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July 6, 2016

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

Dear Mr. Hughes:

**SUBJECT: Amended SPR Part II Research Work Program (SPR-1(98)) for the
Fiscal Period FY 2016: October 1, 2015 to September 30, 2016**

The MDOT Research Division is requesting a change to the FY 2016 research budget to allocate \$1,000.00 to the current FY budget for State Study 276. The amended MDOT Research Work Program for FY 2016 is attached for your information and approval. This proposed program includes an estimated FHWA SPR Part II funding allocation for FY 2016. Your prompt review and approval of this document is requested.

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

Sincerely,

James Watkins, P.E.
State Research Engineer

Attachment
pc: Central File w/attachment
FY 2016 Work Program file w/attachment

APPROVED
JUL 18 2016
DATE

**FOR THE DIVISION ADMINISTRATOR
FEDERAL HIGHWAY ADMINISTRATION**

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July 6, 2016

Mr. Andrew H. Hughes
Division Administrator
Federal Highway Administration
666 North Street, Suite 105
Jackson, MS 39202-3199

Dear Mr. Hughes:

SUBJECT: Certification of amended SPR-1(98) Research Work Program (FY 2016) in Accordance with 23 CFR 420.209(c)

In accordance with 23 CFR 420.209(c), the following certification is submitted to assist in your approval of MDOT's Research Work Program for FY 2016:

"I, James Watkins, State Research Engineer of the State of Mississippi, do hereby certify that the State is in compliance with all requirements of 23 U.S.C. 505 and its implementing regulations with respect to the research, development, and technology transfer program and contemplate no changes in statutes, regulations or administrative procedures which would affect such compliance."

Sincerely,

James Watkins, P.E.
State Research Engineer
Mississippi Department of Transportation

Jansen, Randal (FHWA)

From: Vance, Robbie <rvance@mdot.ms.gov>
Sent: Wednesday, July 06, 2016 1:44 PM
To: Jansen, Randal (FHWA)
Cc: Watkins, James; Smith, Cindy
Subject: Work Program approval
Attachments: Certification Letter amended 7-6-16.pdf; Submission Letter amended 7-6-16.pdf; Final 2016 Work Program July Draft.doc

Randy,

We need to get approval on a minor work program change. The new study that was added on the last round of changes had \$0 budgeted for FY 16. Now, we need to budget \$1,000 for this FY so that it can get programmed in FMS. We need that so that an ADM can be completed to get the contract process underway. Please let me know if you have any questions.

Robbie Vance
Research Liaison
Mississippi Department of Transportation

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Mississippi
Department of Transportation
RESEARCH WORK PROGRAM
'SPR-1(98)', Part II
M56E

For the Fiscal Period
October 1, 2015 to September 30, 2016



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 2016

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GENERAL COMMENTS ON RESEARCH WORK PROGRAM FOR FISCAL YEAR 2016

The SPR Part II research work program allocation for FY 2016 totals \$2,351,331.75 and includes a National Cooperative Highway Research Program (NCHRP) contribution of \$100,220 .00 which is the amount paid in FY 2015, a TRB Correlation Service contribution of \$25,939.25, AASHTO Technical Services Program contributions totaling \$111,200.00, and pooled-fund studies totaling \$320,000.00 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 FY 2016. 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 2016 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 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 future work programs over the life of the state studies. Study proposals for future submissions will be numbered sequentially.

Mississippi Research Work Program 2016

Mississippi FY2016 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	FY2016 Budget	FY2015 Expenditures	Principal Investigator	Agency/Co
Existing State Studies & Internal Line Items										
1	Minor Research Studies	N/A	10/1/2015	9/30/2016	\$0.00	\$0.00	\$50,000.00	\$21,939.04	James C. Watkins	MDOT
2	Long-Term Field Monitoring and Performance of Paving Fabric Interlayer Systems to Reduce Reflective Cracking	184	10/1/2005	6/30/2016	\$218,224.00	\$192,904.54	\$25,319.46	\$4,869.41	Farshad Amini	Jackson State University
3	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	6/30/2016	\$30,000.00	\$1,427.34	\$2,000.00	\$0.00	Bill Barstis	MDOT

Mississippi Research Work Program 2016

Mississippi FY2016 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	FY2016 Budget	FY2015 Expenditures	Principal Investigator	Agency/Co
4	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	6/30/2016	\$20,400.00	\$14,900.00	\$2,000.00	\$1,200.00	Randy Ahlrich	Burns Cooley Dennis, Inc.
5	Full Depth Reclamation for High Traffic Applications	250	2/1/2012	12/31/2015	\$291,975.80	\$289,975.80	\$2,000.00	\$129,020.65	Isaac Howard	Mississippi State University
6	In-House Support to Full-Depth Reclamation for High-Traffic Applications	251	2/1/2012	12/31/2015	\$11,000.00	\$7,993.72	\$2,500.00	\$6,158.29	Alex Middleton	MDOT
7	Evaluation of the WatchDog Weather Station to Reduce Drift from MDOT Spray Trucks	262	10/1/2013	12/31/2015	\$77,748.00	\$44,355.02	\$33,392.98	\$-7,875.07	John Byrd	Mississippi State University

Mississippi Research Work Program 2016

Mississippi FY2016 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	FY2016 Budget	FY2015 Expenditures	Principal Investigator	Agency/Co
8	Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements	263	10/1/2015	12/31/2018	\$639,000.00	\$0.00	\$50,000.00	\$0.00	Allen Cooley	Burns Cooley Dennis, Inc.
9	District Traffic Control Support to Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements	264	10/1/2015	12/31/2016	\$50,000.00	\$0.00	\$20,000.00	\$0.00	Bill Barstis	MDOT
10	Research Division Support to Collection and Evaluation of Core Data for the MEPDG for Overlaid and New Pavements	265	10/1/2013	6/30/2017	\$200,000.00	\$55,263.88	\$100,000.00	\$21,332.32	Bill Barstis	MDOT

Mississippi Research Work Program 2016

Mississippi FY2016 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	FY2016 Budget	FY2015 Expenditures	Principal Investigator	Agency/Co
11	Field Aging Effects on Asphalt Mixed at Different Temperatures and Hauled Different Distances	266	3/1/2014	12/31/2017	\$150,000.00	\$43,819.73	\$82,000.00	\$29,662.36	Isaac L. Howard	Mississippi State University
12	MDOT Research Program Peer Exchange	267	10/1/2014	6/30/2017	\$75,000.00	\$0.00	\$65,000.00	\$0.00	Tulio Sulbaran	University of Southern Mississippi
					Total Technical Assistance		\$50,000.00	\$21,939.00		
					Total State Studies Excluding Tech Assistance		\$384,212.00	\$184,367.00		
					Total Studies Closing in FY 2015			\$19,306.79		
					Total All Continuing 80/20		\$434,212.00	\$225,612.79		

Mississippi Research Work Program 2016

Mississippi FY2016 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	FY2016 Budget	FY2015 Expenditures	PI	Agency/Co
New State Studies for FY 2016										
13	Development of a Data Quality Management Plan for Pavement Management System (PMS) Data	268	10/1/2015	6/30/2017	\$121,436.16	\$0.00	\$75,000.00	\$0.00	Greg Duncan	Applied Pavement Technology, Inc
14	Development of a Setup Prediction Method and Implementation into LRFD Driven Pile Design in Mississippi soils	269	10/1/2015	6/30/2019	\$202,000.00	\$0.00	\$50,000.00	\$0.00	Eric J. Steward	University of South Alabama
15	Continuation of Field Aging Effects on Asphalt Mixed at Different Temperatures and Hauled Different Distances Phase III	270	10/1/2015	12/31/2019	\$155,000.00	\$0.00	\$60,000.00	\$0.00	Isaac Howard	Mississippi State University

Mississippi Research Work Program 2016

Mississippi FY2016 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	FY2016 Budget	FY2015 Expenditures	PI	Agency/Co
16	Knowledge of Effects of Different Mississippi Soil Deposits on Pavement Performance	271	10/1/2015	6/30/2017	\$100,000.00	\$0.00	\$50,000.00	\$0.00	Richard Sheffield	Thompson Engineering
17	MDOT Specific Design Procedure for Chip Seals	272	10/1/2015	6/30/2018	\$200,000.00	\$0.00	\$80,000.00	\$0.00	Isaac Howard	Mississippi State University
18	Update and Documentation of MDOT Warranty Process and Distress Thresholds	273	10/1/2015	6/30/2018	\$200,000.00	\$0.00	\$80,000.00	\$0.00	Feng Wang	Jackson State University
19	Improving Federal Transit Administration (FTA) Transit Vehicle Procurement Process in Mississippi	274	7/1/2016	12/13/2017	\$75,000.00	\$0.00	\$15,000.00	\$0.00	To be determined	Gresham, Smith and Partners
20	Intermodal Project Selection Criteria	275	7/1/2016	12/31/2017	\$75,000.00	\$0.00	\$15,000.00	\$0.00	To be determined	To be determined

Mississippi Research Work Program 2016

Mississippi FY2016 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	FY2016 Budget	FY2015 Expenditures	PI	Agency/Co
21	Soil-Cement Manual of Practice: Interconnected Framework for Pavement Design, Laboratory Mixture Design, and Construction Quality Control/Assurance	276	10/1/2016	12/31/2020	\$350,000.00	\$0.00	\$1,000.00	\$0.00	Isaac Howard	Mississippi State University
					Total New Studies		\$426,000.00			
					Total All 80/20 Expenditures		\$860,212.00	\$225,612.79		

Mississippi Research Work Program 2016

100% Federally Funded FY2016 Studies		
Continuing Pooled Funds		
	FY2015	FY2016
Accelerated Performance Testing on the 2015 NCAT Pavement Test Track	\$210,000.00	\$210,000.00
Improving the Quality of Pavement Surface Distress and Transverse Profile Data Collection and Analysis	\$15,000.00	\$15,000.00
Traffic Control Device (TCD) Consortium	\$15,000.00	\$15,000.00
Southeast Transportation Research Consortium	\$5,000.00	\$10,000.00
Total Continuing Pooled Funds	\$245,000.00	\$250,000.00

Mississippi Research Work Program 2016

Rejoined Pooled Fund Studies for FY2016
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	FY2016
Highway Safety Manual Implementation	\$20,000.00
National Sustainable Pavement Consortium	\$25,000.00
Improving the Quality of Pavement Profiler Measurement	\$15,000.00
Superpave Regional Center, Southeastern Region	\$40,000.00
Traffic Signal Systems Operation and Management	\$25,000.00
Total Rejoined Pooled Funds	\$125,000.00
Total Continuing and Rejoined Pooled Funds	\$375,000.00

Mississippi Research Work Program 2016

AASHTO Technical Services Program

	FY2015	FY2016
AASHTO Load and Resistance Factor Design (LRFD) Bridges and Structures Specification Maintenance (LRFDSM)	\$10,000.00	\$10,000.00
AASHTO Transportation System Preservation (TSP2)	\$20,000.00	\$20,000.00
AASHTO Innovative Initiative (AII) (FormerlyTIG)	\$6,000.00	\$6,000.00
AASHTO Equipment Management Technical Services Program (EMTSP)	\$3,000.00	\$3,000.00
AASHTO Product Evaluation Listing (APEL)	\$1,200.00	\$1,200.00
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 National Transportation Product Evaluation Program (NTPEP)	\$12,000.00	\$17,000.00
AASHTO Technical Service Program to Develop AASHTO Materials Standards (DAMS)	\$5,000.00	\$5,000.00
AASHTO Transportation Curriculum Coordination Council	\$0.00	\$20,000.00
AASHTO Snow and Ice Cooperative Program (SICOP)	\$0.00	\$4,000.00
TOTAL AASHTO TSP		\$116,201.00

Mississippi Research Work Program 2016

NCHRP & TRB

	FY2015	FY2016
Transportation Research Board Correlation Service	\$25,891.75	\$31,947.29
Mississippi Participation in NCHRP	\$121,915.21	\$121,803.52
TOTAL Pooled Funds Including AASHTO, NCHRP & TRB		\$644,952.00

Mississippi Research Work Program 2016

Summary of Work Program Expenditures and Budget FY2015-FY2016

	FY2015	FY2016
SPR PART II ALLOCATION	\$ 2,351,331.75	\$ 2,351,331.75
Obligation Authority	\$ 2,069,171.94	\$ 2,069,171.94
Less NCHRP (Estimated)	\$ (100,220.00)	\$ (121,803.00)
Less TRB (Estimated)	\$ (25,939.25)	\$ (25,939.25)
Less Continuing Pooled Fund Studies	\$ (20,000.00)	\$ (250,000.00)
Less Rejoined Pooled-Fund Studies	\$ (40,000.00)	\$ (125,000.00)
Less New Pooled-Fund Studies	\$ (210,000.00)	\$ -
Less AASHTO TSPs	\$ (87,200.00)	\$ (116,200.00)
Less Peer Exchange	\$ (10,000.00)	\$ (65,000.00)
TOTAL 100% Federal Expenditures	\$ (493,359.25)	\$ (703,942.25)
Plus previous FY Closeout from FMS (FYs 2013 and 2014)	\$ 1,301,088.00	
Plus Carryover from FMIS Previous FY (from Federal Funds Worksheet)	\$ -	\$ 284,466.30
SPR Available for 2015 & 2016 Part II Work Program	\$ 2,876,900.69	\$ 1,649,695.99
plus STATE MATCH	\$ 719,225.17	\$ 329,939.20
TOTAL AVAILABLE FROM SPR PART II	\$ 3,596,125.86	\$ 1,979,635.19
Less Internal Line Items	\$ (819,707.56)	
Less State Study Expenditures Through 7/31/2015	\$ (178,517.10)	
Less Estimated State Study Expenditures 8/1/15 - 9/30/15	\$ (35,703.42)	
Less Projects Closing in FY15	\$ (19,306.79)	
Encumbered Funds	\$ (973,309.37)	
Total State Match Expenditures	\$ (2,026,544.24)	
FY 2016 Total Available SPR Part II + FY 2015 Contingency Funds		\$ 3,549,216.81
Less FY2016 Unencumbered Continuing State Studies, New State Studies, & 80/20 Internal Expenditures		\$ (2,162,648.16)
Contingency Funds	\$ 1,569,581.62	\$ 1,386,568.65

Mississippi Research Work Program 2016

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

	Budget Program FY 2015	Previous FY Expenditures	Total Expended to Date	Total Study Budget
Field Aging Effects on Asphalt Mixed at Different Temperatures and Hauled Different Distances	\$0.00	\$0.00	\$8,600.00	\$64,942.70

PI: Isaac L. Howard

Mississippi Research Work Program 2016

LINE ITEM 1

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 \$25,000 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 2016 budgeted amount: \$50,000.00

State Studies

Continuing State Studies

LINE ITEM: 2

STATE STUDY NUMBER: 184

TOTAL STUDY BUDGET: \$218,224.00

TOTAL STUDY COST TO DATE: \$192,904.54

DATE STARTED: 11/10/2005

COMPLETION DATE: 06/30/2016

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:

Mississippi Research Work Program 2016

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 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.

Mississippi Research Work Program 2016

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:

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.

FY 2015:

The seventh annual survey was completed during this year. The data was used to determine the effectiveness of the paving fabric systems. The data for the last seven years have been preliminary analyzed. This data will be used during the final evaluation of the crack growth. Preliminary relations for the crack growth as a function of time have been developed.

Plans for 2016:

The seventh annual crack survey as well as all prior years 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. This will be done to evaluate the effectiveness of the paving fabric systems to reduce reflective cracking. The effects of several factors including overlay thickness, sealing, and milling on the performance of the paving fabrics will be determined. A final report that covers all the results and conclusions will be provided.

Cost Estimate for FY 2016 \$25,319.46

Mississippi Research Work Program 2016

LINE ITEM: 3

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: 06/30/2016

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.

FY 2008:

Mississippi Research Work Program 2016

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.

FY 2015:

Reviewed distress data.

Plans for 2016:

Review final report.

Cost Estimate for FY 2016 \$2,000.00

Mississippi Research Work Program 2016

LINE ITEM: 4

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: 06/30/2016

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 2016

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.

FY 2015:

Plans for FY 2016:

Review final report

Cost Estimate for FY 2016 \$2,000.00

Mississippi Research Work Program 2016

LINE ITEM: 5

STATE STUDY NUMBER: 250

TOTAL STUDY BUDGET: \$291,975.80

TOTAL STUDY COST TO DATE: \$289,975.80

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 2016

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.

FY 2015:

Progress was made on all tasks where work was left to accomplish at the end of FY2014. Items where progress has occurred include strength variability, gradation variability, durability, traffic opening, specimen curing, wheel tracking, elastic modulus, literature review, and field work on US Highway 49 and US Highway 45 Alt. Analysis and writing are nearing completion as of the end of FY 2015.

Plans for FY 2016:

Complete the three reports and finish the state study. This state study is scheduled to be delivered in three written reports. By the end of FY 2015, at least one of those three reports is scheduled to be complete and to MDOT for review. The remaining two reports are envisioned to be nearing completion by the end of FY 2015, with a considerable amount of the information from both of those reports available to MDOT for review by the end of FY 2015. The remaining work for State Study 250 reports is envisioned to occur early during FY 2016, and with ample time to complete the project on time in December of 2015.

Cost Estimate for FY 2016 \$2,000.00

Mississippi Research Work Program 2016

LINE ITEM: 6

STATE STUDY NUMBER: 251

TOTAL STUDY BUDGET: \$11,000.00

TOTAL STUDY COST TO DATE: \$7,993.72

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:

Alex Middleton

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.

FY 2015:

Performed an automated distress survey of all lanes within project limit in April 2015. Organized coring and falling weight deflectometer (FWD) operations along with Mississippi State periodically during May and June 2015.

Plans for FY 2016:

Follow up with any additional information or data collection as requested by Mississippi State.

Cost Estimate for FY 2016 \$2,500.00

Mississippi Research Work Program 2016

LINE ITEM: 7

STATE STUDY NUMBER: 262

TOTAL STUDY BUDGET: \$77,748.00

TOTAL STUDY COST TO DATE: \$44,355.02

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.

FY 2014:

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

FY 2015:

Compared wind speed data collected by control instrument and Watchdog Weather Station.

Plans for FY 2016:

Project completed.

Cost Estimate for FY 2016 \$33,392.98

Mississippi Research Work Program 2016

LINE ITEM: 8

STATE STUDY NUMBER: 263

TOTAL STUDY BUDGET: \$639,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2015

COMPLETION DATE: 12/31/2018

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.

FY 2015:

Performed an automated distress survey of all lanes within project limit in April 2015. Organized coring and falling weight deflectometer (FWD) operations along with Mississippi State periodically during May and June 2015.

Mississippi Research Work Program 2016

Plans for FY 2016:

Follow up with any additional information or data collection as requested by Mississippi State.

Cost Estimate for FY 2016 \$50,000.00

Mississippi Research Work Program 2016

LINE ITEM: 9

STATE STUDY NUMBER: 264

TOTAL STUDY BUDGET: \$50,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2015

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

FY 2015:

None

Plans for FY 2016:

Provide traffic control for 67 pavement sample sections

Cost Estimate for FY 2016 \$20,000.00

Mississippi Research Work Program 2016

LINE ITEM: 10

STATE STUDY NUMBER: 265

TOTAL STUDY BUDGET: \$200,000.00

TOTAL STUDY COST TO DATE: \$55,263.88

DATE STARTED: 10/01/2015

COMPLETION DATE: 06/30/2017

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

FY 2015:

None

Plans for FY 2016:

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 2016 \$100,000.00

Mississippi Research Work Program 2016

LINE ITEM: 11

STATE STUDY NUMBER: 266

TOTAL STUDY BUDGET: \$150,000.00

TOTAL STUDY COST TO DATE: \$43,819.73

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.

FY 2014:

Progress was made in reviewing literature and preparing specimens for outdoor aging.

FY 2015:

Literature review, specimen removal from outdoor aging, laboratory mixture testing, and laboratory binder testing were performed during FY 2015.

Plans for FY 2016:

Continue to work on literature review, specimen removal from outdoor aging, laboratory mixture testing, and laboratory binder testing.

Cost Estimate for FY 2016 \$82,000.00

Mississippi Research Work Program 2016

LINE ITEM: 12

STATE STUDY NUMBER: 267

TOTAL STUDY BUDGET: \$75,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2014

COMPLETION DATE: 06/30/2017

MDOT Research Program Peer Exchange

RESEARCH AGENCY:

University of Southern Mississippi

PRINCIPAL INVESTIGATOR:

Tulio Sulbaran

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 2016 \$65,000.00

Mississippi Research Work Program 2016

New State Studies for FY 2016

LINE ITEM: 13

STATE STUDY NUMBER: 268

TOTAL STUDY BUDGET: \$121,436.16

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2015

COMPLETION DATE: 06/30/2017

Development of a Data Quality Management Plan for Pavement Management System (PMS) Data

RESEARCH AGENCY:

Applied Pavement Technology, Inc

PRINCIPAL INVESTIGATOR:

Greg Duncan

Objective:

With movement toward transportation asset management, pavement management system (PMS) data quality is more important than ever. MDOT seeks to consolidate existing PMS documentation, review existing practices, and get recommendations for quality improvement.

Cost Estimate for FY 2016 \$75,000.00

Mississippi Research Work Program 2016

LINE ITEM: 14

STATE STUDY NUMBER: 269

TOTAL STUDY BUDGET: \$202,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2015

COMPLETION DATE: 06/30/2019

Development of a Setup Prediction Method and Implementation into LRFD Driven Pile Design in Mississippi soils

RESEARCH AGENCY:

University of South Alabama

PRINCIPAL INVESTIGATOR:

Eric J. Steward

Objective:

Geotechnical engineering, and pile driving in particular, contains a significant amount of uncertainties in the design process. At this point in time, a pile foundations' increase in strength or bearing capacity, over time cannot be quantified. Determination of this long-term bearing capacity can influence both the required pile size and embedment depth and, in turn, would lower project costs considerably. This study intends to develop a pile loading database for MDOT as well as calibrate regionally specific resistance factors required for LRFD (Load Resistance Factor Design) for MDOT projects.

Cost Estimate for FY 2016 \$50,000.00

Mississippi Research Work Program 2016

LINE ITEM: 15

STATE STUDY NUMBER: 270

TOTAL STUDY BUDGET: \$155,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2015

COMPLETION DATE: 12/31/2019

Continuation of Field Aging Effects on Asphalt Mixed at Different Temperatures and Hauled Different Distances Phase III

RESEARCH AGENCY:

Mississippi State University

PRINCIPAL INVESTIGATOR:

Isaac 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 2016 \$60,000.00

Mississippi Research Work Program 2016

LINE ITEM: 16

STATE STUDY NUMBER: 271

TOTAL STUDY BUDGET: \$100,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2015

COMPLETION DATE: 06/30/2017

Knowledge of Effects of Different Mississippi Soil Deposits on Pavement Performance

RESEARCH AGENCY:

Thompson Engineering

PRINCIPAL INVESTIGATOR:

Richard Sheffield

Objective:

MDOT S.O.P. TMD-20-14-00-000, "Centerline Soil Profiles and Standard Design Procedures for Construction of Roadways Through High Volume Change Soils," specifies use of the Mississippi Office of Geology's *Geologic Map of Mississippi* to identify the boundaries/areal extent of geologic units of various soil types distributed across the state. This S.O.P. references eight geologic units that include active clays requiring either replacement or treatment with lime. The MDOT Assistant Chief Engineer – Operations advised that MDOT does not construct rigid pavements within the "Loess" geologic unit due to the erodibility of this type soil. These examples demonstrate that given soil deposits impact selection of pavement type or construction practice.

Mississippi DOT is in the process of implementing the Mechanistic-Empirical Pavement Design procedure for designing rigid and flexible pavements. This effort includes providing the agency with a manual, "Mississippi DOT Pavement ME Design User Input Guide." The current draft manual needs to be enhanced with the addition of a chapter focused on the various soil deposits located throughout the state.

This chapter will capture available institutional knowledge on the general properties of each geological unit of soil deposit and their effects on the performance of pavements constructed thereon. Given geological units requiring special pavement design or pavement foundation considerations will be addressed. This chapter will also list the geologic units that preclude construction of rigid pavements. It is envisioned that the Mississippi Office of Geology's *Geologic Map of Mississippi* will be used as the basis for this chapter with accompanying discussion of each geologic unit and corresponding impact on pavement performance.

Cost Estimate for FY 2016 \$50,000.00

Mississippi Research Work Program 2016

LINE ITEM: 17

STATE STUDY NUMBER: 272

TOTAL STUDY BUDGET: \$200,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2015

COMPLETION DATE: 06/30/2018

MDOT Specific Design Procedure for Chip Seals

RESEARCH AGENCY:

Mississippi State University

PRINCIPAL INVESTIGATOR:

Isaac Howard

Objective:

Historically, the Department has used chip seals as a preventative maintenance treatment on low traffic rural routes. Developing a methodology to design and evaluate the performance of the design is important to produce a cost effective and long lasting product. Currently, the Department sets target application rates for the binder and aggregate based on general material properties. In addition, the current specifications do not make allowance for the condition of the roadway at the time of placement of the chip seal. Basic chip seal design procedures are needed to establish the binder and aggregate application rates considering the actual component materials, environmental factors, traffic, and existing roadway surface condition. As a part of the design procedure, a test method or methods are needed to evaluate the chip seal design to help ensure the durability of the chip seal and help establish construction criteria for rolling, sweeping, and opening to traffic.

Cost Estimate for FY 2016 \$80,000.00

Mississippi Research Work Program 2016

LINE ITEM: 18

STATE STUDY NUMBER: 273

TOTAL STUDY BUDGET: \$200,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2015

COMPLETION DATE: 06/30/2018

Update and Documentation of MDOT Warranty Process and Distress Thresholds

RESEARCH AGENCY:

Jackson State University

PRINCIPAL INVESTIGATOR:

Feng Wang

Objective:

MDOT implemented warranty specifications in the late 1990s as an option on construction/overlay projects. The specification included distress thresholds which, if exceeded, result in the contractor having to take action, from repair to remove and replace. MDOT seeks to do the following: (1) Document the existing warranty process; (2) Revisit the warranty thresholds to see if they need adjustment; and (3) Quantify the distress thresholds in terms of distress quantities and severities rather than deduct points.

Cost Estimate for FY 2016 \$80,000.00

Mississippi Research Work Program 2016

LINE ITEM: 19

STATE STUDY NUMBER: 274

TOTAL STUDY BUDGET: \$75,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 07/01/2016

COMPLETION DATE: 12/13/2017

Improving Federal Transit Administration (FTA) Transit Vehicle Procurement Process in Mississippi

RESEARCH AGENCY:

Gresham, Smith and Partners

PRINCIPAL INVESTIGATOR:

To be determined

Objective:

This study will examine FTA transit vehicle procurement compliance requirements and those of DFA to identify inconsistencies and bottlenecks, and to streamline the process. The principal investigator (PI) will research and clearly delineate all applicable federal and state level regulations and requirements and recommend ways that MDOT can more efficiently navigate this process. The study objective is not to change policy, but to help MDOT better work within the current system.

Cost Estimate for FY 2016 \$15,000.00

Mississippi Research Work Program 2016

LINE ITEM: 20

STATE STUDY NUMBER: 275

TOTAL STUDY BUDGET: \$75,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 07/01/2016

COMPLETION DATE: 12/31/2017

Intermodal Project Selection Criteria

RESEARCH AGENCY:

To be determined

PRINCIPAL INVESTIGATOR:

To be determined

Objective:

MDOT seeks assistance with improving project selection criteria for the modal committees and other decision makers to use in allocating and distributing available project funds.

Cost Estimate for FY 2016 \$15,000.00

Mississippi Research Work Program 2016

LINE ITEM: 21

STATE STUDY NUMBER: 276

TOTAL STUDY BUDGET: \$350,000.00

TOTAL STUDY COST TO DATE: \$0.00

DATE STARTED: 10/01/2016

COMPLETION DATE: 12/31/2020

Soil-Cement Manual of Practice: Interconnected Framework for Pavement Design, Laboratory Mixture Design, and Construction Quality Control/Assurance

RESEARCH AGENCY:

Mississippi State University

PRINCIPAL INVESTIGATOR:

Isaac Howard

Objective:

Develop a soil-cement manual of practice for MDOT that focuses on integrating pavement layer thickness design (MEPDG), laboratory mixture design, and construction quality control/assurance.

Cost Estimate for FY 2016 \$1,000.00

Pooled Fund Studies

Continuing Pooled Fund Studies

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 2016

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 2016

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

FY 2016 - \$15,000

FY 2017 - \$15,000

Mississippi Research Work Program 2016

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

Rejoined Pooled Fund Studies for FY 2016

Highway Safety Manual Implementation

Host Agency: Federal Highway Administration

The Highway Safety Manual (2010), 1st Edition, was published by AASHTO in 2010. The HSM provides the best factual information and tools in a useful form to facilitate roadway planning, design, operations, and maintenance decisions based on precise consideration of their safety consequences. The primary focus of the HSM is the introduction and development of analytical tools for predicting the impact of transportation project and program decisions on road safety.

The AASHTO Standing Committee on Highway Traffic Safety has established a goal to institutionalize the AASHTO Highway Safety Manual (HSM) and its associated analytical tools to make data-driven decisions, advance the science of safety, and to ultimately reduce fatalities and serious injuries. One proposed action in support of that goal is to establish and maintain an HSM Implementation Transportation Pooled-Fund Study.

The objectives of the study are (1) to advance ongoing efforts by lead states to implement the HSM, and (2) to expand implementation to all states. This study would be coordinated with other ongoing and planned implementation activities sponsored by AASHTO, FHWA, and TRB, including NCHRP Project 17-50 "Lead States Initiative for Implementing the Highway Safety Manual." It will also be coordinated with projects that develop content for future editions of the HSM including NCHRP Project 17-45 "Enhanced Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges," NCHRP Project 17-54 "Consideration of Roadside Features in the Highway Safety Manual," and Transportation Pooled-Fund Study TPF-5(099) "Evaluation of Low Cost Safety Improvements."

FY 2016 - \$20,000

FY 2017 - \$20,000

FY 2018 - \$20,000

FY 2019 - \$20,000

Mississippi Research Work Program 2016

National Sustainable Pavement Consortium

Host Agency: Virginia Department of Transportation

The objective of the proposed pooled-fund project is to establish a research consortium focused on enhancing pavement sustainability. The six-year program will be developed in cooperation with the consortium participants and will include at a minimum answering the following research questions:

- (1) What emerging materials, construction practices and pavement systems have the most potential for increasing the sustainability of our road infrastructure? The consortium will review emerging sustainable materials, technologies, products, and pavement systems, how to facilitate their adoption; and what testing, approaches, and methods are needed to adopt these technological improvements.
- (2) What do we need to measure --and how-- to address sustainability in the context of pavement engineering? To start answering this question, it will necessary to identify an appropriate set of metrics that cover all aspects of pavement sustainability and the adaption or development of tools for the assessment of pavement sustainability on a qualitative and quantitative relative scale.
- (3) How do we integrate sustainability consideration into the pavement management processes? This can be answered by looking at how sustainability considerations will affect all aspect of pavement engineering such as planning, design, construction, maintenance, management, and reclamation.
- (4) What changes are needed in our pavement engineering practices to adapt to climate changes? The consortium will investigate the effect of climatic change on pavement engineering in the region in terms of design, construction, and maintenance and management.

FY 2016 - \$25,000

FY 2017 - \$25,000

FY 2018 - \$25,000

FY 2019 - \$25,000

Mississippi Research Work Program 2016

Improving the Quality of Pavement Profiler Measurement

Host Agency: Federal Highway Administration

This research study focuses on providing agencies with information and firsthand experience to address issues and concerns related to profiler operation, equipment, and procedures. There is an increasing need for Department of Transportation to purchase and upgrade profiling equipment to provide network-level and project specific smoothness information. This includes profilers operated at close to posted speed limits that are most often used to determine ride quality on a network-level. The project objectives include:

- Deliver sample procurement specifications, maintenance guidelines, and profile analysis software.
- Establish criteria for verification centers and assist with the development of these locations.
- Develop and deploy a traceable verification center.
- Provide technical review of software that locates surface imperfections that require corrective repair during construction can relate the bumps to the highway users and procure for general distribution. MDOT contributed to this pooled fund from 2003-2006.

FY2003 - \$30,000 FY2004 - \$30,000 FY2005 - \$30,000 FY2006 - \$30,000

FY2011 - \$15,000 FY2012 - \$15,000 FY2013 - \$15,000 FY2014 - \$15,000

Mississippi Research Work Program 2016

Superpave Regional Center, Southeastern Region

Host Agency: Alabama Department of Transportation

The Southeastern Superpave Center has been supported by state agencies through a pooled-fund project that has been largely used to provide training, verify ruggedness of equipment, check equipment calibrations, provide materials research, and aid in keeping agency personnel abreast of changes in asphalt technology. In order to continue the efforts in training, technology transfer, and implementable research, it is essential that the pooled-fund effort be continued.

FY 2016- \$40,000

Mississippi Research Work Program 2016

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

AASHTO Technical Service Programs

AASHTO Load and Resistance Factor Design (LRFD) Bridges and Structures Specification Maintenance (LRFDSM)

Host Agency: AASHTO

Load and Resistance Factor Design (LRFD) Bridges and Structures Specification Maintenance (LRFDSM) 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.

AASHTO Transportation System Preservation (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. 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 2016

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 2016

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. 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 2016

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. 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 2016

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 2016

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 2016

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 2016

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 2016

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. 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.

Mississippi Research Work Program 2016

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.

Mississippi Research Work Program 2016

AASHTO Transportation Curriculum Coordination Council

Host Agency: AASHTO

TC3 launched in summer 2000, with the purpose of improving training opportunities for transportation technical workers, while applying innovative measures to reduce duplication of efforts and costs to state and local transportation agencies. It was developed as a partnership among state departments of transportation (DOTs), Federal Highway Administration (FHWA) and its National Highway Institute (NHI), the American Association of State Highway and Transportation Officials (AASHTO), industry associations and institutes, and academia. It also combined resources and knowledge to develop standardized technical training materials for all stakeholders. The Council's goals included developing a core curriculum to support national priorities that could be used by any agency to improve the skills and qualifications of the transportation technical workforce. The cost is \$20,000.

Mississippi Research Work Program 2016

AASHTO Snow and Ice Cooperative Program (SICOP)

Host Agency: AASHTO

SICOP is a pooled fund effort established by AASHTO in 1994 to identify and fund a series of high-priority winter maintenance research and technology transfer projects. Additionally, if warranted, some SICOP participants contribute additional pooled funds to support one or more specific projects in which they have a special interest. SICOP membership includes the AASHTO member departments, APWA, and NACE.

The projects chosen thus far have been selected through workshops attended by representatives of the participating states and approved by the Winter Maintenance Technical Services Program Committee. Project details can be found at www.sicop.net. SICOP also provides list-serve services to the winter maintenance community through the website. Over 700 winter maintenance enthusiasts from state DOTs, counties, cities, and the private sector use the list-serve. Often answers to difficult operational questions from implementing new and emerging technologies are found by simply posting the question and getting opinions from practitioners. Message strings are archived for easy retrieval and future use. The cost is \$4,000 per year.

Other Federal Programs

NCHRP/TRB

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 2016 SPR Part II Funds: \$31,947.29

Mississippi Research Work Program 2016

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 2016 SPR Part II Funds: \$121,803.52

