP2
Every Day Counts

- EDC-1 - 14 Innovations (2011 – 2012)
- EDC-3 - 11 Innovations (2015 – 2016)
- EDC-4 - 80+ Proposals being reviewed

http://www.fhwa.dot.gov/everydaycounts/
Renewal Focus Area

- **Goal:**
  - Facilitate rapid approaches
  - Long-lasting facilities
  - Minimal disruption to the traveling public

- 24 products
- $42.8 million identified for the implementation

**Implementation Assistance Opportunities**

- Proof of Concept Pilot
- User Incentive
- Lead Adopter Incentive

**Upcoming:** Round 7 - Spring 2016
SHRP2 Renewal Products

**Pavements**
- Precast concrete pavement (R05)
- Composite pavement systems (R21)
- Pavement Renewal Solutions (R23)
- Preservation for high volume roadways (R26)

**Structures**
- Bridge designs for rapid renewal (R04)
- Service life design for bridges (R19A)
- Service limit state design (R19B)

**Project Delivery**
- GeoTechTools (R02)
- Worker fatigue risk management (R03)
- Performance specifications (R07)
- Risk management for rapid renewal (R09)
- Managing complex projects (R10)
- Work zone impact software (R11)

**Non-Destructive Testing**
- Non-destructive testing for concrete bridge decks (R06A)
- Technologies to fingerprinting construction materials (R06B)
- Technologies to enhance quality control on asphalt pavements (R06C)
- Advanced methods to identify pavement delamination (R06D)
- Pavement smoothness (R06E)
- Non-destructive testing for tunnel linings (R06G)

**Utilities and Railroads**
- Utility locating technologies (R01B)
- 3-D utility location data repository (R01A)
- Identifying and managing utility conflicts (R15B)
- Practices to expedite DOT/Railroad coordination (R16)

http://www.fhwa.dot.gov/goSHRP2/
For More Information

• FHWA Main Site:  https://www.fhwa.dot.gov/
• FHWA Pavements: https://www.fhwa.dot.gov/pavement/
• FHWA Research: https://www.fhwa.dot.gov/research/
• EDC: https://www.fhwa.dot.gov/innovation/everydaycounts
• SHRP2:  https://www.fhwa.dot.gov/goshrp2
• Permeable Asphalt Pavements  FHWA-HIF-15-009 2015
• The Use of Recycled Tire Rubber to Modify Asphalt Binder and Mixtures  FHWA-HIF-14-015 2014
• Asphalt Material Characterization for Pavement ME Design Using the Asphalt Mixture Performance Tester  FHWA-HIF-13-060 2013
• Asphalt Mixture Performance Tester (AMPT)  FHWA-HIF-13-005 2013
• Construction Quality Assurance for Design-Build Highway Projects  FHWA-HRT-12-039 2012
• An Alternative Asphalt Binder, Sulfur-Extended Asphalt (SEA)  FHWA-HIF-12-037 2012
• The Use and Performance of Asphalt Binder Modified with Polyphosphoric Acid (PPA)  FHWA-HIF-12-030 2012
• Independent Assurance Program FHWA-HIF-12-001 2012
• The Multiple Stress Creep Recovery (MSCR) Procedure FHWA-HIF-11-038 2011
• A Review of Aggregate and Asphalt Mixture Specific Gravity Measurements and Their Impacts on Asphalt Mix Design Properties and Mix Acceptance FHWA-HIF-11-033 2011
• Superpave Gyratory Compactors FHWA-HIF-11-032 2011
• Superpave Mix Design and Gyratory Compaction Levels FHWA-HIF-11-031 2011
• Intelligent Compaction for Asphalt Materials, 2010

... and many more!!