

FPIII ***TechBriefs***

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Asphalt Binder ETG
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- **FHWA funding and direction**
 - **FPIII and FPIII validation contracts**
 - **Jack Youtcheff**
 - **Ernie Bastian**
- **Binder ETG**
- **WRI**
 - **Ray Robertson, Fred Turner and the whole team**

- **FPIII contract background**
- **Deliverables**
- **Focus on TechBriefs**
- **Summary and perspectives**



- **Fundamental Properties of Asphalts and Modified Asphalts, III (FP III)**
 - FHWA contract DTFH61-07-D-00005
 - Value: \$ 14.8 M
 - Duration 5 years, starting 1/9/2007
 - Officially ended: 5/31/2015
- **Scope**
 - Moisture damage mechanisms
 - Oxidative aging mechanisms and modeling
 - Nano-structuring and modeling
 - Additives
 - Reclaimed asphalt pavement studies
 - Warm mix asphalt mechanisms and testing
 - Emulsion test development

- **Technical white papers**

- 23 papers
- Reviewed and validated by FHWA
- Online at:

<http://www.westernresearch.org/transportation.aspx?id=2662>

- **Final Reports**

- 2 reports
- Under review
- Online release planned by the end of 2015

- **TechBriefs for selected products**

- 6 Techbriefs
- Under review – 508 compliance
- Online release planned by the end of 2015

- **Communications:** Various events & peer reviewed journals

- **Volume I: Fundamental and Applied Research**
 - Lab & field aging studies
 - Development of a new oxidative aging model
 - Development and applications of new rheology, and chemical separation methods
 - RAP and RAS aging and blending studies
 - WMA aging and characterization methods
 - Emulsion recovery and sampling methods
- **Volume II: Methodology**
 - New and modified methods developed to assist asphalt binder sampling, treatment, and characterization for both laboratory and field studies
 - AASHTO standard forms: 4mm-DSR, USAT (short/long term aging & emulsion residue recovery), Micro-sampling & extraction
 - Test methods for SAR-AD, SEC, Coulometric KF water titration in asphalt

- **Technical white papers List**

- FP01: Automated HPLC SAR-AD Separation
- FP02: Analytical Method to Measure Water in Asphalt
- FP03: The Limit of Detection (LOD) Method: an FTIR Screening Tool for Evaluating Solvent Remaining after Extraction
- FP05: Asphalt Film Aging Model
- FP06: Chemo-Mechanical Software
- FP07: Impact of Water on Aging
- FP08: Determining the Low Temperature Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)
- FP09: Asphalt Pavement – Micro-sampling and Micro-extraction Methods
- FP10-11: Aging Master Curve and Aging Rate Model
- FP13: Characterization of the Effects of Wax (Sasobit®) on Asphalt Binder
- FP14: The Universal Simple Aging Test (USAT) and Low Temperature Performance Grading Using Small Plate Dynamic Shear Rheometry: An Alternative to Standard RTFO, PAV, and BBR for HMA and WMA
- FP15: Aging Characteristics of RAP Binders—What Types of RAP Binders Suitable for Multiple Recycling?
- FP16: Rejuvenator for Enhancing RAP Application and Improving Material Compatibility
- FP17: Analytical Methods to Characterize Recycled Shingle Binders (RAS) and to Determine whether High Recycled Shingle Content is Suitable for Hot Mix Asphalt (HMA)
- FP18: Emulsions: Recovery, Aging, and Rheological Testing
- FP19-21: Laboratory and Field Asphalt Binder Aging: Chemical Changes and Influence on Asphalt Binder Embrittlement
- FP22: Adaptation of Existing Analytical Scale Size Exclusion Chromatography Methods
- FP23: Rheological Interconversions

- 4-mm DSR (Dynamic Shear Rheometry)
- Asphalt Pavement – Micro-Sampling and Micro-Extraction Methods
- The Universal Simple Aging Test (USAT)
- The Asphalt Binder Oxidative Aging Chemo-Mechanical Model
- Automated HPLC SAR-AD Separation
- **Analytical Method to Measure Water in Asphalt and its Application to Emulsion Residue Recovery**

- The FP111 contract has been very fruitful in terms of deliverables, new products such as analytical and test methods, the oxidation model, the chemometrics software...
- The “FP111 validation”, much smaller contract is finishing, focusing on the application and validation of some of the products
- Most products are being used by WRI today in federal and commercial contracts to help industrial partners solve their problems generally related to binder quality and variability, or agencies to address forensics issues in the field
 - Additive effect, roofing and paving binder durability, chip seals...
- Some test methods are in the standardization process pipeline, waiting for ruggedness testing then R&R testing
 - i.e.; 4mm-DSR (as part of T315), USAT and microsampling
- Some test methods may become integrated in other new specification systems (like 4mm DSR and USAT for emulsions)
- Some test methods are already being used regularly by stakeholders, like the 4mm DSR



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THANK YOU!

From Molecules to Innovative Pavements

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