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May 18, 2015

Mr. Andrew H. Hughes  
Division Administrator  
Federal Highway Administration  
100 West Capitol Street Suite 1062.  
Jackson, MS 39269

Dear Mr. Hughes:

**SUBJECT: Modification of the SPR Part II Research Work Program (SPR-1(75)) for the Fiscal Period FY 2015: October 1, 2014 to September 30, 2015**

The Research Division gained approval from the MDOT Research Advisory Committee (RAC) on April 15, 2015, to approve modifications to the FY 2015 research budget. I am requesting FHWA approval for extending the ending dates for the following items:

- SS 263 Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements—due to delays in the proposal process, asking for new ending date of 6/30/2017.
- SS 267 MDOT Research Program Peer Exchange—due to scheduling conflicts, the meeting had to be rescheduled until November of 2015, asking for new ending date of 6/30/2016.

If there are any questions concerning the program, please contact me at telephone number 359-7650.

Sincerely,

James Watkins  
State Research Engineer

Attachment

pc: Central File w/attachment  
FY 2015 Work Program file w/attachment

APPROVED

JUN 10 2015  
DATE

  
FOR THE DIVISION ADMINISTRATOR  
FEDERAL HIGHWAY ADMINISTRATION

**Mississippi**  
**Department of Transportation**  
**RESEARCH WORK PROGRAM**  
**'SPR-1(75)', Part II**  
**M56E**

For the Fiscal Period  
October 1, 2014 to September 30, 2015



Prepared by the  
Mississippi Department of Transportation  
*RESEARCH DIVISION*

James C. Watkins, P.E.  
State Research Engineer  
In Cooperation with the  
U.S. Department of Transportation  
Federal Highway Administration

# Mississippi Research Work Program 2015

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# Mississippi Research Work Program 2015

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## **GENERAL COMMENTS ON RESEARCH WORK PROGRAM FOR FISCAL YEAR 2015**

The SPR Part II research work program allocation for FY 2015 totals \$2,306,885.00 and includes a National Cooperative Highway Research Program (NCHRP) contribution of \$121,803.52 for FY 2015, a TRB Correlation Service contribution of \$31,947.29, AASHTO Technical Services Program contributions totaling \$87,200.00, and pooled-fund studies totaling \$ 285,000.00 as detailed in the program tabulation and narrative included in this document. The NCHRP funding is 5.5% of the SPR Parts I and II allocation. NCHRP and TRB are funded using 75% SP&R Part I and 25% SP&R Part II funds. This work program tabulation also includes renewal statements for all on-going line items. The renewal statements for state studies contain financial information including total study budget, total expenditures to date, and cost estimates for fiscal year 2015. Also included in the renewal statements for state studies are narrative descriptions of study objectives, accomplishments of the past year, and work planned for fiscal year 2015. Beginning and completion dates are shown for each state study. Line items other than state studies have narrative descriptions of scope, objectives and anticipated activities along with a cost estimate. These tabulations and renewal statements constitute the FY 2015 research work program. The pooled fund studies, the TRB Correlation Service, and NCHRP as described herein are funded with 75% SP&R Part I and 25% SP&R Part II funds (no state match). The 22 line items in the tabulation mentioned above include only those items for which there is a state match (80/20) in the funding. Additional projects using either 100% federal non-SPR funds or 100% state funds that are administered by Research Division are also described in this document. State study numbers in this work program are the same as those currently being used, and they will remain the same in all correspondence study proposals for future submissions will be numbered sequentially.

## Mississippi Research Work Program 2015

Mississippi FY2015 Work Program (100% Federal and 80%/20% State Funded Studies)										
Line Item	Project/Study Name	Study #	Proposed/Actual Start Date	Proposed/Actual End Date	Total Study Budget	Total Expenditures to Date	FY2015 Budget	FY2014 Expenditures	Principal Investigator	Agency/Co
<b>Existing State Studies &amp; Internal Line Items</b>										
1	Long-Term Pavement Performance (LTPP)	N/A	10/1/2014	9/30/2015	\$0.00	\$0.00	\$2,500.00	\$2,345.54	James C. Watkins	MDOT
2	Implementation of Research Projects	N/A	10/1/2014	9/30/2015	\$0.00	\$0.00	\$320,000.00	\$396,087.58	James C. Watkins	MDOT
3	Technology Transfer	N/A	10/1/2014	9/30/2015	\$0.00	\$0.00	\$130,000.00	\$136,288.87	James C. Watkins	MDOT
4	Pavement Management	N/A	10/1/2014	9/30/2015	\$0.00	\$0.00	\$310,000.00	\$356,546.72	Cindy Smith	MDOT
5	Skid Collection	N/A	10/1/2014	9/30/2015	\$0.00	\$0.00	\$15,000.00	\$5,339.95	Marta Charria	MDOT
6	Research Contract Liaison	N/A	10/1/2011	9/30/2015	\$0.00	\$0.00	\$68,000.00	\$63,943.94	Robbie Vance	MDOT
7	Minor Research Studies	N/A	10/1/2014	9/30/2015	\$0.00	\$0.00	\$30,000.00	\$14,139.72	James C. Watkins	MDOT
8	Smoothness Specification	N/A	10/1/2014	9/30/2015	\$0.00	\$0.00	\$20,000.00	\$0.00	Alex Middleton	MDOT
9	Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking	184	10/1/2005	9/30/2015	\$218,224.00	\$256,853.07	\$150,020.10	\$35,848.16	Farshad Amini	Jackson State University

## Mississippi Research Work Program 2015

Mississippi FY2015 Work Program (100% Federal and 80%/20% State Funded Studies)										
Line Item	Project/Study Name	Study #	Proposed/Actual Start Date	Proposed/Actual End Date	Total Study Budget	Total Expenditures to Date	FY2015 Budget	FY2014 Expenditures	Principal Investigator	Agency/Co
10	In-House Support to State Study No. 184 - Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking	185	10/1/2005	9/30/2015	\$30,000.00	\$1,427.34	\$30,000.00	\$556.55	Bill Barstis	MDOT
11	Consultant Support to State Study No. 184 - Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking	186	10/1/2005	12/31/2015	\$20,400.00	\$14,900.00	\$5,500.00	\$0.00	Randy Ahlrich	Burns Cooley Dennis, Inc.
12	Influence of Cementitious Materials on Shrinkage of Bridge Deck Concrete	247	3/1/2012	12/31/2014	\$99,821.14	\$103,961.12	\$29,076.02	\$0.00	Robert Varner	Burns Cooley Dennis, Inc.

## Mississippi Research Work Program 2015

Mississippi FY2015 Work Program (100% Federal and 80%/20% State Funded Studies)										
Line Item	Project/Study Name	Study #	Proposed/Actual Start Date	Proposed/Actual End Date	Total Study Budget	Total Expenditures to Date	FY2015 Budget	FY2014 Expenditures	Principal Investigator	Agency/Co
13	Full Depth Reclamation for High Traffic Applications	250	2/1/2012	12/31/2015	\$291,975.80	\$127,801.94	\$150,000.00	\$54,447.38	Isaac Howard	Mississippi State University
14	In-House Support to Full-Depth Reclamation for High-Traffic Applications	251	2/1/2012	12/31/2014	\$6,000.00	\$2,000.00	\$2,500.00	\$1,835.42	William Barstis	MDOT
15	Analyzing the Impact of Intermodal-Related Risk to the Design and Management of Biofuel Supply Chain	259	10/1/2013	12/31/2014	\$99,642.00	\$66,533.26	\$76,728.14	\$27,496.63	Xiaopeng Li	Mississippi State University
16	Guidelines for PCC Inputs to AASHTOWARE Pavement ME Design	260	10/1/2013	12/31/2014	\$22,500.00	\$0.00	\$22,500.00	\$0.00	Chetana Rao	Rao Research and Consulting, LLC

## Mississippi Research Work Program 2015

Mississippi FY2015 Work Program (100% Federal and 80%/20% State Funded Studies)										
Line Item	Project/Study Name	Study #	Proposed/Actual Start Date	Proposed/Actual End Date	Total Study Budget	Total Expenditures to Date	FY2015 Budget	FY2014 Expenditures	Principal Investigator	Agency/Co
17	Turbidity Monitoring and Equipment Evaluation at MDOT Construction Sites	261	10/1/2013	12/31/2014	\$124,999.64	\$59,434.74	\$75,470.69	\$59,434.74	Bobby Moseley	Thompson Engineering
18	Evaluation of the WatchDog Weather Station to Reduce Drift from MDOT Spray Trucks	262	10/1/2013	12/31/2015	\$77,748.00	\$27,775.28	\$38,000.00	\$27,775.28	John Byrd	Mississippi State University
19	Collection and Evaluation of Core Data for the MEPDG for Overlayed and New Pavements	263	10/1/2014	6/30/2017	\$350,000.00	\$0.00	\$150,000.00	\$0.00	Allen Cooley	Burns Cooley Dennis, Inc.
20	District Traffic Control support to Collection and Evaluation of Core Data for the MEPDG for Overlayed and New Pavements	264	10/1/2014	12/31/2016	\$50,000.00	\$0.00	\$20,000.00	\$0.00	Bill Barstis	MDOT

## Mississippi Research Work Program 2015

Mississippi FY2015 Work Program (100% Federal and 80%/20% State Funded Studies)										
Line Item	Project/Study Name	Study #	Proposed/Actual Start Date	Proposed/Actual End Date	Total Study Budget	Total Expenditures to Date	FY2015 Budget	FY2014 Expenditures	Principal Investigator	Agency/Co
21	Research Division Support to Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements	265	10/1/2014	12/31/2016	\$50,000.00	\$6,826.34	\$20,000.00	\$6,826.34	Bill Barstis	MDOT
22	Field Aging Effects on Asphalt Mixed at Different Temperatures and Hauled Different Distances	266	3/1/2014	12/31/2016	\$150,000.00	\$0.00	\$50,000.00	\$0.00	Isaac L. Howard	Mississippi State University
					<b>Total Technical Assistance</b>		\$895,500.00	\$974,694.00		
					<b>Total State Studies Excluding Tech Assistance</b>		\$819,795.00	\$214,220.00		
					<b>Total Studies Closing in FY 2014</b>			\$738,545.00		

## Mississippi Research Work Program 2015

Mississippi FY2015 Work Program (100% Federal and 80%/20% State Funded Studies)										
Line Item	Project/Study Name	Study #	Proposed/Actual Start Date	Proposed/Actual End Date	Total Study Budget	Total Expenditures to Date	FY2015 Budget	FY2014 Expenditures	Principal Investigator	Agency/Co
					<b>Total All Continuing 80/20</b>		\$1,715,295.00	\$1,927,459.00		

## Mississippi Research Work Program 2015

Mississippi FY2015 Work Program (100% Federal and 80%/20% State Funded Studies)										
Line Item	Project/Study Name	Study #	Proposed/Actual Start Date	Proposed/Actual End Date	Total Study Budget	Total Expenditures to Date	FY2015 Budget	FY2014 Expenditures	PI	Agency/Co
<b>New State Studies for FY 2015</b>										
23	MDOT Research Program Peer Exchange	267	10/1/2014	6/30/2016	\$75,000.00	\$0.00	\$10,000.00	\$0.00	Cindy Smith	MDOT
					<b>Total New Studies</b>		\$10,000.00			
					<b>Total All 80/20 Expenditures</b>		\$1,725,295.00	\$1,927,459.00		

## Mississippi Research Work Program 2015

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<b>100% Federally Funded FY2015 Studies</b>		
<b>Continuing Pooled Funds</b>		
	<b>FY2014</b>	<b>FY2015</b>
Southeast Transportation Research Consortium	\$5,000.00	\$5,000.00
Improving the Quality of Pavement Surface Distress and Transverse Profile Data Collection and Analysis	\$15,000.00	\$15,000.00
<b>Total Continuing Pooled Funds</b>	<b>\$20,000.00</b>	<b>\$20,000.00</b>

## Mississippi Research Work Program 2015

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<b>Rejoined Pooled Fund Studies for FY2015</b>
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	<b>FY2015</b>
Traffic Control Device (TCD) Consortium	\$15,000.00
Traffic Signal Systems Operation and Management	\$25,000.00
<b>Total Rejoined Pooled Funds</b>	<b>\$40,000.00</b>
<b>Total Continuing and Rejoined Pooled Funds</b>	<b>\$60,000.00</b>

# Mississippi Research Work Program 2015

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## New Pooled Fund Studies for FY2015

	<b>FY 2015</b>
Accelerated Performance Testing on the 2015 NCAT Pavement Test Track	\$210,000.00
<b>Total New Pooled Funds</b>	<b>\$210,000.00</b>
<b>Total All Pooled Funds</b>	<b>\$270,000.00</b>

## Mississippi Research Work Program 2015

### AASHTO Technical Services Program

	FY2014	FY2015
AASHTO National Transportation Product Evaluation Program (NTPEP)	\$12,000.00	\$12,000.00
AASHTO Innovative Initiative (All) (FormerlyTIG)	\$6,000.00	\$6,000.00
AASHTO Equipment Management Technical Services Program (EMTSP)	\$3,000.00	\$3,000.00
AASHTO Technical Service Program to Develop AASHTO Materials Standards (DAMS)	\$5,000.00	\$5,000.00
AASHTO Product Evaluation Listing (APEL)	\$1,200.00	\$1,200.00
AASHTO Transportation System Preservation Technical Service Program (TSP2)	\$20,000.00	\$20,000.00
AASHTO Materials Reference Library (AMRL)	\$6,666.66	\$6,666.66
AASHTO Cement and Concrete Reference Laboratory (CCRL)	\$6,666.67	\$6,666.67
AASHTO Accreditation Program (AAP)	\$6,666.67	\$6,666.67
AASHTO Safe, Reliable, and Secure Transportation Operations (SAFETY)	\$10,000.00	\$10,000.00
AASHTO Load and Resistance Factor Design (LRFD)	\$10,000.00	\$10,000.00
<b>TOTAL AASHTO TSP</b>		<b>\$87,201.00</b>
Transportation Research Board Correlation Service	\$25,891.75	\$31,947.29
Mississippi Participation in NCHRP	\$121,915.21	\$121,803.52
<b>TOTAL Pooled Funds Including AASHTO, NCHRP &amp; TRB</b>		<b>\$510,952.00</b>

## Mississippi Research Work Program 2015

### Summary of Work Program Expenditures and Budget FY2014-FY2015

	<u>FY2014</u>	<u>FY2015</u>
<b>SPR PART II ALLOCATION</b>	\$ 2,306,885.00	\$ 2,306,885.00
Obligation Authority	\$ 2,227,528.00	\$ 2,030,058.80
Less NCHRP (Estimated)	\$ (121,915.21)	\$ (121,803.52)
Less TRB (Estimated)	\$ (25,891.75)	\$ (31,947.29)
Less Continuing Pooled Fund Studies	\$ (300,000.00)	\$ (20,000.00)
Less Rejoined Pooled-Fund Studies	\$ -	\$ (55,000.00)
Less New Pooled-Fund Studies	\$ (15,000.00)	\$ (210,000.00)
Less AASHTO TSPs	\$ (87,200.00)	\$ (87,200.00)
Less SHRP2	\$ (92,355.50)	\$ -
Less Peer Exchange		\$ (75,000.00)
<b>TOTAL 100% Federal Expenditures</b>	<b>\$ (642,362.46)</b>	<b>\$ (600,950.81)</b>
Plus previous FY Closeout from FMS	\$641,450.00	
Plus Carryover from FMIS Previous FY (from Federal Funds Worksheet)	\$0.00	\$308,383.70
SPR Available for 2013 & 2014 Part II Work Program	\$ 2,226,615.54	\$ 1,737,491.69
plus STATE MATCH	\$445,323.11	\$347,498.34
<b>TOTAL AVAILABLE FROM SPR PART II</b>	<b>\$ 2,671,938.65</b>	<b>\$ 2,084,990.03</b>
Less Internal Line Items	\$ (974,692.33)	
Less State Study Expenditures Through 7/31/2014	\$ (178,517.10)	
Less Estimated State Study Expenditures 8/1/14 - 9/30/14	\$ (35,703.42)	
Less Projects Closing in FY14	\$ (738,545.17)	
<b>Total State Match Expenditures</b>	<b>\$ (1,927,458.02)</b>	<b>\$ -</b>
Estimated FY20xx Carryover (Total Available + Previous FY Balance)		\$2,829,470.65
<b>TOTAL FUNDS AVAILABLE</b>		
Less FY20xx State Studies & Internal Expenditures		\$ (2,010,320.56)
Contingency Funds	\$744,480.63	\$819,150.09
Previously encumbered funds	\$723,058.50	

## Mississippi Research Work Program 2015

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### Mississippi Participation in Other Research Projects 100% State Funded (Non-SPR)

	<b>Budget Program FY 2014</b>	<b>Previous FY Expenditures</b>	<b>Total Expended to Date</b>	<b>Total Study Budget</b>
<b>Field Aging Effects on Asphalt Mixed at Different Temperatures and Hauled Different Distances</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$8,600.00</b>	<b>\$64,942.70</b>

**PI: Isaac L. Howard**

## Continuing State Studies and Technical Assistance Line Items

### LINE ITEM 1

#### Long-Term Pavement Performance (LTPP)

This line item is for support of the Long-Term Pavement Performance (LTPP) program begun under the Strategic Highway Research Program (SHRP) and now a part of the Federal Highway Administration (FHWA). Activities covered include site nomination, site verification, historic data searches, support for material sampling and field-testing, construction supervision, and technology transfer activities associated with LTPP and SHRP product implementation. Activities associated with the new SHRP II program as outlined in the current authorization will also be supported by this line item.

**FY 2015 budgeted amount:** \$2,500.00

# Mississippi Research Work Program 2015

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## LINE ITEM 2

### Implementation of Research Projects

This line item funds Research Division activities relating to implementation of research studies. Implementation Activities consist of field and office activities that apply research results to the solution of operational problems in the transportation area. Examples of these activities are:

1. Applying new products and/or procedures in the field to specific field problems.
2. Short-term field and/or office technical support in trouble-shooting and design.
3. Assistance in development of specifications and tests to implement new products or procedures.
4. Identifying areas in which research is required.
5. Initial preparation costs associated with proposed research.

Research information for implementation may originate from MDOT's Research Program (in-house and Contract), including both completed and ongoing studies; from other state transportation agencies' experiences and research; from national and international sources, from the FHWA; and from major research sources such as NCHRP, Corps of Engineers, etc.

**FY 2015 budgeted amount:** \$320,000.00

# Mississippi Research Work Program 2015

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## LINE ITEM 3

### Technology Transfer

This activity funds Research Division activities relating to the distribution of information about transportation technologies to any of MDOT Research Division's transportation customers.

Examples of technology transfer activities include:

- making presentations of research results to various groups such as universities and technical societies
- participation in user group meetings, conferences, seminars and training courses
- distribution of research results
- inputting research and research-in-progress (RIP) results into the Transportation Research Information Service (TRIS)
- producing and distributing a MDOT Research Newsletter

NOTE: The SPR WORK PROGRAM-PART I (SPR-1(52)), provides direct support to the Center for Technology Transfer (T2) at Jackson State University, and those activities and funds are not included in the above line item, Technology Transfer.

**FY 2015 budgeted amount:** \$130,000.00

## LINE ITEM 4

### Pavement Management

This item covers the activities of the Research Division relating to the development, implementation, maintenance and operation of the Department's Pavement Management System. The Pavement Management System database serves as an important resource for Departmental sponsored pavement related research.

Activities include awareness of national pavement management state-of-the-art and practice, administration of field data collection and statewide database development, administration of pavement condition survey contracts, quality assurance for condition surveys, in-house software development, administration of contract software development, planning and conducting in-house training, administration of contract pavement management research, implementation of pavement management research and annual distress surveys associated with MDOT's maintained pavement projects.

**FY 2015 budgeted amount:** \$310,000.00

## Mississippi Research Work Program 2015

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### LINE ITEM 5

#### Skid Collection

This item covers the skid data collection activities of the Research Division to ensure that MDOT provides acceptable surface skid resistance for the traveling public. This line item includes skid collection for new construction acceptance, product evaluation, and quality assurance of contractor-collected skid data, and periodic maintenance and calibration of the skid collection vehicle.

**FY 2015 budgeted amount:** \$15,000.00

## Mississippi Research Work Program 2015

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### LINE ITEM 6

#### Research Contract Liaison

This line item covers the division's contracting, work program preparation assistance, monitoring of quarterly progress reports, and payment of pooled funds, NCHRP, TRB, and other federally funded programs. Included are such tasks as completion of ADMs, close communication with Consultant Services Unit, assistance with Commission agenda items, completion of FHWA payment forms, tracking of project status and expenditures, and review and publication of quarterly progress reports and final research reports.

**FY 2015 budgeted amount:** \$68,000.00

# Mississippi Research Work Program 2015

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## LINE ITEM 7

### Minor Research Studies

Low cost/short duration projects may be done without being put into a process of clearances and competing with other programs. An example of such a project is an experimental feature evaluation.

The Research Advisory Committee will establish a resource threshold to be met before requiring any project be put into a centralized clearinghouse/priority setting process. Current operating procedures are to conduct research projects where the expenditure ceiling is expected to be under \$10,000 and the project duration is expected to be one year or less.

These are based on selection and approval by the Research Engineer, following an appropriate review of District needs and literature review.

Additionally, support for national efforts coordinated by organizations such as AASHTO, will be funded by this line item.

**FY 2015 budgeted amount: \$30,000.00**

## Mississippi Research Work Program 2015

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### LINE ITEM 8

#### Smoothness Specification

This line item covers costs associated with implementation of the smoothness specification for construction acceptance. This includes providing assistance to contractors, project engineers, Construction Division, and other personnel.

**FY 2015 budgeted amount:** \$20,000.00

# Mississippi Research Work Program 2015

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**LINE ITEM:** 9

**STATE STUDY NUMBER:** 184

**TOTAL STUDY BUDGET:** \$218,224.00

**TOTAL STUDY COST TO DATE:** \$256,853.07

**DATE STARTED:** 11/10/2005

**COMPLETION DATE:** 09/30/2015

## Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking

**RESEARCH AGENCY:**

Jackson State University

**PRINCIPAL INVESTIGATOR:**

Farshad Amini

### Objective:

The conclusions and recommendations from Phase I State Study No. 174, Potential Applications of Paving Fabrics to Reduce Reflective Cracking, substantiated the development of this project. The primary objective is to conduct long-term monitoring of the performance of a flexible pavement which includes a paving fabric between the in-situ pavement and an HMA overlay. A comprehensive testing, monitoring, and analysis program is proposed, where twelve 500-ft pavement test sections are constructed on an existing two-lane highway, and then monitored for seven years. Particular attention is directed towards investigating the influence of overlay thickness on long-term performance. A comparison between the performance of paving fabric treatment systems for milled and non-milled surfaces, as well as a comparison between the performance of paving fabrics on sealed and non-sealed surfaces will be reported. In addition, a cost-benefit analysis will be performed to develop total life cycle costs for each section. This project, by accomplishing the above objectives, will provide a fundamental understanding of the behavior of paving fabric systems to reduce reflective cracking, and will offer practicing engineers a valuable alternative for more effective schemes during pavement rehabilitation strategies.

### Progress:

#### FY 2007:

The test site was selected. A site visit was conducted to examine the initial conditions. FWD testing was performed on the road for the test sections. A crack survey was done on the existing pavement of all test sections before milling, sealing, or overlay placement. The distress data collection is generally in accordance with the "Distress Identification Manual for the Long-Term Pavement Performance Project, SHRP-P-338". Full depth coring was done on the existing pavement of all test sections before milling, sealing, or overlay placement. The specifications for the installation of the paving fabric sections were modified and finalized. The construction of the paving fabric sections included a test section, and the 12

## Mississippi Research Work Program 2015

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research sections. The construction process was closely monitored. The monitoring including quality control during construction to ensure that the paving fabric systems have been installed in accordance with the specifications.

### **FY 2008:**

A comprehensive construction report indicating the results of the test section, the 12 research sections, process during quality control, the equipment, testing, and the lessons learned and recommendations was prepared. The initial crack survey analysis was also completed during this year.

### **FY 2009:**

The first annual survey was completed. One paper titled "Lessons Learned from Construction of Paving Fabric Systems to Reduce Reflective Cracking in Pavements" was presented at the Mississippi Transportation Institute (MTI) Conference held in Choctaw, MS in October 2008.

### **FY 2010:**

The second annual survey was completed and analyzed during this year. The distress data collection was in accordance with the "Distress Identification Manual for the Long-Term Pavement Performance Project, SHRP-P-338" (SHRP, 1993). The data is used to determine the effectiveness of the paving fabric systems. Quarterly progress reports were submitted.

### **FY 2011:**

The third annual survey was completed during this year. The data is used to determine the effectiveness of the paving fabric systems. In addition, three core samples from each of the twelve test sections were taken to determine the thickness and conditions of each section. This data will be used during the evaluation of the crack growth.

### **FY 2012:**

The fourth annual survey was completed during this year. The data is used to determine the effectiveness of the paving fabric systems. In addition, three core samples from each of the twelve test sections were taken to determine the thickness and conditions of each section. This data will be used during the evaluation of the crack growth.

### **FY 2013:**

The fifth annual survey was completed during this year. The data is used to determine the effectiveness of the paving fabric systems. This data will be used during the evaluation of the crack growth.

### **FY 2014:**

## Mississippi Research Work Program 2015

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The sixth annual survey was completed during this year. The data is used to determine the effectiveness of the paving fabric systems. The data for the last six years has been analyzed. This data is used during the final evaluation of the crack growth after Year 7 data is completed.

### **Plans for 2015:**

The seventh annual crack survey will be completed and analyzed during this year. The distress data collection will generally be in accordance with the "Distress Identification Manual for the Long-Term Pavement Performance Project, SHRP-P-338" (SHRP, 1993). The crack data from the prior preconstruction crack survey will be compared to the subsequent annual crack data. An analysis of the crack growth for the last seven years will also be done at the end of next year. This will be done to evaluate the effectiveness of the paving fabric systems to reduce reflective cracking.

**Cost Estimate for FY 2015** \$150,020.10

## Mississippi Research Work Program 2015

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**LINE ITEM:** 10

**STATE STUDY NUMBER:** 185

**TOTAL STUDY BUDGET:** \$30,000.00

**TOTAL STUDY COST TO DATE:** \$1,427.34

**DATE STARTED:** 11/10/2005

**COMPLETION DATE:** 09/30/2015

### **In-House Support to State Study No. 184 - Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking**

**RESEARCH AGENCY:**

MDOT

**PRINCIPAL INVESTIGATOR:**

Bill Barstis

#### **Objective:**

This study will be conducted to support the proposed study "Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking." The required tasks include:

1. FWD field testing and evaluation of requisite overlay of proposed pavement for inclusion in Phase II study.
2. Operation of the MDOT profiler to obtain video images of the pavement surface one time prior to construction of the twelve test sections and nine times subsequent to construction.
3. Mapping of cracks on the video logs for submission to Jackson State University.
4. Traffic control will be required to facilitate FWD testing by MDOT and pavement coring operations by Burns, Cooley, & Dennis, Inc.
5. Review of one construction report, three progress reports, and one final report.

#### **Progress:**

##### **FY 2007:**

A crack survey was done on the existing pavement of all test sections before milling, sealing, or overlay placement. MDOT used the profiler to collect crack data and review the data. The distress data collected was in accordance with the "Distress Identification Manual for the Long-Term Pavement Performance Project, SHRP-P-338" (SHRP, 1993).

The construction process was monitored for the research sections. An initial crack survey was performed of the test sections using the MDOT profiler immediately following completion of construction.

## Mississippi Research Work Program 2015

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### **FY 2008:**

MDOT collected data for the third survey of the research sections. In addition to collecting the third set of data, MDOT continued to map all distresses from the first, second and third surveys and submitted the results to JSU. The first draft of the construction report was completed by JSU and reviewed by MDOT during the past fiscal year.

### **FY 2009:**

MDOT collected data for the third survey of the research sections. In addition to collecting the third set of data, MDOT continued to map all distresses from the surveys and submitted the results to JSU.

### **FY 2010:**

Collected the data for the annual survey and submit same to JSU.

### **FY 2011:**

Collected the data for the annual survey and submit same to JSU.

### **FY 2012:**

Data was collected and submitted to JSU.

### **FY 2013:**

Annual data collection was performed and analyzed.

### **FY 2014:**

Collected pavement distress data.

### **Plans for 2015:**

Review final report.

**Cost Estimate for FY 2015** \$30,000.00

# Mississippi Research Work Program 2015

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**LINE ITEM:** 11

**STATE STUDY NUMBER:** 186

**TOTAL STUDY BUDGET:** \$20,400.00

**TOTAL STUDY COST TO DATE:** \$14,900.00

**DATE STARTED:** 01/30/2006

**COMPLETION DATE:** 12/31/2015

## **Consultant Support to State Study No. 184 - Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking**

**RESEARCH AGENCY:**

Burns Cooley Dennis, Inc.

**PRINCIPAL INVESTIGATOR:**

Randy Ahlrich

### **Objective:**

This project will provide consultant support to the proposed study "Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking." The required tasks include:

1. Provide guidance on selection of paving fabric.
2. Provide guidance regarding paving fabric construction for inclusion in construction bid documents.
3. Monitor construction of test sections.
4. Perform requisite coring of pavement test sections.
5. Review the construction report, three progress reports and the final report.

### **Progress:**

#### **FY 2007:**

Full depth coring was done on the existing pavement of all test sections before milling, sealing, or overlay placement. One full-depth core was extracted from all test sections except for the 2 control sections. 3 full depth cores were extracted from each of the 2 control sections. BCD also monitored the construction process for the research sections.

#### **FY 2008:**

BCD reviewed draft of construction report prepared by JSU. No other work was performed this year.

#### **FY 2009:**

No work performed during FY 09.

## Mississippi Research Work Program 2015

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**FY 2010:**

No work was done in FY10.

**FY 2011:**

No work was done in FY11.

**FY 2012:**

No work was done in FY2012.

**FY 2013:**

No work is planned for FY2013.

**FY 2014:**

Obtained three full-depth field cores from each of the twelve test sections.

**Plans for FY 2015:**

Review final report

**Cost Estimate for FY 2015** \$5,500.00

# Mississippi Research Work Program 2015

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**LINE ITEM:** 12

**STATE STUDY NUMBER:** 247

**TOTAL STUDY BUDGET:** \$99,821.14

**TOTAL STUDY COST TO DATE:** \$103,961.12

**DATE STARTED:** 03/13/2012

**COMPLETION DATE:** 12/31/2014

## Influence of Cementitious Materials on Shrinkage of Bridge Deck Concrete

**RESEARCH AGENCY:**

Burns Cooley Dennis, Inc.

**PRINCIPAL INVESTIGATOR:**

Robert Varner

### Objective:

BCD proposes to test thirty concrete mixtures to determine the influence of source of portland cement and source fly ash on shrinkage and cracking of concrete bridge decks. Six sources of portland cement will be selected and used to develop six mixtures with 100 percent portland cement. Four sources of Class C and Class F fly ash will be selected and combined with one of the sources of portland cement to develop twenty-four mixtures using fly ash to replace portland cement. Replacement rates for fly ash will be 15%, 20%, and 25%.

### Progress:

#### FY 2012:

BCD received NTP on March 31, 2012. BCD has collected samples of aggregate and has performed laboratory testing on the aggregates.

#### FY 2013:

BCD finished all laboratory testing of concrete mixtures and continued shrinkage measurements. BCD will continue to evaluating data.

#### FY 2014:

Task 4: Collected and summarized data. Task 5A: Provide MDOT with draft report for review.

#### Plans for FY 2015:

Task 5D: Provide MDOT with final report.

**Cost Estimate for FY 2015** \$29,076.02

# Mississippi Research Work Program 2015

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**LINE ITEM:** 13

**STATE STUDY NUMBER:** 250

**TOTAL STUDY BUDGET:** \$291,975.80

**TOTAL STUDY COST TO DATE:** \$127,801.94

**DATE STARTED:** 01/17/2012

**COMPLETION DATE:** 12/31/2015

## Full Depth Reclamation for High Traffic Applications

**RESEARCH AGENCY:**

Mississippi State University

**PRINCIPAL INVESTIGATOR:**

Isaac Howard

### Objective:

The proposed study will characterize properties of FDR that are important to design, construction and performance in high traffic applications. Historically FDR has been more commonly used in lower traffic applications and a study of the nature proposed could not be identified with materials similar to those native to Mississippi. The proposed study is aimed at providing design, construction, and performance guidance for FDR layers in high traffic applications, which have different behavioral conditions than low traffic applications.

### Progress:

#### FY 2012:

Task 2 (material acquisition from Hwy 49) was completed during FY 2012. A modest amount of literature review was performed (Task 3), and work commenced on strength versus time specimens (Task 7). Testing of 9.5 mm and 19 mm asphalt began (Task 4), as did gradation variability testing (Task 5). Task 17 (permeability testing), made some progress as needed items were purchased and one field test was performed.

#### FY 2013:

Progress was made on several tasks. The majority of the literature review (Task 3) was completed. Unless additional tests are warranted from analysis, Tasks 4 and 5 asphalt testing and gradation variability are complete. Task 6 and 7 (wheel tracking) is an area where more progress is needed. Specimen preparation questions have put this task on hold slightly relative to the original plan. Some preliminary wheel tracking efforts have been performed. Task 7 (strength versus time) has been initiated for some specimens, with additional testing planned for the upcoming FY. Tasks 8 through 11 (strength variability, traffic opening, durability, and elastic modulus) have been investigated to some extent, and they are envisioned for more detailed investigation in upcoming FY's. Task 17 (longitudinal joint measurement) is progressing as planned with two field tests and subsequent analysis per year.

## Mississippi Research Work Program 2015

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### **FY 2014:**

Progress was made on several tasks. Wheel tracking did not make as much progress as envisioned, as specimen preparation questions have not as of yet been fully resolved. Strength variability, gradation variability, durability, traffic opening, and specimen curing have all been investigated. Field work and investigation was performed on Hwy 49 (multiple test sections), and also on Hwy 45. The work on Hwy 45 was partially in response to questions brought up by MDOT after SS 250 was initiated. A fair amount of analysis, writing and literature review has also been conducted.

### **Plans for FY 2015:**

A draft final report is planned by the end of FY2015. Key items of investigation are planned to be wheel tracking, elastic modulus, durability, strength versus time, and field work (with subsequent data analysis). Longitudinal joint testing is envisioned to continue as it has been. Any remaining needed items are planned to be completed. It is also envisioned the results to be presented at a professional meeting.

**Cost Estimate for FY 2015** \$150,000.00

## Mississippi Research Work Program 2015

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**LINE ITEM:** 14

**STATE STUDY NUMBER:** 251

**TOTAL STUDY BUDGET:** \$6,000.00

**TOTAL STUDY COST TO DATE:** \$2,000.00

**DATE STARTED:** 01/17/2012

**COMPLETION DATE:** 12/31/2015

### **In-House Support to Full-Depth Reclamation for High-Traffic Applications**

**RESEARCH AGENCY:**

MDOT

**PRINCIPAL INVESTIGATOR:**

William Barstis

**Objective:**

This study will provide in-house support to the Full-Depth Reclamation for High-Traffic Applications. This item will fund traffic control and MDOT staff time for the study.

**Progress:**

**FY 2013:**

Collected Falling Weight Deflectometer (FWD) data for PI of SS No. 250. Provided traffic control for FWD data collection.

**FY 2014:**

Collected periodic falling weight deflectometer (FWD) data throughout the project limits. Cored several FWD locations in April to verify in-situ layer thicknesses and material properties.

**Plans for FY 2015:**

Follow up on any additional requests by Dr. Isaac Howard of Mississippi State University.

**Cost Estimate for FY 2015** \$2,500.00

# Mississippi Research Work Program 2015

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**LINE ITEM:** 15

**STATE STUDY NUMBER:** 259

**TOTAL STUDY BUDGET:** \$99,642.00

**TOTAL STUDY COST TO DATE:** \$66,533.26

**DATE STARTED:** 10/23/2013

**COMPLETION DATE:** 12/31/2014

## Analyzing the Impact of Intermodal-Related Risk to the Design and Management of Biofuel Supply Chain

**RESEARCH AGENCY:**

Mississippi State University

**PRINCIPAL INVESTIGATOR:**

Xiaopeng Li

### Objective:

The objective of this proposal is to design decision-support tools for identifying biorefinery locations that ensure a cost-efficient and reliable supply chain. We will build mathematical models which take into consideration the benefits (such as, accessibility to different modes of transportation), as well as, the risk associated with locating a refinery near an intermodal facility. The goal is to design biofuel supply chains that not only perform well under normal conditions but also maximally hedge against losses of not having access to cost-efficient transportation modes because of disruptions at intermodal facilities.

The outcomes of this project are on-line with the mission of the Intermodal Planning Division of MDOT to promote and support intermodal transportation by providing technical assistance which aims to improve and increase the usability of existing intermodal facilities. Through our experiments we will identify under what conditions locating a biofuel plant near an intermodal facility is advisable; and what are the benefits/costs of such a decision. These results can be used to encourage biofuel plants to use intermodal facilities/transportation and make their investments accordingly.

The biofuels industry seems to have a bright future in Mississippi due to the abundance amount of biomass in the form of agricultural residues, forest products, and forest residues. Other factors, such as, low wages, non-unionized labor, and incentive packages offered by the state, impact a company's decision to locate in Mississippi. These tools can be used to help biofuel plant make better facility locations decisions; which in turn will contribute to their success.

### Progress:

#### FY 2014:

Task 1: Literature review and site visits 100% complete. We still plan to visit some intermodal plants.

Task 2: Mathematical model - 100% complete. Task 3: CPLEX Algorithm - 100% complete. Task 4:

Customized Algorithm -100% complete. Task 5: Case Study -100% complete Task 6: Develop a visual

demo - 30% complete. The team has been working on developing a website where the interactive tool will reside. The following is the website we have created: <http://biofuel.msstate.edu/>. Building this

## Mississippi Research Work Program 2015

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interactive tool is a challenging task. Therefore, we have started working on it to give ourselves the time we need to complete it. Task 7.1 Quarterly Reports - 66% complete. The report we are submitting counts for 15% of the task.

### **Plans for FY 2015:**

Task 6: Develop the visual demo. We will continue working on the visual demo. We will complete 100% of this task. Task 7.1. We will submit the quarterly report, and complete 100% of this task. Task 7.2., the final report will be completed

**Cost Estimate for FY 2015** \$76,728.14

## Mississippi Research Work Program 2015

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**LINE ITEM:** 16

**STATE STUDY NUMBER:** 260

**TOTAL STUDY BUDGET:** \$22,500.00

**TOTAL STUDY COST TO DATE:** \$0.00

**DATE STARTED:** 12/19/2013

**COMPLETION DATE:** 12/31/2014

### Guidelines for PCC Inputs to AASHTOWARE Pavement ME Design

**RESEARCH AGENCY:**

Rao Research and Consulting, LLC

**PRINCIPAL INVESTIGATOR:**

Chetana Rao

#### Objective:

This proposal is submitted for MDOT to consider developing a formal report on PCC materials data necessary for AASHTOWare PAVEMENT ME Design. A detailed problem statement highlighting the project objective, and a work plan to accomplish the objectives are presented in this proposal.

Under SS 177, MDOT conducted a comprehensive test program to determine ME pavement design PCC material inputs for mix designs covering a wide range of materials available in Mississippi. Results from this project are expected to be used in the materials library that MDOT plans to develop to support MEPDG implementation. The results contain test data for 20 mixes and include results for the following properties determined from the listed test procedures:

- Modulus of Rupture or Flexural Strength – ASTM C 78
- Compressive Strength – ASTM C 39
- Modulus of Elasticity – ASTM C 469
- Tensile Strength – ASTM C 469
- CTE – AASHTO TP-60
- Concrete Shrinkage – ASTM C 157
- Unit Weight – ASTM C 138
- Poisson's Ratio – ASTM C 469

These results have not been formally published by MDOT so far. It will be immensely useful to summarize these data in a report so it can be used in the future implementation of the ME Design procedure.

For the measurement of CTE AASHTO has revised the TP-60 test procedure to the T336 procedure which results in more accurate CTE values. The T336 procedure corrects the assumption made for the CTE of the calibration specimen in the TP 60 procedure. The SS 177 CTE values are being corrected under the SS 170 study, which is producing a stand-alone document on the CTE corrections. The report developed in the proposed study will include the corrected CTE values.

## Mississippi Research Work Program 2015

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Additionally, the availability of such a comprehensive and complete set of materials database also provides a great opportunity to develop level 2 correlations for use in MEPDG.

**Progress:**

**FY 2014:**

Prepare final report for the project

**Plans for FY 2015:**

Revisions and final submission

**Cost Estimate for FY 2015** \$22,500.00

# Mississippi Research Work Program 2015

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**LINE ITEM:** 17

**STATE STUDY NUMBER:** 261

**TOTAL STUDY BUDGET:** \$124,999.64

**TOTAL STUDY COST TO DATE:** \$59,434.74

**DATE STARTED:** 10/23/2013

**COMPLETION DATE:** 12/31/2014

## **Turbidity Monitoring and Equipment Evaluation at MDOT Construction Sites**

**RESEARCH AGENCY:**

Thompson Engineering

**PRINCIPAL INVESTIGATOR:**

Bobby Moseley

### **Objective:**

MDOT has collected some initial data on turbidity levels in receiving streams due to run-off from construction projects. However, the results of the initial study (State Study 225) identified other areas where additional data is needed. The goal of this research project is to expand the current limited baseline turbidity conditions at select construction sites and to evaluate differing turbidity monitoring equipment under differing site conditions. Data, following initial site selection and site visits with MDOT, will be collected using MDEQ and EPA protocols as guidance.

### **Progress:**

#### **FY 2013:**

No work has been performed. Contract not issued.

#### **2014:**

Kick Off Meeting, SAP Development, Reviews of Erosion Control Plans, Equipment rental, background sampling, and equipment deployment and data collection at 4 locations (the Little Tangipahoa River, Trahon Creek, Eutacutachee Creek, and Prairie Branch) have all been completed. Current activities include data and equipment performance evaluation and drafting report.

#### **Plans for FY 2015:**

Submit and finalize draft report. This project is scheduled to end early in the next fiscal year October 23, 2014.

**Cost Estimate for FY 2015** \$75,470.69

## Mississippi Research Work Program 2015

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**LINE ITEM:** 18

**STATE STUDY NUMBER:** 262

**TOTAL STUDY BUDGET:** \$77,748.00

**TOTAL STUDY COST TO DATE:** \$27,775.28

**DATE STARTED:** 09/23/2013

**COMPLETION DATE:** 12/31/2015

### **Evaluation of the WatchDog Weather Station to Reduce Drift from MDOT Spray Trucks**

**RESEARCH AGENCY:**

Mississippi State University

**PRINCIPAL INVESTIGATOR:**

John Byrd

**Objective:**

Weather conditions that cause right of way herbicide drift onto sensitive adjacent crops can be avoided if wind speed and direction relative to the spray truck can be accurately monitored during applications.

**Progress:**

**FY 2013:**

Developed proposal.

**2014:**

Sprayer Stations purchased May; initial static testing done June, July, August, 2014. Mobile testing will start August, 2014

**Plans for FY 2015:**

Continue mobile testing at MSU and road spray truck testing; analyze data; complete written report.

**Cost Estimate for FY 2015** \$38,000.00

# Mississippi Research Work Program 2015

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**LINE ITEM:** 19

**STATE STUDY NUMBER:** 263

**TOTAL STUDY BUDGET:** \$350,000.00

**TOTAL STUDY COST TO DATE:** \$0.00

**DATE STARTED:** 10/01/2014

**COMPLETION DATE:** 06/30/2017

## Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements

**RESEARCH AGENCY:**

Burns Cooley Dennis, Inc.

**PRINCIPAL INVESTIGATOR:**

Allen Cooley

### Objective:

The Mechanistic-Empirical Pavement Design Guide (MEPDG) method for designing pavement structures utilizes mechanistic materials properties combined with other inputs to predict pavement performance using user inputs. Pavement performance models are used for this prediction of pavement performance. The pavement performance models are based upon national predictive models that are likely not applicable to Mississippi. This research project is designed to provide the required information for the calibration of these performance models for Mississippi materials and conditions. A number of test pavement sections will be visited, evaluated, sampled, and tested. Following these activities site reports will be prepared for each individual site that provides the information required for this calibration of the pavement performance models to local conditions.

### Progress:

#### FY 2013:

Collected Falling Weight Deflectometer (FWD) data for PI of SS No. 250. Provided traffic control for FWD data collection.

#### FY 2014:

Collected periodic falling weight deflectometer (FWD) data throughout the project limits. Cored several FWD locations in April to verify in-situ layer thicknesses and material properties.

#### Plans for FY 2015:

Follow up on any additional requests by Dr. Isaac Howard of Mississippi State University.

**Cost Estimate for FY 2015** \$150,000.00

## Mississippi Research Work Program 2015

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We are requesting FHWA approval for extending the ending date for SS 263 Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements—due to delays in the proposal process, asking for new ending date of 6/30/2017.

## Mississippi Research Work Program 2015

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**LINE ITEM:** 20

**STATE STUDY NUMBER:** 264

**TOTAL STUDY BUDGET:** \$50,000.00

**TOTAL STUDY COST TO DATE:** \$0.00

**DATE STARTED:** 10/01/2014

**COMPLETION DATE:** 12/31/2016

### **District Traffic Control support to Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements**

**RESEARCH AGENCY:**

MDOT

**PRINCIPAL INVESTIGATOR:**

Bill Barstis

**Objective:**

District traffic control personnel and equipment are required to provide lane closures for the conduct of field sampling/testing operations related to the conduct of State Study No. 263. District charges for this task will be funded by this support study.

**Progress:**

**FY 2014:**

None

**Plans for FY 2015:**

Provide traffic control for 67 pavement sample sections

**Cost Estimate for FY 2015** \$20,000.00

## Mississippi Research Work Program 2015

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**LINE ITEM:** 21

**STATE STUDY NUMBER:** 265

**TOTAL STUDY BUDGET:** \$50,000.00

**TOTAL STUDY COST TO DATE:** \$6,826.34

**DATE STARTED:** 10/01/2014

**COMPLETION DATE:** 12/31/2016

### **Research Division Support to Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements**

**RESEARCH AGENCY:**

MDOT

**PRINCIPAL INVESTIGATOR:**

Bill Barstis

#### **Objective:**

The Research Division in-house support to State Study (SS) 263 will provide falling weight deflectometer (FWD) field testing and FWD data analysis to characterize in-situ moduli of pavement layers at each project site used for local calibration of MEPDG performance models. Extensive coordination between principal investigator of SS No. 263 and MDOT District traffic control personnel will be performed via this support study as well as review of site reports generated as a deliverable of SS 263.

#### **Progress:**

##### **FY 2014:**

None

##### **Plans for FY 2015:**

For each of 67 pavement sample sections: Perform coordination between BCD and MDOT traffic control, perform FWD testing, and perform back calculation of FWD deflection data.

**Cost Estimate for FY 2015** \$20,000.00

## Mississippi Research Work Program 2015

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**LINE ITEM:** 22

**STATE STUDY NUMBER:** 266

**TOTAL STUDY BUDGET:** \$150,000.00

**TOTAL STUDY COST TO DATE:** \$0.00

**DATE STARTED:** 03/01/2014

**COMPLETION DATE:** 12/31/2017

### **Field Aging Effects on Asphalt Mixed at Different Temperatures and Hauled Different Distances**

**RESEARCH AGENCY:**

Mississippi State University

**PRINCIPAL INVESTIGATOR:**

Isaac L. Howard

#### **Objective:**

With all the options available to produce and place asphalt pavement in present day, a study into the field aging of these materials needs to be performed. Field aging has always been one of the biggest uncertainties in asphalt pavement performance, and with the widespread use of warm mix technologies, there are more aging questions than ever. This study is very timely, and if performed now can be conducted for less cost by leveraging the investment of a previous study.

**Cost Estimate for FY 2015** \$50,000.00

# Mississippi Research Work Program 2015

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## New State Studies for FY 2015

**LINE ITEM:** 23

**STATE STUDY NUMBER:** 267

**TOTAL STUDY BUDGET:** \$75,000.00

**TOTAL STUDY COST TO DATE:** \$0.00

**DATE STARTED:** 10/01/2014

**COMPLETION DATE:** 06/30/2016

## MDOT Research Program Peer Exchange

**RESEARCH AGENCY:**

MDOT

**PRINCIPAL INVESTIGATOR:**

Cindy Smith

### Objective:

The State Planning and Research Program Administration regulations (23 CFR Part 420) became effective on August 22, 1994. Subpart B requires the States to conduct a peer exchange of their research and technology (R & T) management process on a periodic basis. Mississippi's first round peer exchange was held in June of 1998 and the second was held in September of 2002. The program is designed to send an outside team of invited top level managers to meet with the host agency to discuss and review its RD&T management processes. Information on the host agency and team members' RD&T policies and procedures are exchanged with the intent to improve the overall RD&T management process. Peer exchanges provide an opportunity for participants to share best practices and management innovations with each other. The information gathered from the exchange is presented to agency management. An in-state University to be determined later will provide assistance to MDOT in conducting this required peer exchange program. Specifically, the University will be reimbursed for the following functions related to this line item:

- Organizing the Event
- Reimbursing the Peer Exchange Participants Travel Cost
- Providing Lodging, Meals and Meeting Space for the Participants
- Preparing and Distributing a Final Report
- Providing Ground Transportation for Participants

**Cost Estimate for FY 2015** \$10,000.00

We are requesting FHWA approval for extending the ending for SS 267 MDOT Research Program Peer Exchange—due to scheduling conflicts, the meeting had to be rescheduled until November of 2015, asking for new ending date of 6/30/2016.

## Pooled Fund Studies

### Southeast Transportation Research Consortium

Host Agency: Louisiana Department of Transportation & Development

The RAC Region II is developing a collaborative research program through the Transportation Pooled Fund (TPF) Program. The research program is called the Southeast Transportation Consortium and is intended to encourage coordination among member states and provide resources and management of collaborative studies. The consortium intends to address high priority transportation research topics of common interest to the RAC II Region states and for which expertise exists within the region.

FY 2009-\$5,000

FY 2010 - \$5,000

FY 2011 - \$5,000

FY 2012- \$5,000

FY 2013 - \$5,000

FY 2014 - \$5,000

FY 2015 - \$5,000

# Mississippi Research Work Program 2015

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## Improving the Quality of Pavement Surface Distress and Transverse Profile Data Collection and Analysis

Host Agency: Federal Highway Administration

Improve the Quality of Pavement Surface Distress and Transverse Profile Data Collection and Analysis by assembling SHAs, the FHWA, and industry representatives to:

- Identify data collection integrity and quality issues
- Identify data analysis needs
- Suggest approaches to addressing identified issues and needs

Based on this information, the SHAs and the FHWA will:

- Initiate and monitor projects intended to address identified issues and needs
- Disseminate results
- Assist in solution deployment

FY 2015- \$15,000

FY 2016- \$15,000

FY 2017- \$15,000

FY 2018- \$15,000

FY 2019- \$15,000

## Mississippi Research Work Program 2015

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### Traffic Control Device (TCD) Consortium

Host Agency: Federal Highway Administration

The TCD Consortium will focus on systematic evaluation of novel TCDs, employing a consistent process that addresses human factors and operations issues for each TCD idea. Providing local and state agencies quicker response to their needs and quicker response to new technologies with the right assessment skills and tools will enable consistent TCD idea identification and evaluation. TCD Consortium efforts will address TCD issues identified by local and state jurisdictions, industry, and organizations and aid in the compliance to the MUTCD rule-making process and incorporation of novel TCDs into the MUTCD.

FY 2015- \$15,000

# Mississippi Research Work Program 2015

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## Traffic Signal Systems Operation and Management

Host Agency: Indiana Department of Transportation

Signalized arterial represent a substantial component of the highway transportation network in the United States. The National Transportation Operations Coalition (NTOC) in their 2007 Traffic Signal Report Card noted that nationally 5 to 10 percent of all traffic delay is caused by improper traffic signal timings along major roadways. In 2007, the National Report Card for overall traffic signal systems operations was a D. The situation is not expected to improve as travel demand is forecast to grow significantly faster than network capacity. The increase in national attention on sustainable and livable communities necessitate a concentrated effort be placed upon improved management and operation of our nations traffic signal system inventory.

The Transportation Management Center (TMC) Pooled fund study (SPR-2(207)) initiated in 2000, has been very successful at generating consensus on best management practices for traffic management centers oriented mainly towards freeway operations. It is desirable to develop a similar pooled fund study oriented toward traffic signal operations and management that would complement SPR-2(207) and engage a broad cross section of agencies on the leading edge of active traffic signal management.

Develop a network of transportation agencies to:

1. Develop consensus on operational standards of performance,
2. Define a central management model that can leverage commercial wireless IP offerings that can be competitively outsourced, and
3. Management principles for using a central system to identify when and where resources are most needed to maximize return on investment.

The level of participation and associated funding commitments will allow for additional opportunities over time or in parallel to explore additional traffic signal initiatives beyond those described herein. For example, the evaluation of adaptive control field deployments and associated systems engineering guidance documents under development by FHWA.

FY 2012 - \$25,000    FY 2013 - \$25,000    FY 2014 - \$25,000

FY 2015 - \$25,000    FY 2016 - \$25,000

# Mississippi Research Work Program 2015

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## Accelerated Performance Testing on the 2015 NCAT Pavement Test Track

Host Agency: Alabama Department of Transportation

1. Constructing 200 ft test sections on the existing 1.7-mile NCAT test oval that are representative of in-service roadways;
2. Applying accelerated performance truck traffic in the 2 years following construction;
3. Assessing/comparing the functional & structural field performance of trafficked sections on a regular basis via surface & subsurface measures;
4. Validating/calibrating new & existing mechanistic-empirical (M-E) approaches to pavement analysis & design using pavement surface condition, pavement load response, precise traffic & environmental logging, & cumulative damage;
5. Determining the life cycle cost of various pavement preservation alternatives in a highly controlled experiment that will provide state Departments of Transportation (DOTs) with the financial foundation to begin to build a decision tree for their own maintenance program;
6. Correlating field results with laboratory data for both mechanistic & preservation applications; and
7. Answering practical questions posed by research sponsors through formal (i.e., reports & technical papers) & informal (e.g., one-on-one responses to sponsor inquiries) technology transfer.

FY 2015- \$210,000

FY 2016- \$210,000

FY 2017- \$210,000

## Mississippi Research Work Program 2015

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### **AASHTO National Transportation Product Evaluation Program (NTPEP)**

Host Agency: AASHTO

National Transportation Product Evaluation Program (NTPEP) is associated with the AASHTO Subcommittee on Materials and can be found at [www.ntpep.org](http://www.ntpep.org). NTPEP was established by the AASHTO Board of Directors in 1994 to cooperatively test manufactured transportation products that are of common interest to all member departments and share the results from these laboratory and field evaluations. NTPEP is able to provide coordinated evaluations on various products and materials in the areas of traffic, safety, construction, and maintenance. The program is evaluated every four years for financial viability, its effectiveness, the funding mechanisms to support it, and the need for its continuance. NTPEP is run through a joint funding concept between participating industry and AASHTO members, with revenue from industry being used primarily for the testing of and reporting on their products, and with voluntary member dues used primarily for support services to administer NTPEP. Cost is \$12,000 per year.

### **AASHTO Innovative Initiative (AII) (Formerly TIG)**

Host Agency: AASHTO

TIG was established to identify and champion the implementation of a select few “ready to use” technologies, products, or processes that were likely to yield benefits to the users. TIG scans the horizon for outstanding advancements in transportation technology and invests time and money to accelerate their adoption by agencies nationwide. TIG is associated with the AASHTO Standing Committee on Highways, Research Advisory Committee.

Each year, TIG selects 3-4 highly valuable, but largely unrecognized procedures, processes, software, devices, or other innovations that have been adopted by at least one agency, are market-ready, and are available for use by other interested agencies. TIG’s objective is to share information with AASHTO member agencies, local agencies, and their industry partners to improve the nation’s transportation system. Cost is \$6,000 per year.

## Mississippi Research Work Program 2015

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### **AASHTO Equipment Management Technical Services Program (EMTSP)**

Host Agency: AASHTO

The AASHTO Equipment Management Technical Services Program (EMSTP) was formerly called AETO and can be found at [www.emtsp.org](http://www.emtsp.org). It is associated with the AASHTO Subcommittee on Maintenance and was established in 2008.

Equipment fleets comprise a significant asset investment and are a large portion of all public works agencies' budgets and expenses. The effectiveness of such equipment fleet operations affects the public agencies' ability to adequately perform normal activities and successfully respond to emergency events. In addition, the rate of advancement of technology associated with roadway construction and maintenance equipment is so rapid that it is nearly impossible for individual public agencies to stay abreast of the latest technologies, evaluate these technologies, and implement the most cost-effective technologies to gain the advantages that they could provide.

The AASHTO Equipment Management Technical Services Program (EMSTP) will keep current data pertaining to new types of equipment along with all advancing innovation and technology directly related to equipment fleet. This technical service program will also help advance asset management principles in the management of these fleets. This information will be disseminated throughout the state DOTs to reduce costs of maintenance operations. Cost is \$3,000 per year.

## Mississippi Research Work Program 2015

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### **AASHTO Technical Service Program to Develop AASHTO Materials Standards (DAMS)**

Host Agency: AASHTO

Technical Service Program to Develop AASHTO Materials Standards (DAMS) is associated with the AASHTO Subcommittee on Materials. The primary function of this AASHTO Technical Service Program is to support the participation of member departments at the Subcommittee on Materials annual meeting, which is convened for the discussion of outstanding ballot items, development of new standards, and revisions and updates to current standards. A secondary role may include the financial support for the involvement of professional writers in the development of new specifications or major revisions of current specifications. AASHTO Member Departments will be asked to sponsor this Technical Service Program by contributing a voluntary assessment of \$5,000 per sponsor annually to fund the establishment and ongoing activities of the program. Cost is \$5,000 per year.

### AASHTO Product Evaluation Listing (APEL)

Host Agency: AASHTO

AASHTO Product Evaluation Listing (APEL) is associated with the AASHTO Subcommittee on Materials and can be found at [apel.transportation.org](http://apel.transportation.org). APEL is a web-based technical service program that serves as a clearinghouse for state-level evaluation and testing of new and/or proprietary engineered transportation products. This program offers a substantial cost benefit to member departments, as well as to manufacturers of transportation products. The program allows manufacturers to submit products online for evaluation to multiple agencies. For the member departments, the program allows agencies to customize and automate the work flow process for new product evaluations. The program also shares individual member departments' products evaluations for the benefit of AASHTO, which lowers the evaluation costs. The APEL Council under the Subcommittee on Materials is charged with program guidance and development. Cost is \$1,200 per year.

## Mississippi Research Work Program 2015

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### AASHTO Transportation System Preservation Technical Service Program (TSP2)

Host Agency: AASHTO

Transportation System Preservation Technical Service Program (TSP2) is associated with the AASHTO Subcommittee on Maintenance. Its website is [www.tsp2.org](http://www.tsp2.org). It supports the research, technical, and program needs of the member states in their development and implementation of their own preservation programs for both pavement and bridges. AASHTO, in collaboration with the National Center for Pavement Preservation, has successfully implemented this technical service program to assist states with their pavement preservation efforts, including the establishment of regional pavement preservation partnerships.

An Oversight Panel guides the implementation and operation of the TSP2 program, including representation from the AASHTO Subcommittees on Bridges and Structures, Maintenance, Materials, and Asset Management, and Design's Joint Technical Committee on Pavements, as well as members from each of the AASHTO regions.

TSP2 has proven to be a successful program for pavement preservation and, with its recent expansion, bridges will be incorporated into the program. In this increasingly tight economy, participation in this program will help state DOTs preserve not only their pavements but their bridges as well. Cost is \$20,000 per year.

## Mississippi Research Work Program 2015

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### AASHTO Materials Reference Library (AMRL)

Host Agency: AASHTO

The primary vision of the AASHTO Materials Reference Laboratory (AMRL) is to be the center for promoting quality and achievement of excellence in construction materials testing (CMT). We do this by providing services and tools through our three major programs: the Laboratory Assessment Program (LAP), the Proficiency Sample Program (PSP), and the AASHTO Accreditation Program (AAP). Through these activities, we evaluate testing competency, promote continual improvement, and instill confidence in the laboratories and specifiers that use our programs.

AMRL is part of the Engineering and Technical Services division of AASHTO (American Association of State Highway and Transportation Officials), an international leader in setting technical standards for all phases of highway system development. AASHTO represents all fifty states, Washington D.C. and Puerto Rico and serves as a liaison between the state departments of transportation and the federal government. AASHTO is the voice for transportation and strives to educate the public and key decision makers about the critical role that transportation plays in securing a good quality of life and a sound economy for our nation. The cost is \$6,666.66 per year.

## Mississippi Research Work Program 2015

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### AASHTO Cement and Concrete Reference Laboratory (CCRL)

Host Agency: AASHTO

In the early part of the 20th century, various organizations, including the National Institute of Standards and Technology (formerly the National Bureau of Standards), the U.S. Army Corps of Engineers, the American Society of Civil Engineers, ASTM Committee C-1 on Cement, and the Portland Cement Association, began efforts to standardize the specifications and methods for testing portland cement. This eventually led to the establishment of the Cement Reference Laboratory (CRL) in 1929 at NIST with ASTM Committee C-1 as its sponsor. Inspection of laboratories was designated as the primary CRL activity. Until 1947, laboratory inspections were limited to laboratories performing physical tests on hydraulic cements. The inspection activity was gradually expanded to include concrete testing and ASTM Committee C-9 on Concrete and Concrete Aggregates became a joint sponsor in 1958. The name Cement and Concrete Reference Laboratory (CCRL) was adopted in 1960. The CCRL Laboratory Inspection Program has expanded in scope over the years to include cement, concrete, aggregate, steel reinforcing bars, pozzolan, and masonry materials (mortar and solid units). Over 1100 laboratories in the United States, Canada and Mexico currently receive inspections.

The second major CCRL activity is the distribution of proficiency samples for interlaboratory testing. The first portland cement sample was distributed in 1936. Samples have been added over the years with the current program including portland cement, blended cement, masonry cement, portland cement concrete, pozzolan, and masonry materials (mortar and solid units). Participation levels vary from 46 laboratories in the masonry mortar program to 1106 in the portland cement concrete program. The cost is \$6,666.67 per year.

## Mississippi Research Work Program 2015

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### **AASHTO Accreditation Program (AAP)**

Host Agency: AASHTO

The AASHTO Accreditation Program (AAP) was established in 1988 as a means of formally recognizing the competence of testing laboratories to perform specific tests on construction materials. AAP is a voluntary program that is available to all testing laboratories including government, commercial, university, and research facilities. There are nearly 1,500 individual laboratories that are currently accredited through AAP, making it the largest accrediting body of construction materials testing laboratories. AAP utilizes laboratory assessment and proficiency sample services provided by the AASHTO Materials Reference Laboratory (AMRL) and the Cement and Concrete Reference Laboratory (CCRL). AMRL provides administrative coordination and technical support for AAP. The cost is \$6,666.67 per year.

## Mississippi Research Work Program 2015

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### **AASHTO Safe, Reliable, and Secure Transportation Operations (SAFETY)**

Host Agency: AASHTO

AASHTO member departments coordinate and cooperate with other public safety agencies and highway safety partners to develop and implement programs for improving safety on all public roads. The Highway Safety Policy and Management technical service program will support member departments' and AASHTO's highway safety efforts. This program began as the Safe, Reliable, and Secure Transportation Operations program and is being modified to reflect its focus on highway safety.

To work toward the goal of reducing highway fatalities by half in two decades, and reflecting the partnerships state DOTs have, AASHTO participates in the State Highway Safety Alliance to coordinate positions on transportation funding; the Toward Zero Deaths national steering committee to promote AASHTO's perspectives on developing and implementing a national strategy on highway safety, and in efforts with individual safety partners representing the multidisciplinary approach to highway safety. This program supports the role of the AASHTO Program Manager for Safety in these activities and others, such as Highway Safety Manual development and implementation and update of the AASHTO Strategic Highway Safety Plan. It also supports staff efforts to revise and implement safety-related publications, and to coordinate AASHTO input into publications of other organizations.

The program supports two AASHTO committees: Standing Committee on Highway Traffic Safety's and the SCOHTS Subcommittee on Safety Management. [Note: This program was established in October 2008 as the Safe, Reliable, and Secure Transportation Operations program. The cost is \$10,000 per year.

## Mississippi Research Work Program 2015

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### AASHTO Load and Resistance Factor Design (LRFD)

Host Agency: AASHTO

Load and Resistance Factor Design (LRFD) Bridges and Structures Specification Maintenance (LRFD) is associated with the AASHTO Subcommittee on Bridges and Structures. On April 21, 2002, the AASHTO Board of Directors approved policy resolution PR-4-02 endorsing the project, "Long-Term Maintenance of Load and Resistance Factor Design (LRFD) Specifications." In order to continue funding for these purposes, a Transportation Pooled Fund, TPF-5(068) was set up with the Iowa DOT, and states were able to contribute to the fund. This pooled fund has been successfully in place since 2003. The AASHTO Highway Subcommittee on Bridges and Structures unanimously approved the need for continuing to fund this program at their annual meeting in May of 2006. The pooled fund program through Iowa DOT was extended until Fiscal Year 2010, at which point it was closed out. Because the LRFD specifications still need further research and development to maintain quality documents, AASHTO has determined the necessity of keeping this program in place and has now taken over the program as an AASHTO Technical Service Program. In December of 2009 FHWA determined that this program met the criteria for use of 100% State Planning and Research (SP&R) funds. This program continues to support the maintenance and updating of all the LRFD Design specifications. Cost is \$10,000 per year.

## Mississippi Research Work Program 2015

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### Transportation Research Board Correlation Service

This service provides for subscription to a "Research Correlation Service" from the Transportation Research Board, a service established and operated in accordance with the recommendation of the Executive Committee of AASHTO. The activities supported by this subscription include the collection of available information concerning past, current and proposed research related to transportation from all sources including federal, state and other government agencies, colleges and universities, research and planning organizations, transport operators and industry, as well as the TRB Annual Meeting and conference programs; the study and correlation of this information through the work of the committees of the Board and dissemination of the useful findings of research and other information by all feasible means including the several TRB publication series, the output of the Transportation Information Services, and through personal contacts during scheduled field visits by the TRB professional staff. Funding for the TRB Correlation Service is paid using 75% SP&R Part I and 25% SP&R Part II funds.

**Cost Estimate for 2015 SPR Part II Funds: \$31,947.29**

## Mississippi Research Work Program 2015

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### Mississippi Participation in NCHRP

The Mississippi Department of Transportation contributes to the National Cooperative Highway Research Program (NCHRP). NCHRP is a special-purpose program administered by the Transportation Research Board (TRB) under a three-way agreement among the National Academy of Sciences, AASHTO, and the FHWA. Funding is provided by state highway and transportation agencies at a rate of 5.5% of the agencies' SPR (both Part I & II) funds. Funds for this participation are 100% Federal and thus contain no state match. These pooled funds are used to fund research aimed at solving national or regional problems and can only be spent on problems approved by at least two-thirds of the states. Formal solicitations are made from the states, AASHTO committees, TRB committees and FHWA to develop problem statements. MDOT's annual contribution is paid from 75% SP&R Part I and 25% SP&R Part II funds.

**Cost Estimate for 2015 SPR Part II Funds: \$121,803.52**